RECOMMENDATION FOR ACGME ACCREDITATION OF FELLOWSHIP (CA-4) TRAINING IN OBSTETRIC ANESTHESIOLOGY

Introduction

Obstetric anesthesiology is the subspecialty of anesthesiology devoted to the comprehensive anesthetic management, perioperative care and pain management of women during pregnancy and the puerperium.

The Society for Obstetric Anesthesia and Perinatology (SOAP) is the official component society of the American Society of Anesthesiologists (ASA) representing obstetric anesthesiology. The Board of Directors of SOAP seeks to gain accreditation of fellowship training in obstetric anesthesiology. This proposal documents how obstetric anesthesiology fulfills all the criteria required for a subspecialty to achieve accreditation of fellowship training by the American Council on Graduate Medical Education (ACGME). This application also codifies the body of knowledge that constitutes obstetric anesthesiology and proposes criteria to insure unified standards in training of obstetric anesthesiologists through the Residency Review Committee (RRC) review process. Uniform training requirements and periodic review will assure that future generations of obstetric anesthesiologists will have the clinical, research and educational foundations required to provide high quality, cost-conscious, clinical care to pregnant women; educate generalists and future subspecialists; as well as provide for the development of new knowledge that will benefit pregnant women and their infants.

With this application, SOAP is seeking accreditation of fellowship training in obstetric anesthesiology that will have unique requirements and require the acquisition of knowledge distinct from the core residency in anesthesiology. Accreditation of fellowship training in obstetric anesthesiology has become essential, in part, due to advances in obstetrics and technology that have enabled a greater number of women who have complex obstetric and medical conditions to carry pregnancies to the point of fetal viability or even term. In addition to the altered physiologic and anatomic states that occur during pregnancy, these women also have superimposed pathophysiology and anatomic changes that greatly affect their anesthetic and obstetric management. By the end of the core residency in anesthesiology, few trainees have gained sufficient clinical experience and training to provide optimal care for the complete spectrum of issues presented by pregnant women who have complex medical and obstetric conditions. This limitation in the core curriculum, for those so motivated, would be best addressed by a minimum of one-year (12 month) fellowship training period in obstetric anesthesiology. The following distinctions in the two programs are in place:

1. Core Residency: By the end of the core residency, the general anesthesiologist shall be able to:
    a. Provide safe anesthesia and post-anesthesia care for pregnant women undergoing routine obstetric, diagnostic and therapeutic procedures and to recognize when clinical conditions or the proposed procedure require consultation, skills, a facility or support beyond the capability of the anesthesiologist or institution.
    b. Perform resuscitation of pregnant women and healthy term newborns.

2. Fellowship Program: The subspecialist in obstetric anesthesiology, after at least one year of training, shall have the knowledge and expertise to:
    a. Provide anesthesia care for the full spectrum of pregnant women requiring anesthesia care, particularly those with ***complicated*** medical and obstetric conditions, for all types of obstetric, surgical, therapeutic and diagnostic interventions.
    b. Perform resuscitation, pain management, and critical care specific to pregnant women
    c. Act as a consultant to other generalist anesthesiologists, obstetricians, pediatricians, and nurses and critical care medicine physicians.
    d. Have education and skills required to develop new knowledge and techniques for the anesthetic care of the pregnant woman.
    e. Train future generations of generalists and sub-specialists in obstetric anesthesiology.
    f. To develop obstetric anesthesiology clinical and educational programs.

Accreditation of the subspecialty and uniform training requirements will accomplish the following:

Establish and sustain a cohort of anesthesiologists with the expertise required for the anesthetic management of pregnant women, particularly those with high-risk conditions.

Establish and sustain a cohort of anesthesiologists to develop policies, guidelines, standards, practice parameters and quality management tools to insure the public health and quality anesthesia care of pregnant women.

Establish and sustain a faculty who will upgrade educational and training programs in obstetric anesthesiology for the core residency. The latter is an essential feature in order for anesthesiology residency programs to comply with the ACGME RRC requirements.

Establish and sustain leaders in the specialty for public service, government entities and policy groups.

Establish and sustain a cohort of anesthesiologists having the knowledge and skills to develop new knowledge applicable to the anesthesia care of women during their reproductive years.

Establish and sustain a cohort of anesthesiologist with the knowledge, skills and interest to enhance scholarship in Anesthesiology.

Criteria A: The existence of a body of scientific medical knowledge underlying the subspecialty that is in large part distinct from, or more detailed than, that of other areas in which accreditation is already offered; this body of knowledge must be sufficient for educating individuals in a clinical field, and not just in one or more techniques.

In the last 50 years a large body of knowledge specific to obstetric anesthesiology has been developed through clinical practice and laboratory and clinical research. The growth of obstetric anesthesiology has paralleled the growth of obstetrics, particularly maternal-fetal medicine. For example, an increasing number of women with chronic illnesses and complex obstetric conditions are able to conceive and sustain pregnancies to the point of fetal viability and delivery. The anesthetic care of these women has advanced lock-step with the availability of improved obstetric care. The depth and breadth of obstetric anesthesiology is found, in part, in current anesthesiology textbooks. There are chapters pertaining to obstetric anesthesiology in all the major comprehensive textbooks, such as Miller's "Anesthesia" and Barash et al's "Clinical Anesthesia" which are used in the core program. The need for more comprehensive obstetric anesthesiology textbooks was recognized as early as 1967 when John J. Bonica wrote the first encyclopedic textbook of obstetric anesthesiology. Since then there have been many textbooks, updated regularly, summarizing the knowledge base and clinical practice, which constitutes the subspecialty of obstetric anesthesiology. Current major textbooks devoted to obstetric anesthesiology are:

1. Chestnut's "Obstetric Anesthesia: Principles and Practice" (3rd edition);
2. Shnider and Levinson's "Obstetric Anesthesia" (4th edition);
3. Van Zundert and Ostheimer's "Pain Relief and Anesthesia in Obstetrics";
4. Norris' "Obstetric Anesthesia";
5. Birnbach et al's "Textbook of Obstetric Anesthesia" (2nd edition).

Furthermore, related textbooks in obstetrics and maternal-fetal medicine, such as William's "Obstetrics" (21st edition), Reece et al's "Medicine of the Fetus and Mother" (2nd edition), Clark et al's "Critical Care Obstetrics (4th edition), all include chapters written by obstetric anesthesiologists. In addition, numerous monographs and hundreds of peer reviewed original research articles related to obstetric anesthesiology are published in anesthesiology, obstetric, pediatric and other related journals.

The official journal of SOAP is ***Anesthesiology***, which is one of the most prestigious journals in anesthesiology and has the largest circulation of any anesthesiology journal, with over 45,000 subscribers worldwide. The editorial board includes editors and associate editors who are recognized experts in the field of obstetric anesthesiology. The journal publishes original articles on all aspects of obstetric anesthesiology, review articles dealing with new and controversial topics, as well as editorial opinions and case reports. ***Anesthesia & Analgesia***, the other major journal of anesthesiology in the United States, has a circulation of approximately 35,000 and maintains a distinct section devoted to obstetric anesthesiology (with its own subspecialist section editor). Most importantly, there is also a high quality, indexed journal solely dedicated to obstetric anesthesiology, viz. ***International Journal of Obstetric Anesthesia***. The high volume of articles related to obstetric anesthesiology has resulted in publication of a quarterly review, ***Obstetric Anesthesia Digest***, where current articles are summarized and critiqued. A pertinent bibliography of recent textbooks and monographs is attached (**Appendix 1**).

Criteria B: The existence of a sufficiently large group of physicians who concentrate their practice in the proposed subspecialty area; information should include the number of physicians, the annual rate of increase in the past decade in the number of such physicians, and their present geographic distribution.

There are approximately 4 million births in the United States every year (1). Of these, over 1 million are by cesarean delivery requiring the administration of a major anesthetic (1). In addition, the majority of women having a vaginal delivery receive neuraxial pain relief during labor (1). The most comprehensive data is found in a survey of obstetric anesthesia manpower sponsored by several professional organizations conducted at 10-year intervals (1-3). The most recent report for the year 2001 was just published in 2005. The most resounding finding of the 2005 survey is that there continues to be a dramatic increase in the demand for obstetric anesthesia since publication of the 1981and 1992 surveys (1-3). In the most recent survey, the number of women who do not use some form of pain relief during labor decreased whereas there was a tripling in the number of women opting for regional analgesia techniques (spinal and epidural analgesia) since 1981 (1-3). For instance, in hospitals having greater than 1500 births/year, the proportion of laboring women having regional anesthetics increased from 22% in 1981 to 61% in 2001. In 1992, the survey suggested that 1500 anesthesiologists devoted their practice to obstetric anesthesiology. Although the most recent survey did not ask that question directly, the number of physician anesthesiologist providing regional analgesia for labor has increased from 70% in 1981 to 98% in 2001 in the larger units (1-3). We anticipate that uniform fellowship training requirements and the resultant enhanced education specific to obstetric anesthesiology in the core residency will motivate a greater number of physicians to practice obstetric anesthesiology.

Criteria C: The existence of national medical societies with a principal interest in the proposed subspecialty area; information should include the number of peer-reviewed journals published in the specialty area as well as how many national and regional meetings are held annually.

The SOAP was formed in 1965 by a small group of prominent obstetric anesthesiologists who, even then, recognized the need for enhancing education, research and clinical anesthesia care of women during the peripartum period. Today, the society has grown to 1100 active members.

SOAP sponsors a fully accredited annual four day meeting (**Appendix 2:** 38th annual meeting program) in the spring, which is an international forum for discussion of all aspects of obstetric anesthesiology and related disciplines. Attendance at the annual SOAP meeting is approximately 50% of the membership or 550 attendees. The educational mission of the annual meeting is met through lectures, problem-based case discussion, debates, oral and poster presentations, and keynote speakers. The abstracts of research works presented at the annual meeting are published in ***Anesthesiology*** and distributed to over 45,000 subscribers (**Appendix 3:** abstract volume). In addition, SOAP and the American Society for Regional Anesthesia and Pain Management (ASRA) have held two joint winter meetings focusing primarily on obstetric anesthesiology. In addition, ASRA sponsors a yearly annual meeting with approximately 750 registrants with substantial time dedicated to obstetric anesthesiology by recognized authorities in the subspecialty.

Obstetric anesthesiology is also an important part of the annual meeting of the American Society of Anesthesiologists. Approximately 15-20% of the meeting, which has a registration of over 20,000, is devoted to refresher courses, panels, poster sessions and problem based learning discussions in obstetric anesthesiology. Most recently, obstetric anesthesiology was selected to be a subspecialty target program in the reorganization of the ASA annual meeting program featuring sub-specialty content/tracks. The International Anesthesia Research Society, and state anesthesiology organizations, such as in California (CSA) and New York (PGA), sponsor large annual meetings with significant time allotted to education and discussion within the subspecialty. There are also various well-attended stand-alone annual review meetings (**Appendix 4**), such as:

Sol M. Shnider Obstetric Anesthesia (University California –San Francisco),
TACO (Baylor College of Medicine)
Virginia Apgar Seminar (Frank Moya Associates)

Each of these is 3-4 day meeting solely dedicated to the clinical practice of obstetric anesthesiology. In addition, most comprehensive anesthesiology meetings and review courses include specific sessions devoted to obstetric anesthesiology.

The American Society of Anesthesiologists recognizes the importance of education, research and clinical care in obstetric anesthesiology by maintaining a standing Committee on Obstetric Anesthesia. Furthermore, the ACOG has an active Committee on Obstetric Practice that includes an obstetric anesthesiologist liaison who also is a member of the SOAP Board of Directors and the ASA Committee on Obstetric Anesthesia. These two committees jointly and separately have promulgated a number of guidelines, technical bulletins, communications specific to safeguarding and enhancing the clinical practice of obstetric anesthesiology (**Appendix 5: Guidelines and Parameters, Optimal Goals)**.

As stated earlier, ***Anesthesiology*** is the official journal of SOAP and publishes original articles, case reports, medical intelligence reviews, and editorials on obstetric anesthesiology. A section on obstetric anesthesiology with a dedicated editor, is part of one of the oldest journals in our specialty, ***Anesthesia & Analgesia*** (circulation 35,000). There is also a refereed and indexed journal exclusively dedicated to obstetric anesthesiology, ***the International Journal of Obstetric Anesthesia.***

In addition to the many textbooks, there exist high-quality, educational publications, such as Bailliere's Clinical Obstetrics and Gynaecology, International Anesthesiology Clinics, Seminars in Anesthesia, and the ASA's own Refresher Course Series, which regularly issue volumes on obstetric anesthesiology.

SOAP publishes a newsletter (3 times a year) containing educational articles written by members of the Education and Publication Committees (**Appendix 6:** Newsletter). The ***Obstetric Anesthesia Digest*** is published quarterly. In it, leading obstetric anesthesiologists summarize and critique articles that are published not only in obstetric anesthesiology but also in the obstetric, pediatric and public health literature.

Criteria D: The regular presence in academic units and health care organizations of educational programs, research activities, and clinical services such that the subspecialty is broadly available nationally and sufficient to improve the quality of healthcare by providing high standards of medical education.

An estimated 4 million births occur in the United States each year and almost all require anesthetic intervention for relief of pain during labor or for operative delivery, including forceps and cesarean section (1). Additional specialized anesthesia care is required for women having non-obstetric surgery during pregnancy and procedures during the immediate post-partum period. An estimated 75,000 women each year in the United States will also undergo nonobstetric surgery during their pregnancy. It is important to provide education

regarding the specific alterations in maternal physiology during the different stages of pregnancy, the effects of anesthesia and surgery on utero-placental perfusion, and measures to prevent adverse reproductive outcome in these women. Furthermore, new developments in infertility and fetal surgery likewise require specialized anesthesia care. Thus, a significant number of women during their reproductive years will require the services of health care professionals knowledgeable and experienced in the special anesthetic needs of women during this period of their lives. This unique obstetric anesthesia knowledge and experience needs to be acquired through fellowship training directly supervised by physicians who are expert in obstetric anesthesiology. This is particularly true in light of the fact that women with infertility and complicated medical problems, which present unique challenges to anesthetic management, are now able to carry a gestation to fetal viability. Furthermore, societal factors leading to poverty, increasing substance abuse, an alarming rate of teenage pregnancy, violence and systemic infections in pregnant women heightens the challenges of present day obstetrics and obstetric anesthesiology. In addition, up to 3% of pregnant women have significant cardiac disease. Indeed, cardiac disease is now the leading cause of maternal mortality. With advances in cardiac surgery and other interventions, more women with partially or fully corrected complex congenital heart disease are surviving to reproductive age. Morbid obesity has recently emerged as an increasing public health problem which poses specific challenges to the anesthesiologist with respect to pathophysiology, the presence of co-morbidities, and technical difficulties. There is a heightened risk of pregnancy in the morbidly obese woman due to the additional strains on the cardiorespiratory system, not only during gestation but also particularly during labor, delivery and the post-partum period. Morbidly obese pregnant woman have a higher risk of cesarean delivery as well as the potential for macrosomia and shoulder dystocia if delivering vaginally, as compared to women of normal weight.

The ACGME, ACOG, and the American Board of Medical Specialties (ABMS) through the creation of maternal-fetal medicine and medicine of pregnant woman as areas of special competence in obstetrics and internal medicine, have already contributed significantly to the training of experts proficient in caring for the medical and obstetric needs of women. In fact most major medical centers have specialists in maternal-fetal medicine and neonatology working together with obstetric anesthesiologists to care for complicated obstetric patients. Internal medicine, through the North American Society for Obstetric Medicine (NASOM) has also recognized the increasing need for education, scholarly output and clinical care of pregnant women with medical conditions. It is now time for SOAP, ASA, ABA and the ACGME to ensure that the anesthetic and critical care needs of pregnant women are guaranteed for future generations through accreditation of fellowship training in obstetric anesthesiology.

According to the most recent Obstetric Anesthesia manpower survey (1), there has been a consolidation of obstetric care into the larger maternity units (> 1500 deliveries/year) away from the small units (< 500 deliveries/year). The ASA,

ACOG, and American Academy of Pediatricians (AAP) Guidelines recommend that anesthesiology departments in these large medical centers, and most centers performing a significant number of deliveries, have anesthesiologists on the medical staff who are sub-specialists in obstetric anesthesiology **(Appendix 5: Optimal Goals for Anesthesia Care in Obstetrics, Guidelines for Perinatal Care)**. In the case of centers with accredited anesthesiology residencies, there **must be** a Section Chief for Obstetric Anesthesiology, who in addition to providing clinical service, leads the education and teaches the core curriculum in obstetric anesthesiology to residents. Obstetric and pediatric residents, subspecialty fellows in maternal-fetal medicine and neonatology, as well as nurses and other health care professionals also benefit from having subspecialists in obstetric anesthesiology on the medical staff. Indeed, fellowship training requirements in maternal-fetal medicine recognize that an active obstetrical anesthesiology service is essential to the comprehensive success of their fellowships. Indeed, the presence of an anesthesiologist with expertise in obstetric anesthesia is required.

The potential impact of obstetric anesthesiology and the effect of accredited fellowship training on the quality and cost of women's health care have not been fully assessed. However, indirect evidence of the impact of obstetric anesthesiology is available. The educational and training efforts of obstetric anesthesiologists have contributed to a reduction in the number of maternal deaths directly related to anesthesia over the past two decades. Heightened awareness regarding the particular hazards of general anesthesia and managing airway catastrophes in pregnant women, as well as advances in regional anesthesia techniques, are just two obstetric anesthesia refinements that have made this improvement possible (4). A key component in reducing maternal mortality related to anesthesia, particularly in emergency situations, has been education of obstetricians and anesthesiologists through SOAP, the ASA and ACOG. Obstetric anesthesiologists perform the laboratory and clinical studies necessary to improve clinical practice. For instance, general education and training provided by obstetric anesthesiologist have reduced the case fatality rate related to anesthesia in the United States in the 11-year interval from 1979 – 1990 (4). Improperly administered analgesics/anesthetics may affect the progress of labor and result in an increased risk of forceps/cesarean delivery at an increased public health cost. An increased cesarean delivery rate due to the side effects of pain relief during labor would constitute an enormous health-financing burden considering the widespread demand for pain relief during labor. Clinical practices introduced by obstetric anesthesiologists have resulted in the use of ultra-low dose local anesthetic-opioid combinations, the introduction of "walking epidurals", and the development of the combined spinal-epidural technique (CSE). The culmination of these efforts is that analgesia during labor currently is a safer, more clinically effective and more cost effective option for women during childbirth than previously. Other studies have demonstrated that an obstetric anesthesiologist overseeing an on-demand epidural service resulted in an increase in the use of epidurals for labor while at the same time the cesarean

delivery rate decreased (5). Most recently, a manuscript published in the New England Journal of Medicine, indicated that the rate of cervical dilation was greater and the length of the first stage of labor shorter, when neuraxial analgesia (CSE) was instituted during the latent as compared to active phase of labor (6).

Obstetric anesthesiologists have been advocates in a national debate regarding the right of women to have adequate and safe pain relief during labor. A consensus has emerged that safe and effective pain relief during labor is a human right regardless of cost or ability to pay **(Appendix 5: ASA-ACOG Statement on Pain Relief During Labor)**. Furthermore, obstetric anesthesiologists have introduced new modalities for pain relief that increase therapeutic options, such as patient-controlled epidural analgesia. Obstetric anesthesiologists also provide valuable consultation to many specialties in the management of women during pregnancy, particularly during the puerperium. The role of the obstetric anesthesiologist extends beyond clinical care into areas to improve knowledge and education of nursing staff and expectant parents. Expectant parent classes and in-house nursing and midwife training and education programs have been introduced by obstetric anesthesiologists'.

The effects of improperly administered anesthetics can have devastating consequences to mother and infant at a tremendous financial and societal cost. It is difficult to measure, as it is for other subspecialties of anesthesiology, what effect training of fellows and generalist anesthesiologists by sub-specialists will have on the quality, cost and safety during the anesthetic management of pregnant women. Nonetheless, it seems logical and predictable that fellowship training will improve outcomes, particularly for those women and their babies at greatest risk. The dramatic reduction in maternal deaths related to anesthesia paralleled by the growth of obstetric anesthesiology suggests that better training in obstetric anesthesiology improves the care of pregnant women. Indeed, the most comprehensive data is found in the Confidential Inquiries into Maternal Deaths in the United Kingdom: Why Mothers Die. In the latest triennium report, lack of subspecialty knowledge and skill in obstetric anesthesiology was deemed to be the major factor in maternal mortality directly related to anesthesia care (7).

Recent efforts at health care reform have centered on greater emphasis on primary and preventive rather than specialty care. The continuous assaults on academic medical centers by the government and health insurance industry have seriously threatened the viability of obstetric anesthesiology fellowship training programs. Therefore, fellowship accreditation in obstetric anesthesiology holds great importance to women's health. In the early 1990's, a period of great deliberation in American health policy, the ACGME recognized that new subspecialties must develop:

"We also focused ACGME activities on determining whether to extend accreditation to additional areas of medical education. We deliberated

extensively before expanding our accreditation oversight, recognizing the widely held perception that, in the aggregate, the country does not need more specialists. However, the constant advancement of medical knowledge opens new diagnostic and therapeutic possibilities. And, as these discoveries move from experimental procedures to common practice, we believe the quality of training programs in these areas needs to be maintained through regular, objective review"

(John Gienapp, Ph.D.
Executive Director ACGME
1994 Annual Report)

Furthermore, a recent special article in ***Anesthesiology*** by Schwinn and Balser suggested that the future of academic anesthesiology was threatened, in part, by the lack of formal recognition and development of subdisciplines of anesthesiology (8). Thus, an added benefit of accreditation of subspecialty training in Anesthesiology may improve scholarship in addition to enhancing patient care.

The overall public health costs of accrediting obstetric anesthesiology fellowship training should not negatively impact the overall health care costs. In fact, the cost may decrease even further. For instance, obstetric anesthesiologists have been critical in reducing pre-cesarean delivery admission, laboratory tests and post-cesarean delivery length of stay, as well as reducing the risk of cesarean delivery related to neuraxial techniques of pain relief. Length of stay has been shortened by the widespread use of neuraxial techniques for post-cesarean delivery analgesia. These techniques result in mothers ambulating early, avoiding maternal and neonatal sedative effects of systemically administered narcotics (which cross into breast milk) and being able to rapidly assume care for their infants, even in the immediate post-operative period. Indeed, obstetric anesthesiologist have explored and developed techniques that not only provide safe and effective pain relief but also enhance a woman's autonomy during a most stressful interval. The popularity and appeal of pain relief during labor has been well documented in the lay press.

Criteria E: The growth of the subspecialty to the extent that the projected number of programs to be accredited will be sufficient to assure that accreditation is a cost-effective method of quality evaluation.

The ASA Committee on Anesthesia Subspecialties conducts annual surveys of all anesthesiology program directors to determine the number of anesthesiologist in training beyond the core curriculum residency. In the 10-year period since 1990, there has been a steady increase in the number of residents selecting a CA-4 fellowship from 62 in 1990 to 547 in 1998 and 523 in 1999. According to the results of a recent SOAP survey, there were at least 26 fellows pursuing a fellowship in obstetric anesthesiology in 2001. It is difficult to predict with certainty what effect accreditation of obstetric anesthesiology fellowship programs will have on the number of programs offering subspecialty training. At

present, 29 programs advertise a CA-4 fellowship in obstetric anesthesiology on the SOAP website. We believe it is likely that ACGME accreditation of obstetric anesthesiology fellowship training will draw greater numbers of fellows and enhance quality and cost-effectiveness of clinical care, research and education and potentially increase the number of fellowship programs available. We believe that it will also result in a concentration of training in the large maternity units which will have the volume, acuity and mentors to create a generation of robust obstetric anesthesiologists to manage increasing future women's health needs. The fellow to program ratio will not be less than one fellow in each year for which the program is accredited.

Criteria F & G: That the duration of the residency program is at least one year beyond the core specialty; the educational program is primarily clinical.

The duration of fellowship training in obstetric anesthesiology is recommended to be at least one year in addition to the curriculum and training requirements for the core residency in anesthesiology. The fellowship training program is recommended to be primarily clinical with opportunities for additional training in obstetric anesthesiology research during and beyond the first year. Virtually all current programs offering advanced training in obstetric anesthesiology require a minimum of a one-year training period beyond the 3-year core base in anesthesiology. Indeed, over the last decade, training program directors have developed intense subspecialty training in obstetric anesthesiology (and other subspecialties) into a post-residency fellowship with a curriculum and content distinct from that of the core residency **(Program Requirements)**.

Criteria H: The accrediting of programs in the petitioning or proposed subspecialty area has no substantial adverse effect upon programs of the primary specialty or other disciplines.

Accreditation of fellowship training programs in obstetric anesthesiology will not have an adverse effect on anesthesiology or other disciplines. On the contrary, uniform fellowship training programs in obstetric anesthesiology will enhance training in core anesthesiology and benefit related disciplines, particularly obstetrics and maternal-fetal medicine. The goals and objectives of fellowship training in obstetric anesthesiology will be distinct from those of the core residency **(Program Requirements)**. In fact, accreditation of fellowship training in obstetric anesthesiology will ensure that there will be sufficient numbers of rigorously trained experts in the field to adequately educate not only future generations of obstetric anesthesiologists but also residents in the core program. The latter is necessary so that obstetric anesthesiology education in the core residency can be accomplished. This alone ranks as one of the most compelling reasons to accredit, not only training programs in obstetric anesthesiology, but in

other anesthesiology subspecialties as well, such as the ACGME has done with Pediatric Anesthesia and soon, Cardiac Anesthesia.

Because the goals of each curriculum are distinct, competition between core residents and obstetric anesthesiology fellows will only become significant if there are too few obstetric high risk cases or if the number of fellows in an individual program increases to a point that will not support the training requirements and curricula of both programs. In all instances, the needs of the core anesthesiology program must be met first. Nonetheless, an essential part of accreditation review by the RRC of the core and subspecialized programs should be the availability of a sufficient number and varied mix (low and high risk) of obstetric cases to insure that the goals and objectives of the core residency and obstetric anesthesiology fellowship are satisfied. Furthermore, we expect that institutions offering fellowship training in obstetric anesthesiology will be the larger tertiary and secondary referral centers with specialists in maternal-fetal medicine, neonatology, and obstetric medicine.

Obstetric anesthesiologists in medical centers are usually called upon by the obstetric and pediatric departments to collaborate in the training of their own residents and fellows in various aspects of anesthesiology, critical care, and pain management. There should be no negative impact of training programs in obstetric anesthesiology on other disciplines; on the contrary, these other disciplines are likely to benefit from the personnel and educational resources that are available in an institution with an accredited training program in obstetric anesthesiology. Indeed, Internal Medicine has seen the need for specialized training of internists in the medical care of the pregnant woman and ACOG has also developed training and certification in maternal-fetal medicine. Unified training standards through RRC review and accreditation will ensure that future obstetric anesthesiologists are on equal footing with other sub-specialists. It is now time for the field of anesthesiology to recognize the increasing demand for education, scholarly output and clinical care of pregnant woman, particularly during complicated pregnancy.

References:

1. Bucklin B, Hawkins JL, Anderson JR, Ullrich FA. Obstetric anesthesia workforce survey: twenty year update. Anesthesiology 2005; 103:645-53.

2. Gibbs CP, Krischer J, Peckham BM, Sharp H, Kirschbaum TH. Obstetric anesthesia: a national survey. Anesthesiology 1986; 65:298-306.

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4. Hawkins JL, Koonin LM, Palmer SK, Gibbs CP. Anesthesia-related deaths during obstetric delivery in the United States, 1979-1990. Anesthesiology 1997; 86:277-84.

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6. Wong CA, Scavone BM, Peaceman AM et al. The risk of cesarean delivery with neuraxial analgesia given early versus late in labor. N Engl J Med 2005; 352:655-65.

7. Cooper GM, McClure JH on behalf of the editorial board. Maternal deaths from anaesthesia. An extract from Why Mothers Die 2000-2002, the Confidential Enquiries into Maternal deaths in the United Kingdom. Br J Anaesth 2005; 94:417-23.

8. Schwinn DA, Balser JR. Anesthesiology physician scientists in academic medicine: a wake-up call. Anesthesiology 2006; 104:170-8.

Appendix 1

Obstetric Anesthesia Textbooks

Appendix 1: Obstetric Anesthesia Textbooks and Monographs

1. Evidence Based Obstetric Anaesthesia. Ed: Halpern D, Douglas J. Blackwell Publishers, 2005. 432 pages. ISBN: 0727917324X.

2. Obstetric Anesthesia: Principles and Practice, 3rd edition. Ed: Chestnut DH. Mosby-Year, 2004. 1011 pages. ISBN: 0323023576

3. Anesthetic and Obstetric Management of High-Risk Pregnancy. Ed: Datta S. Springer, 2004. 555 pages. ISBN: 0387004432

4. Core Cases in Obstetric Anaesthesia. Eds: Harmer, Clyburn, Collis. Cambridge University Press, 2003. 184 pages. ISBN: 1841101605

5. Shnider and Levinson's Anesthesia for Obstetrics, 4th ed. Eds: Hughes S, Levinson G, Rosen M, Shnider S. Lippincott Williams & Wilkins, 2002. ISBN: 0683306650

6. Handbook of Obstetric Anesthesia. Eds: Palmer C, D'Angelo R, Paech M. BIOS Scientific Publishers Limited, 2002. 266 pages. ISBN 1859962327

7. Obstetric Anesthesia Pocket Reference. Eds: Riley E, Cohen S. Butterworth-Heinemann, 2001. 144 pages. ISBN: 0750671661.

8. Textbook of Obstetric Anesthesia. Eds: Gatt S, Datta S, Birnbach D. Churchill Livingstone, 2000. 864 pages. ISBN: 0443065608

9. Ostheimer's Manual of Obstetric Anesthesia. Eds: Birnbach D, Ostheimer G. Churchill Livingstone, 2000. 345 pages. ISBN: 0443065543.

10. Obstetric Anesthesia Handbook. Ed: Datta S. Hanley & Belfus, 2000. ISBN: 1560534052.

11. Handbook of Obstetric Anesthesia. Ed: Norris MC. Lippincott Williams & Wilkins, 2000. 592 pages. ISBN: 0781718597.

12. Practical Obstetric Anesthesia. Eds: Hood DH, Dewan D. WB Saunders Co., 1997. 385 pages. ISBN: 0721636586.

13. Obstetric Anesthesia and Uncommon Disorders. Eds: Gambling D, Douglas J. Elsevier, 1997. 463 pages. ISBN: 0721661572

14. Clinical Problems in Obstetric Anaesthesia. Eds: Russell IR, Lyons G. Arnold Publishers, 1997. 292 pages. ISBN: 0412716003

15. Pain Relief in Anesthesia in Obstetrics. Ed: Van Zundert A. WB Saunders, 1996. ISBN: 0443044740.

16. Common Problems in Obstetric Anesthesia, 2nd ed. Ed: Datta S. Mosby-Year Book, 1995. 500 pages. ISBN: 0815123485.

17. Principles and Practice of Obstetric Analgesia and Anesthesia. Bonica J, McDonald J. Williams & Wilkins, 1995. ISBN: 0683009303

18. Obstetric Anesthesia, 2nd ed. Ed: Norris MC. Lippincott Williams & Wilkins, 1992. ISBN: 0397511159.

19. Obstetric Anesthesia Pearls. Eds: Ackerman W, Juneja W. McGraw-Hill, 1992. 280 pages. ISBN: 0838571735.

20. Manual of Obstetric Anesthesia. Ed: Ostheimer G. Churchill Livingstone, 2nd ed. 1992; ISBN: 0443087431.

21. Obstetric Anesthesia: Ed: Ramanathan S. Lea & Febiger, 1988. ISBN: 0812111184.

22. Obstetric Anesthesia: The Complicated Patient, 2nd ed. FA Davis Co., 1988. ISBN: 0803649142.

23. Obstetric analgesia and anesthesia: A manual for medical students, physicians in training, midwives, nurses, and other health personnel. Bonica J. World Federation of Societies of Anaesthesiologists; 2nd ed., 1980. 192 pages. ISBN: 0960488200.

Monographs/Series:

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2. Problems in Anesthesia. Lippincott Williams & Wilkins. July 1999, Vol 11, #3. Obstetric Anesthesia Issue. Eds: Bader A, Datta S.

Appendix 2

Syllabus
SOAP Annual Meeting

SOAP 2006 Syllabus

38th Annual Meeting
April 26-30, 2006

The Westin Diplomat Resort & Spa
Hollywood, Florida

The Society for Obstetric Anesthesia and Perinatology is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Society for Obstetric Anesthesia and Perinatology
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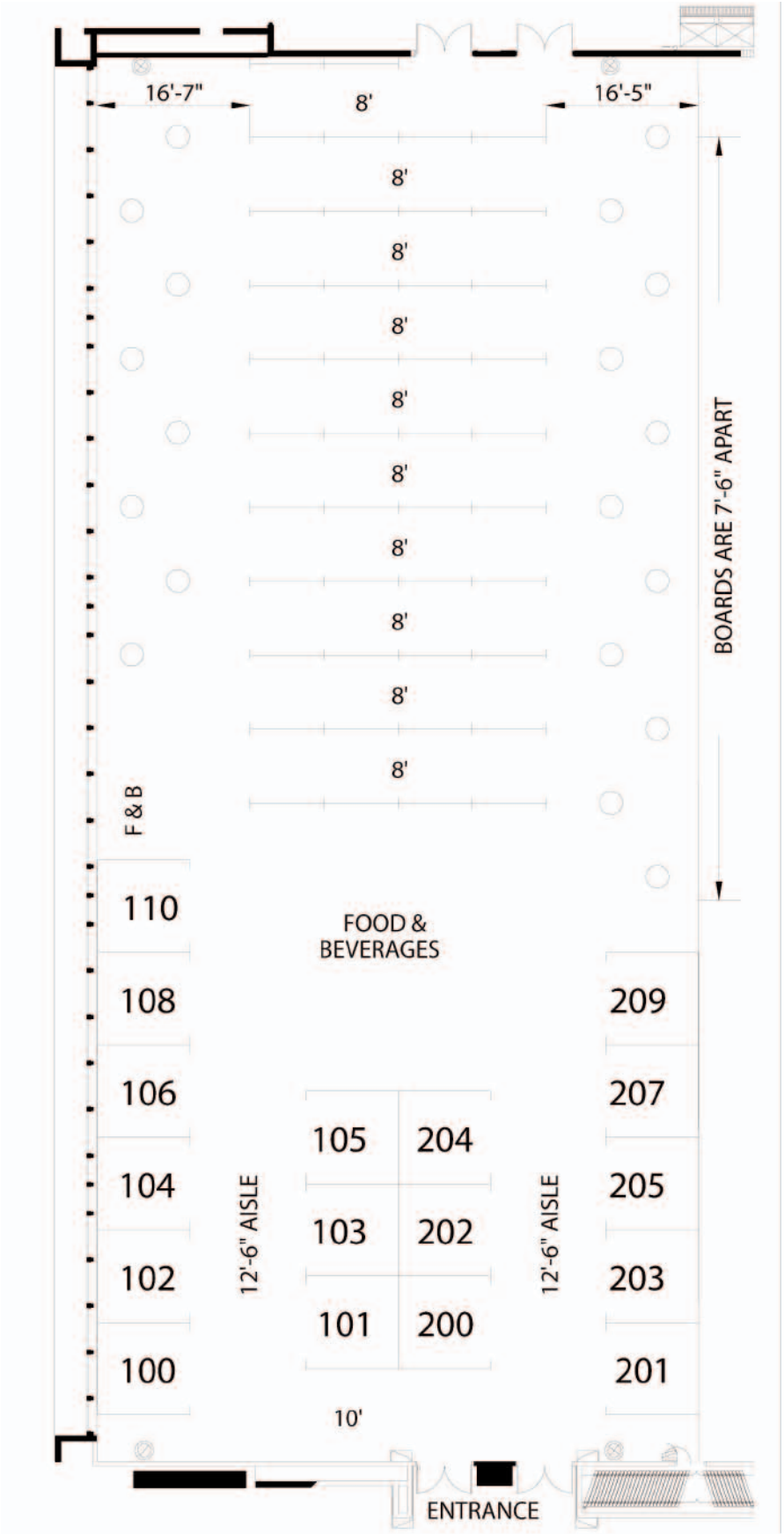
The Westin Diplomat Resort & Spa
Grand Ballroom East • Exhibit Hall/Posters



SOAP 38th Annual Meeting • April 26-30, 2006

Accreditation & Designation

The Society of Obstetric Anesthesia and Perinatology is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Critical Care Obstetric Anesthesia Workshop

The Society of Obstetric Anesthesia and Perinatology designates this educational activity for a maximum of 4 credits in category 1 credits toward the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

38th Annual Meeting

The Society of Obstetric Anesthesia and Perinatology designates this educational activity for a maximum of 26.75 credits in category 1 of the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

Mission of SOAP

The purpose of this Society is to provide a forum for discussion of medical problems unique to the peripartum period and to promote excellence in medical care, research and education in anesthesia, obstetrics, and neonatology.

Mission of SOAP Program Committee

The mission of the Society's Program Committee is to provide anesthesiologists, obstetricians, and other physicians and members of related allied health specialties with the knowledge that will reinforce past learning as well as disseminate new concepts, practices, and skills involving anesthesia and analgesia for the pregnant woman.

Goals of the SOAP 2006 Program

1. To provide ongoing CME activities designed to teach our audience how to best provide analgesia for labor and anesthesia for cesarean delivery and other procedures during pregnancy and postpartum period;
2. To provide an Annual Scientific Meeting to the members as a forum for discussion that includes the opportunity for expression of new clinical insights, presentation of research in progress with discussion of ways to enhance that research, clinical applications of research and courses that will enhance the practice of obstetrical anesthesiology;
3. To provide a forum for discussions dealing with specific issues that will enhance the effectiveness and cost efficiency of obstetrical anesthesia and analgesia;
4. To provide information and a forum for discussion on subjects which have been requested by members of the previous annual meeting and via needs assessment requests.

Educational Format

CME activities may include the following formats: Plenary sessions, debates, lectures, poster discussions, oral abstracts, problem-based learning, and skill-set workshop.

Participants in the SOAP 2006 Program

Attendance shall be open to all health practitioners, provided that they have registered for the meeting. CME credit will only be offered to MDs, DOs or equivalent. A Verification of Participation form must be turned in to SOAP at the conclusion of the meeting. The form will be available in the meeting syllabus and online following the meeting.

Abstract Presenter Disclosures

1. Abstract presenter has no actual or potential relationship(s) that has bearing on the subject matter of this activity.
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Faculty

G. M. Bassell, MD
Wesley Medial Center
Wichita, KS

Yaakov Beilin, MD
Mount Sinai School of Medicine
New York, NY

David J. Birnbach, MD
University of Miami School of Medicine
Miami, FL

Brenda Bucklin, MD
University of Colorado
Denver, CO

William R. Camann, MD
Brigham & Women's Hospital
Boston, MA

Brendan Carvalho, MB, BCh
Stanford University Hospital
Stanford, CA

Jose Carvalho, MD, PhD, FRCPC
Mount Sinai Hospital
Toronto, Ontario, Canada

Sergio Cerda, MD
Universidad de Chile
Santiago, Chile

David Chestnut, MD
Gunderson Clinic
LaCrosse, WI

Patricia A. Dailey, MD
Mills-Peninsula Health Services
Hillsborough, CA

M. Joanne Douglas, MD, FRCP
British Columbia Women's Hospital
Vancouver, British Columbia, Canada

Roshan Fernando, FRCA
Consultant Anesthesiologist
Royal Free Hospital
London, England, United Kingdom

Helene Finegold, MD
Magee Women's Hospital
Pittsburgh, PA

Regina Fragneto, MD
University of Kentucky
Lexington, KY

Robert Gaiser, MD
University of Pennsylvania
Philadelphia, PA

Stephen Halpern, MD
University of Toronto
Toronto, Ontario, Canada

Andrew Harris, MD, MHS
Johns Hopkins University
Baltimore, MD

Joy L. Hawkins, MD
University of Colorado
Denver, CO

David L. Hepner, MD
Brigham & Women's Hospital
Boston, MA

Philip Hess, MD
Beth Israel Deaconess Medical Center
Boston, MA

Samuel Hughes, MD
San Francisco General Hospital
San Francisco, CA

Bupesh Kaul, MD
Magee Women's Hospital
Pittsburgh, PA

Erin Joanne Keely, MD, FRCPC
University of Ottawa
Ottawa, Ontario, Canada

Barbara Leighton, MD
Washington University School of Medicine
St. Louis, MO

Gordon Lyons, MD
St. James Hospital
Leeds, England, United Kingdom

Mary McHugh, MD
University of Pennsylvania Hospital
Pittsburgh, PA

Robert McKay, MD
Wesley Medical Center
Wichita, KS

Howard Minkoff, MD
Maimonides Medical Center
Brooklyn, NY

Professor Warwick Ngan Kee
The University of Hong Kong
Shatin, China

Richard Nishman, MD
University of Colorado
Denver, CO

Faculty

Kiki Palacios, MD
Baylor College of Medicine
Houston, TX

Donald Penning, MD, MSc, FRCPC
Johns Hopkins University
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Linda S. Polley, MD
University of Michigan Medical Systems
Ann Arbor, MI

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Kaiser Permanente Medical Center
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Robert Wood Johnson Medical School
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Northwestern University Medical School
Chicago, IL

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Brigham & Women's Hospital
Boston, MA

Shiv Sharma, MD
University of Texas
Southwestern Medical Center
Dallas, TX

Richard Smiley, MD, PhD
Columbia University
New York, NY

Manuel Vallejo, DMD, MD
University of Pittsburgh
Pittsburgh, PA

Gurinder M. S. Vasdev, MD
Mayo Clinic College of Medicine
Rochester, MN

A. Terry Walman, MD, JD
Annapolis, MD

Jonathan Waters, MD
Magee Women's Hospital
Pittsburgh, PA

Lela Weems, MD
State University of New York -
Downstate Medical Center
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Richard Wissler, MD, PhD
University of Rochester Medical Center
Rochester, NY

David J. Wlody, MD
State University of New York
Downstate Medical Center
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Scientific Program

WEDNESDAY, APRIL 26, 2006

1:00 - 5:00 pm **Critical Care Obstetric Anesthesia Workshop**
(By Ticket Only – Limited Registration) Gurinder M. S. Vasdev, MD; et al.

6:00 - 8:00 pm **SOAP Opening Reception**

THURSDAY, APRIL 27, 2006

7:00 - 7:45 am **Breakfast with Exhibitors; Posters**

7:45 - 8:00 am **Opening Remarks and Welcome**
William R. Camann, MD; David J. Wlody, MD; David J. Birnbach, MD; Jose Carvalho, MD, PhD, FRCPC

8:00 - 9:30 am **Gertie Marx Symposium (6)**
Moderator: G. M. Bassell, MD
Judges: Stephen Halpern, MD; Philip Hess, MD; Alan Santos, MD, MPH; Jonathan Waters, MD; Jess Weiss, MD

9:30 - 9:45 am **Distinguished Service Award**
Awarded to Felicity Reynolds, MD
Presenter: William R. Camann, MD

9:45 - 10:15 am **Coffee with Exhibitors; Posters**

10:15 - 11:30 am **Oral Presentations (5)**
Moderator: Linda S. Polley, MD

11:30 - 12:30 pm **PRO/CON Debate:** A Non-Particulate Antacid Should be Used Routinely in All Patients Undergoing Cesarean Section
Moderator: David J. Wlody, MD
Pro: Yaakov Beilin, MD
Con: Jose Carvalho, MD, PhD, FRCPC

12:30 - 1:30 pm **Lunch with Exhibitors; Posters**

1:30 - 2:30 pm **What's New in Obstetrics?**
Introduction: David J. Wlody, MD
Howard Minkoff, MD

2:30 - 3:30 pm **Zuspan Award Symposium (4)**
Moderator: M. Joanne Douglas, MD, FRCP
Judges: Samuel Hughes, MD; Barbara Leighton, MD; Howard Minkoff, MD; Shiv Sharma, MD

3:30 - 4:00 pm **Coffee Break with Exhibitors; Posters**

4:00 - 6:00 pm **SOAP Business Meeting – Awards Presentations**
Moderator: William R. Camann, MD

FRIDAY, APRIL 28, 2006

6:00 - 7:00 am **Fun Run/Walk**

7:00 - 8:00 am **Breakfast with Exhibitors; Posters**

8:00 - 9:00 am **Oral Presentations (4) –** Moderator: Barbara Scavone, MD

9:00 - 10:00 am **Obstetric Medicine Update: Endocrine Disease in Pregnancy**
Introduction: Joy L. Hawkins, MD
Erin Joanne Keely, MD, FRCPC

10:00 - 10:30 am **Coffee with Exhibitors; Posters**

10:30 - 11:30 am **Poster Review #1 –** Moderator: Cynthia Wong, MD

11:30 - 1:00 pm **Panel: Team Training in Obstetrics**
Moderator: Stephen Pratt, MD
Panelists: Paul Preston, MD; Benjamin Sachs, MD; David Birnbach, MD

1:30 pm **SOAP Golf and Tennis Activities**

Scientific Program

SATURDAY, APRIL 29, 2006

7:00 - 8:00 am	**Breakfast with the Experts** Moderator: Robert Gaiser, MD Experts: Jodie Buxbaum, MD; Jose Carvalho, MD, PhD, FRCPC (Portuguese); Helene Finegold, MD; Regina Fragneto, MD; David Hepner, MD (Spanish); Bupesh Kaul, MD; Gordon Lyons, FRCA; Edward McGonigal, MD; Mary McHugh, MD; Deborah Qualey, MD; Jayanthie Ranasinghe, MD; Edward Riley, MD; Gurinder M. S. Vasdev, MD; Lela Weems, MD
7:00 - 8:00 am	**Continental Breakfast; Posters**
8:15 - 9:15 am	**Gerard W. Ostheimer Lecture: What's New in OB Anesthesia?** Introduction: Brenda Bucklin, MD Roshan Fernando, FRCA
9:15 - 9:45 am	**Coffee Break; Posters**
9:45 - 10:45 am	**Poster Review #2 –** Moderator: Edward Riley, MD
10:45 - 11:45 am	**Fred Hehre Lecture** Introduction: William R. Camann, MD David Chestnut, MD
11:45 - 1:00 pm	**Lunch (On Your Own)**
1:00 - 2:30 pm	**Best Paper Presentations (6)** – Moderator: Gordon Lyons, MD Judges: William R. Camann, MD; Prof. Warwick Ngan Kee; Kiki Palacios, MD; Richard Smiley, MD, PhD
2:30 - 4:00 pm	**Panel: Obstetric Anesthesia and Coexisting Diseases** Moderator: Richard Wissler, MD, PhD Panelists: Brendan Carvalho, MB, BCh; Manuel Vallejo, DMD, MD; Richard Wissler, MD, PhD
4:00 - 5:00 pm	**Open Forum: Proposed Revisions to the ASA Practice Guidelines on Obstetric Anesthesia**
6:00 -11:00 pm	**SOAP Banquet**

SUNDAY, APRIL 30, 2006

7:00 - 7:30 am	**Continental Breakfast**
7:30 - 8:30 am	**Panel: Tort Reform** Moderator: Donald Penning, MD, MSC, FRCPC Panelists: Patricia Dailey, MD; Andrew Harris, MD, MHS; A. Terry Walman, MD, JD
8:30 - 9:30 am	**PRO/CON Debate: Supplemental Oxygen Should Be Used Routinely During Cesarean Section** Moderator: David J. Birnbach, MD Pro: Scott Segal, MD Con: Prof. Warwick Ngan Kee
9:30 - 10:30 am	**Poster Case Reports: You did What? The Best Case Reports of the Year!** Moderator: Robert McKay, MD
10:30 am	**Adjournment**

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SOAP wishes to thank the following Exhibitors for their support of the 2006 Annual Meeting:

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WEDNESDAY, APRIL 26, 2006

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Judges: Stephen Halpern, MD; Philip Hess, MD; Alan Santos, MD, MPH; Jonathan Waters, MD

9:30 - 9:45 am **Distinguished Service Award**
Awarded to Felicity Reynolds, MD
Presenter: William R. Camann, MD

9:45 - 10:15 am **Coffee with Exhibitors; Posters**

10:15 - 11:30 am **Oral Presentations (5)**
Moderator: Linda S. Polley, MD

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4:00 - 6:00 pm **SOAP Business Meeting – Awards Presentations**
Moderator: William R. Camann, MD

NOTES

Gertie Marx Symposium

Moderator: G. M. Bassell, MD
Judges: Stephen Halpern, MD; Philip Hess, MD;
Alan Santos, MD, MPH; Jonathan Waters, MD

Thursday, April 27, 2006
8:00 – 9:30 a.m.

Learner Objective: To discuss and review updates and advances in the practice of obstetric anesthesia.

SOAP A-1 **Sterile Technique Practices (STP) for Obstetrical Neuraxial Analgesia and Anesthesia (ONAAA) - Year 2005 Survey**
L. Grondin, V. Misa, G. Feltus, R. D'Angelo, P. H. Pan;
Wake Forest University School of Medicine, Winston-Salem, NC

SOAP A-2 **Ethnicity and the Distance to the Epidural Space in Parturients**
R. C. D'Alonzo1, E. Campbell[2], W. White[1], M. Noone[2], M. Neumann[2], J. R. Schultz[1];
[1]Duke University Health System, Durham, NC, [2]Loma Linda University Medical Center, Loma Linda, CA

SOAP A-3 **Peripheral Venous Pressure as a Hemodynamic Variable in Pregnant Patients Undergoing Spinal Anesthesia**
A. G. O'Shea1, R. Peterfreund[2], L. Tsen[3], J. Charnin[2], L. Leffert[2], M. Pian-Smith[2];
[1]Brigham and Womens/Mass General Hospital, Boston, MA, [2]Mass General Hospital, Boston, MA, [3]Brigham and Womens Hospital, Boston, MA.

SOAP A-4 **Comparison of Loss of Resistance Technique with Air versus Saline to Identify Epidural Space for Combined Spinal Epidural Labor Analgesia**
L. Grondkin, K. Nelson, L. Harris, P. H. Pan;
Wake Forest University School of Medicine, Winston-Salem, NC

SOAP A-5 **Prophylactic Granisetron does not Prevent Nausea and Vomiting During Elective Cesarean Section Under spinal Anesthesia**
S. Kasodekar, S. Dhumne, M. Balki, J. Carvalho;
Department of Anesthesia, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

SOAP A-6 **Effects of Crystalloid and Colloid Preloads on Coagulation Assessed by Thromboelastography in Parturients prior to Elective Cesarean Section**
A. J. Butwick, P. van der Starre, B. Carvalho;
Stanford University School of Medicine, Stanford, CA.

Distinguished Service Award Presentation

Presenter: William R. Camann, MD

Thursday, April 27, 2006
9:30 - 9:45 a.m.

Felicity Reynolds, MD
2006 Distinguished Service Award

Oral Presentations #1

Moderator: Linda S. Polley, MD

Thursday, April 27, 2006
10:15 – 11:30 a.m.

Learner Objective: To discuss and review updates and advances in the practice of obstetric anesthesia.

SOAP A-7 **Lumbar Dural Sac Width determined by Ultrasound does not Correlate with Sensory Levels of Spinal Anesthesia for Elective Cesarean Section**
C. Arzola, M. Balki, J. Carvalho;
Department of Anesthesia and Pain Management, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada

SOAP A-8 **A Randomized Controlled Trial of the Impact of Combined Spinal-Epidural Analgesia on the Success of External Cephalic Version for Breech Presentation**
J. T. Sullivan, B. M. Scavone, S. Grouper, R. Patel, C. Robles, R. J. McCarthy, C. A. Wong;
Northwestern Feinberg School of Medicine, Chicago, IL

SOAP A-9 **Maternal Heart Rate Variability Before and After Combined Spinal-Epidural Labor Analgesia**
C. A. Wong, M. K. Bokermann, N. T. Diaz, R. J. McCarthy;
Northwestern University, Chicago, IL

SOAP A-10 **Maternal Body Temperature Changes with Intermittent versus Continuous Labor Epidural Analgesia**
V. R. Mantha, V. Ramesh, A. Daftary, M. Vallejo, S. Ramanathan;
Magee-Womens Hospital, Pittsburgh, PA

SOAP A-11 **Simulation in Labor and Delivery: Full Team, in situ drills in a large HMO**
P. Preston[1], J. Nunes[2], S. McFerran[2], N. Corbett[2], B. Merl[2], G. Escobar[2];
[1]Kaiser Foundation Hospital, San Francisco, CA, [2]Kaiser Foundation Hospital, Oakland, CA

PRO/CON Debate:
A Non-Particulate Antacid Should Be Used Routinely in All Patients Undergoing Cesarean Section

Moderator: David J. Wlody, JD

Speakers:
PRO: Yaakov Beilin, MD
CON: Jose Carvalho, MD, PhD, FRCPC

Thursday, April 27, 2006
11:30 a.m. – 12:30 p.m.

Learner Objective: The learner will be able to provide evidence to support or oppose the routine use of a non-particulate antacid prior to cesarean section.

What's New in Obstetrics?

Introduction: David J. Wlody, MD

Speaker: Howard Minkoff, MD

Thursday, April 27, 2006
1:30 – 2:30 p.m.

Learner Objective: The learner will gain knowledge of new research in obstetrics and perinatology pertinent to the anesthetic care of the pregnant patient.

Society For Obstetric Anesthesia and Perinatology

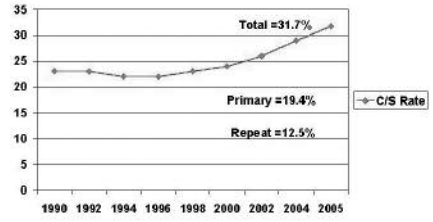
Update in Obstetrics

Howard Minkoff, M.D.

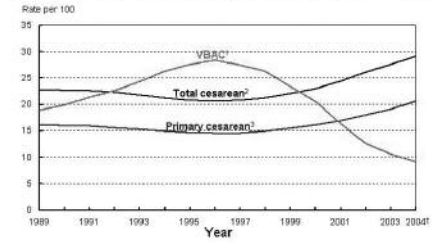
Overview

- **Cesarean Section**
  - Section by Choice
  - Morbidity
  - Mortality
- **Patient Safety**
  - Systems of Care
  - Team Building
- **Late Breakers**

New York State C/S Rate Data

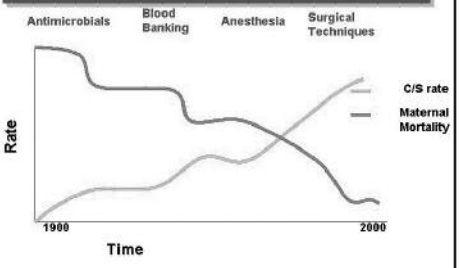


National Cesarean Section Rate

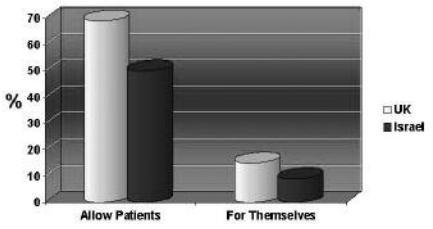


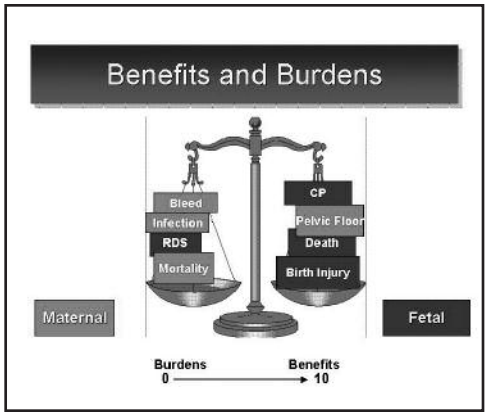
National Center for Health Statistics

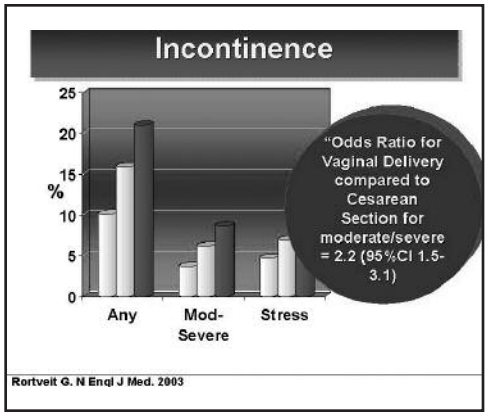
Cesarean Section

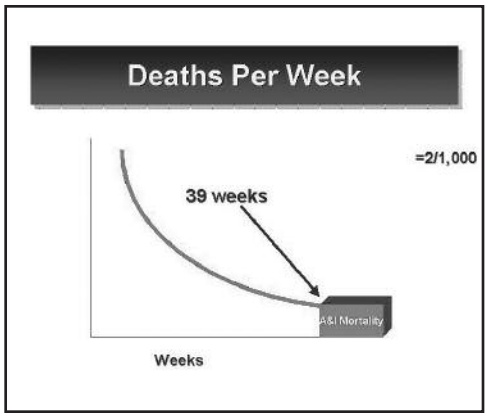


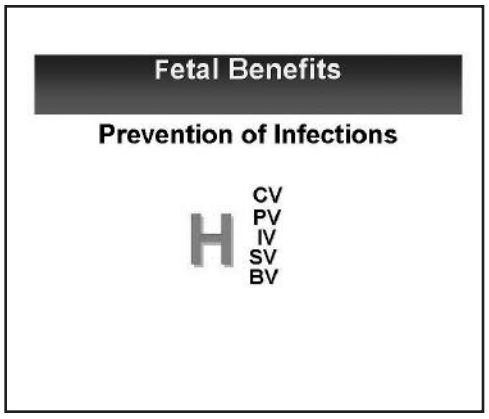
Elective Cesarean Section

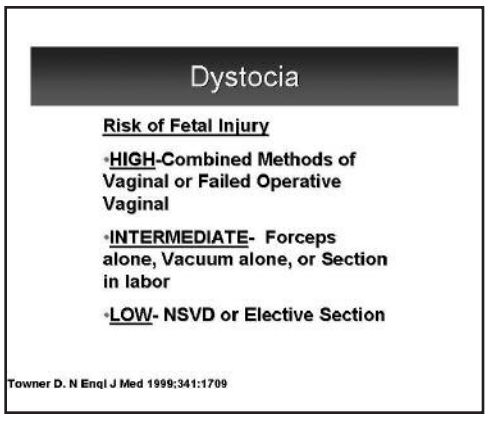


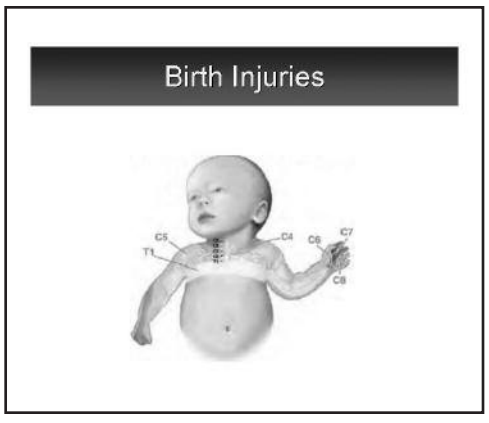

Benefits and Burdens
Bleed
Infection
RDS
Mortality
CP
Pelvic Floor
Death
Birth Injury
Maternal
Fetal
Burdens
0
Benefits
10


Incontinence
25
20
15
%
10
5
0
Any
Mod-Severe
Stress
"Odds Ratio for Vaginal Delivery compared to Cesarean Section for moderate/severe = 2.2 (95%CI 1.5-3.1)
Rortveit G. N Engl J Med. 2003


Deaths Per Week
=2/1,000
39 weeks
A&I Mortality
Weeks


Fetal Benefits
Prevention of Infections
H
CV
PV
IV
SV
BV


Dystocia
Risk of Fetal Injury
•HIGH-Combined Methods of Vaginal or Failed Operative Vaginal
•INTERMEDIATE- Forceps alone, Vacuum alone, or Section in labor
•LOW- NSVD or Elective Section
Towner D. N Engl J Med 1999;341:1709

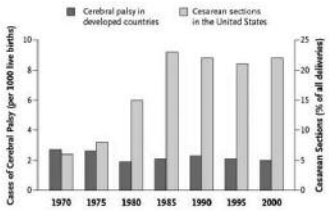

Birth Injuries
C5
T1
C4
C6
C7
C8

Multivariable Risks for Unexplained Cerebral Palsy in Term Infants

Variable	OR (95% CI)*	P Value
Maternal race		
White	Reference	
Black	3.6 (1.4-9.3)	.01
Hispanic	2.0 (0.9-4.1)	.07
Asian	0.9 (0.4-1.9)	.78
Maternal age >25 y	2.6 (1.3-5.2)	.01
Nulliparity	1.8 (1.0-3.0)	.04
Clinical chorioamnionitis	4.1 (1.6-10.1)	.002
Intrauterine growth restriction	4.0 (1.3-12.0)	.01

Wu YW. *JAMA.* 2003;290:2677-2684

Cesarean Section and Cerebral Palsy



Nelson K, N Engl J Med 2003;349:1765

Burdens of Labor with Prior C/S

Table 5. Perinatal Outcomes for Term Infants.*

Outcome	Trial of Labor (N=15,338)	Elective Repeated Cesarean Delivery (N=15,014)	Odds Ratio (95% CI)	P Value
	no. (%)			
Antepartum stillbirth†‡				
37–38 wk	18 (0.40)	8 (0.10)	2.93 (1.27–6.75)	0.008
≥39 wk	16 (0.20)	5 (0.10)	2.70 (0.99–7.38)	0.07
Intrapartum stillbirth‡				
37–38 wk	1 (0.02)	0	—	0.43
≥39 wk	1 (0.01)	0	—	1.00
Hypoxic–ischemic encephalopathy	12 (0.08)	0	—	<0.001
Neonatal death	13 (0.08)	7 (0.05)	1.82 (0.73–4.57)	0.19
One or more of the above	59 (0.38)	20 (0.13)	2.90 (1.74–4.81)	<0.001

Landon MB. NEJM 2004;351:2581-2589

Burdens from Labor With Prior C/S

Table 2. Maternal Complications.*

Complication	Trial of Labor (N=17,898)	Elective Repeated Cesarean Delivery (N=15,801)	Odds Ratio (95% CI)	P Value
	no. (%)			
Uterine rupture	124 (0.7)	0	—	<0.001
Uterine dehiscence†	119 (0.7)	76 (0.5)	1.38 (1.04–1.85)	0.03
Hysterectomy	41 (0.2)	47 (0.3)	0.77 (0.51–1.17)	0.22
Thromboembolic disease‡	7 (0.04)	10 (0.1)	0.62 (0.24–1.62)	0.32
Transfusion	304 (1.7)	158 (1.0)	1.71 (1.41–2.08)	<0.001
Endometritis	517 (2.9)	285 (1.8)	1.62 (1.40–1.87)	<0.001
Maternal death	3 (0.02)	7 (0.04)	0.38 (0.10–1.46)	0.21
Other maternal adverse events§	64 (0.4)	52 (0.3)	1.09 (0.75–1.57)	0.66
One or more of the above	978 (5.5)	563 (3.6)	1.56 (1.41–1.74)	<0.001

Landon MB. NEJM 2004;351:2581-2589

Operative Morbidity

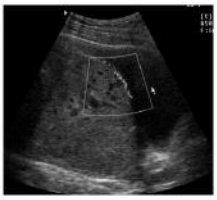
- Fever
- Visceral Injury
- Hospital Readmission
- Hemorrhage

Maternal Mortality

Year	Vaginal Delivery	C/Section
1988-1990	1	8
1994-1996	1	3
1997-1999	1	2

British CEMD

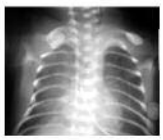
Risks in Subsequent Pregnancies



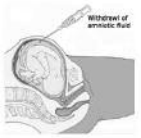
Burdens

Fetal

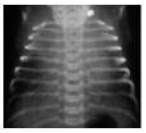
Pulmonary Immaturity



RDS



Amniocentesis

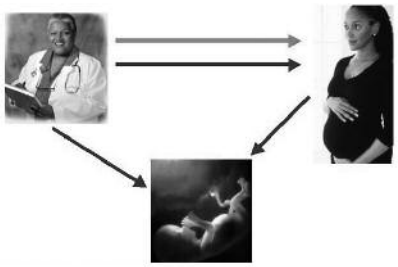


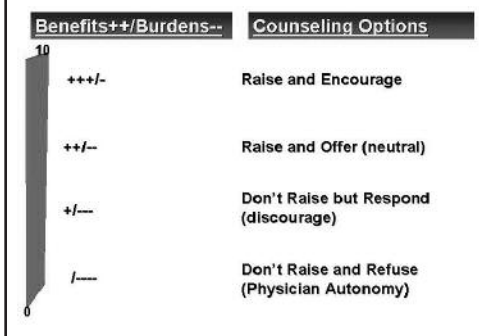
TTN

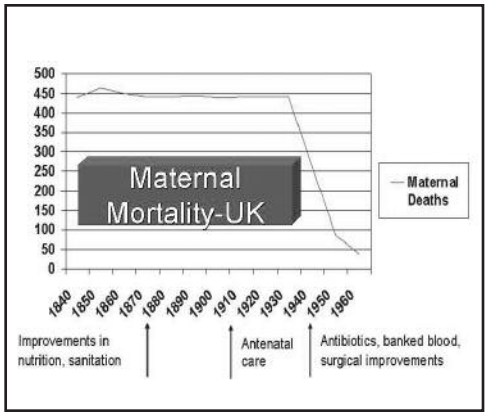
Previous Section and Unexplained Stillbirths

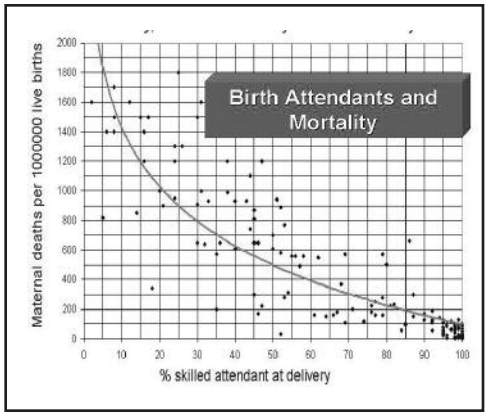
	Previous C/Section	Previous Vaginal
N	17,754	102,879
Stillbirths	68	244
Rate (women/week)	2.39	1.44
Absolute Risk ≥39 weeks)	1.1/1,000	0.5/1,000

Smith GCS. *Lancet* 2003: 362: 1779-84



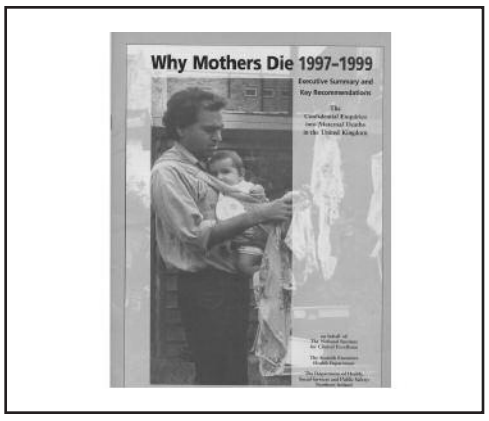


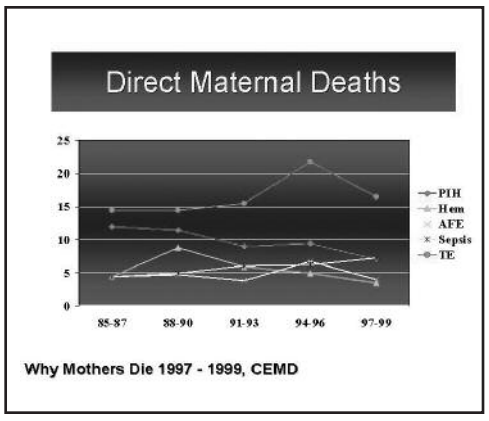

Maternal Mortality-UK
Maternal Deaths
500
450
400
350
300
250
200
150
100
50
0
1840
1850
1860
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960
Improvements in nutrition, sanitation
Antenatal care
Antibiotics, banked blood, surgical improvements


Birth Attendants and Mortality
Maternal deaths per 1000000 live births
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
10
20
30
40
50
60
70
80
90
100
% skilled attendant at delivery

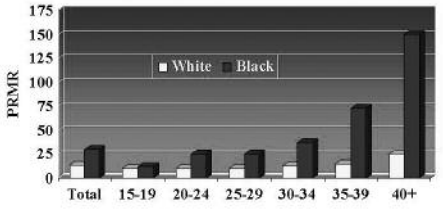

1930=630
U.S. Maternal Mortality
Ratio
30
25
20
15
10
5
Healthy People 2010 Goal: 3.3
Per 100,000 live births
Year


Approximately One-half of Maternal Deaths are Preventable!

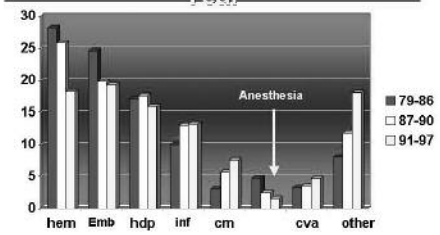

Why Mothers Die 1997-1999
Executive Summary and Key Recommendations


Direct Maternal Deaths
25
20
15
10
5
0
85-87
88-90
91-93
94-96
97-99
PIH
Hem
AFE
Sepsis
TE
Why Mothers Die 1997 - 1999, CEMD

Pregnancy- Related Mortality Ratios (PRMR) by Race & Age, US, 1991-1997



Trends in Cause of Pregnancy-Related Deaths* by Year



Blood Loss

- Prediction
- Prevention
- Treatment

Reducing Hemorrhagic Morbidity

- PREOPERATIVE AUTOLOGOUS DONATION
- INTRAOPERATIVE HEMODILUTION
- INTRAOPERATIVE BLOOD SALVAGE

PREOPERATIVE AUTOLOGOUS BLOOD DONATION (PAD)

- **INDICATIONS:**
  - Relatively good health
  - Elective surgical procedure with likelihood of EBL 500-1000 ml >5-10%
- **CONTRAINDICATIONS:**
  - Unstable angina or angina at rest
  - MI within last 3 months, CHF or serous cardiac disease
  - TIA
  - Marked hypertension

PREOPERATIVE AUTOLOGOUS BLOOD DONATION (PAD)

- Iron supplementation
- Scheduling: draw units at weekly intervals, with the last unit drawn at least two weeks, although *no fewer than 72 hours, prior to surgery.*
- Donor criteria: all ages and weights. Hg>11 /Ht >33%

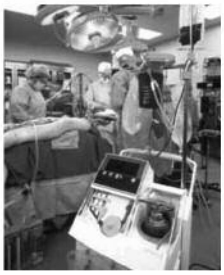
INTRAOPERATIVE BLOOD SALVAGE (IBS)

- Blood from field through a suction attached to dual-channel tubing; allows anticoagulant and blood to be mixed.
- Blood is collected in a reservoir until there is enough for processing. Blood is pumped into the centrifuge bowl, is concentrated and then washed with an isotonic electrolyte solution.
- The processed red cell suspension is then pumped from the centrifuge bowl into an infusion bag.

INTRAOPERATIVE BLOOD SALVAGE (IBS)

- **COMPLICATIONS:**
  - Air embolism
  - Coagulopathy
  - Infection
  - Salvaged blood syndrome (DIC, ARDS, anasarca)
  - Fat embolism
  - Microaggregates

Cell Saver in Cesarean Section



Risks

- Fetal Debris
- Red Cells destroyed by suction
- Limited experience

ACUTE NORMOVOLEMIC INTRAOPERATIVE HEMODILUTION (ANH)

- Removal of blood from a patient, either immediately before or shortly after induction of anesthesia, with maintenance of isovolemia using crystalloid and/or colloid replacement.
- The blood is anticoagulated, maintained at room temperature in the OR for up to 8 hours.
- Reinfused into the pt as needed during, or after, the surgical procedure.

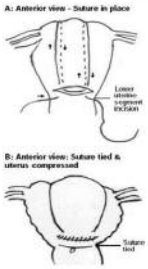
ACUTE NORMOVOLEMIC INTRAOPERATIVE HEMODILUTION: Amount of blood to draw

- V= EBV x ({Ho –Hf} % Hav)
  - *V: volume to be removed*
  - *EBV: estimated blood volume*
  - *Ho: initial hematocrit*
  - *Hf: desired hematocrit*
  - *Hav: average hematocrit*

ACUTE NORMOVOLEMIC INTRAOPERATIVE HEMODILUTION

- **Benefits:**
  - Can be used in emergency surgeries or pt not candidate for PAD
  - Cost-effective
  - Only opportunity to transfuse pt with fresh, whole blood containing viable platelets and high levels of clotting factors
  - It increases tissue perfusion as hemodilution decreases blood viscosity
  - It may decrease the amount of red blood cells lost during surgery, since the blood lost has a lower hematocrit after hemodilution

B Lynch Suture

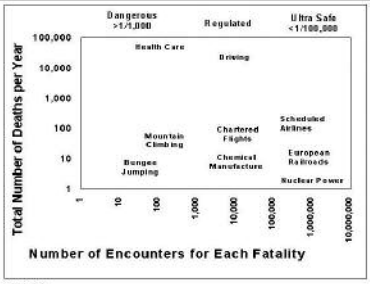


Patient Safety

Annual American Deaths

- Car Accidents: 43,458
- Breast Cancer: 42,297
- AIDS: 16,516
- **Medical Errors: 98,000**

How Hazardous is Health Care?



Leape presentation 11/02

Healthcare Errors

- **3-38% of hospitalized patients with iatrogenic injury or illness**
- **On average, 7% of patients suffer adverse drug reactions.**
- **2 million nosocomial infections per year**

National forum for health care quality measurement and reporting

Adverse Events and Negligence

Specialty	Adverse Events (%)	Negligence (%)
Orthopedics	4.1	22.4
Surgery	7.0	28.0
Vascular	16.1	18.0
Obstetrics	1.5	38.3
Neonatal	0.6	25.8
Medicine	3.6	30.9

Brennan N Engl J Med 1991;324:370-6

When Mistakes Happen

- Systems
- Communication (Hand-offs)
- Failure in Planning
- Failure of Recognition
- Failure to Rescue

Michael Leonard, M.D.

Systems

Need for Communication

- JCAHO Sentinel Event Data
  - 2400 severe cases
  - 75% Mortality
- Communication Failure was Primary Root Cause in Over 70%

Michael Leonard, M.D.

Patient Safety

- Team Based Care
- Drills
- Mannequins
- Don't Miss the Near Miss
- Culture of Concern

Effective Communication

- Structured Communication (SBAR)
- Key Language ("I need clarification")
- Psychological Safety (Environment of Respect)
- Drills: Activities and Communications

Michael Leonard, M.D.

SBAR-Situational Briefing Model

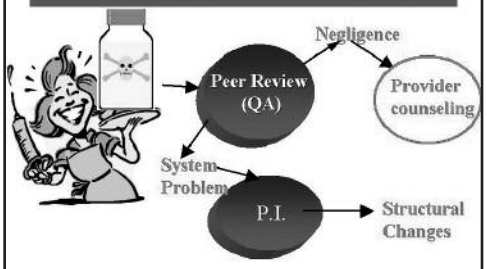
- S-Situation
- B-Background
- A-Assessment
- R-Recommendation

Michael Leonard, M.D.

IOM Recommendations

- Raise Standards
- Establish a National focus
- Reporting-Learn From Mistakes
- Creating safety Systems

Performance Improvement



Competencies

- Professionalism
- Patient care
- Interpersonal Skills
- Systems
- Knowledge
- Case based learning

Health Care in America

- 70% receive recommended acute care
- 60% receive recommended chronic care
- 50% receive recommended preventive care
- 30% receive *contraindicated* acute care

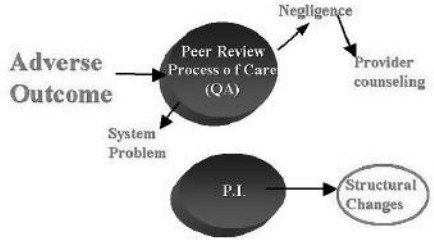
Kizer JAMA 2001;286:1213

Physician Knowledge

- 3-4 years post certification significant declines in knowledge.
- 14-15 years postcertification 68% couldn't pass boards.
- Didactic interventions *rarely* lead to improved health outcomes.

Shaneyfelt JAMA 2001;286:2600

Performance Improvement



When Do Errors Occur?

- Many and varied interactions with technology
- Many individuals involved; multiple handoffs
- Ambient environment prone to distraction
- Need for rapid decisions; time pressured
- High volume, unpredictable patient flow

National forum for health care quality measurement and reporting

Structure of Care

- Do Outpatient Charts Arrive in L&D?
- Who Shows up for a Depressed Kid?
- Quality of Staff.
- % Nurses Floated in.
- When do PMDs Come for Patient in Labor?
- Staff Respect and Communication
- Nurse Patient Ratios.

Physician Staffing Patterns in ICUs

	Hospital Mortality	ICU Mortality	Hospital LOS	ICU LOS
High Intensity Staffing	0.71 (95% CI, 0.62-.82)	0.61 (95% CI, 0.50-0.75)	↓10/13 studies	↓14/18 studies

Pronovost. JAMA. 2002;288:2151-2162

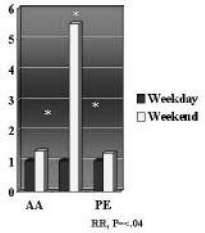
Nurses and Outcomes

Outcome	Decrease Outcome with Increase Staffing (25th-75th Percentile)	
Length of Stay	5.2 (3.4-7.1)	<0.001
UTI	3.6 (1.2-6.0)	<0.003
GI Bleed	5.2 (1.4-8.9)	<0.007
Hosp Pneu	2.7 (-0.4-5.8)	0.08
Shock or Arrest	4.1 (-2.5-10.8)	0.22
Death	0.1 (-2.5-2.4)	0.96

Needlemen N Engl J Med 2002;346:1715

In-Hospital Mortality According to Day of Admission

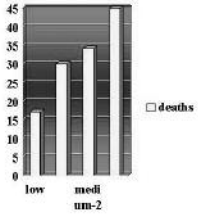
"The reduction in clinical personnel on weekends may lead to shortfalls in care."



Bell CM, Redelmeier DA. N Engl J Med 2001;245:663-8

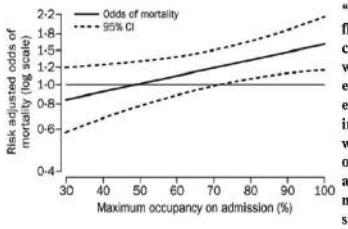
ICU Mortality and Staff Workload

"Variations in mortality may be partly explained by excess ICU workload."



Tarnow-Mordi WO Lancet 2000;356:185-9

Occupancy and Mortality in a NICU

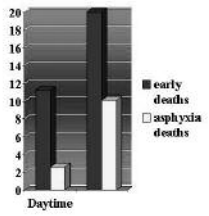


"This finding is consistent with evidence of effect of increased workload on nursing and medical staff"

Lancet 2002;359:99-107

Neonatal Death and Birth Time

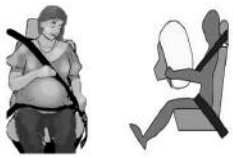
"Maybe the results of the staff's increased *mental and physical fatigue*"



Heller BMJ 2000; 321:274-5

Standards

- Set
- Disseminate
- Monitor
- Enforce



Lessons From the Cockpit

- Speak Truth to Power
- Don't Ignore Near Misses
- Model corrections on the FAA *Not* the DA: Don't fixate on the pilot-Fix the plane!

Zuspan Award Symposium

Moderator: M. Joanne Douglas, MD, FRCP

Judges:
Samuel Hughes, MD; Barbara Leighton, MD; Howard Minkoff, MD; Shiv Sharma, MD

Thursday, April 27, 2006
2:30 – 3:30 p.m.

SOAP A-12 **A Womb with a View: Anesthetic, Obstetric, and Neonatal Care Issues for In-Utero Fetal Surgery**
V. Silva[1], L. C. Tsen[2], L. Wilkins-Haug[3], E. Cappiello[2], B. Kodali[2];
[1]Center for Labor and Delivery, Brigham and Women's Hospital, Boston, MA, [2]Dept of Anesthesiology, Brigham and Women's Hospital, Boston, MA, [3]Dept of Maternal Fetal Medicine, Brigham and Women's Hospital, Boston, MA

SOAP A-13 **Patient-Controlled Analgesia with Background Remifentanil Infusion for Labor Pain**
M. Balki1, S. Kasodekar[1], S. Dhumne[1], P. Bernstein[2], J. Carvalho[1];
[1]Department of Anesthesia, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada, [2]Department of Obstetrics and Gynecology, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada

SOAP A-14 **Does eating in labor influence obstetric outcome: a randomized controlled trial in 2400 primiparous women?**
G. O'Sullivan, B. Liu, A. Shennan, D. Hart;
St. Thomas' Hospital, London, United Kingdom

SOAP A-15 **Explicit Communication in an Obstetrical Emergency**
H. Kobayashi[1], T. B. Walzer[2], R. Gardner[2], M. C. Pian-Smith[3], D. B. Raemer[3];
[1]Harvard School of Public Health, Boston, MA, [2]Brigham & Women's Hospital, Boston, MA, *[3]Massachusetts General Hospital, Boston, MA*

SOAP Business Meeting and Awards Presentations

Moderator: William R. Camann, MD

Thursday, April 27, 2006
4:00 – 6:00 p.m.

NOTES

Scientific Program

FRIDAY, APRIL 28, 2006

6:00 - 7:00 am	**Fun Run/Walk**
7:00 - 8:00 am	**Breakfast with Exhibitors; Posters**
8:00 - 9:00 am	**Oral Presentations (4) –** Moderator: Barbara Scavone, MD
9:00 - 10:00 am	**Obstetric Medicine Update: Endocrine Disease in Pregnancy** Introduction: Joy L. Hawkins, MD Erin Joanne Keely, MD, FRCPC
10:00 - 10:30 am	**Coffee with Exhibitors; Posters**
10:30 - 11:30 am	**Poster Review #1 –** Moderator: Cynthia Wong, MD
11:30 - 1:00 pm	**Panel: Team Training in Obstetrics** Moderator: Stephen Pratt, MD Panelists: Paul Preston, MD; Benjamin Sachs, MD; David Birnbach, MD
1:30 pm	**SOAP Golf and Tennis Activities**

NOTES

Oral Presentations #2

Moderator: Barbara Scavone, MD

Friday April 28, 2006
8:00 – 9:00 a.m.

Learner Objective: To discuss and review updates and advances in the practice of obstetric anesthesia.

SOAP A-16 **Comparison of Contractions: IUP vs EHG**
T. Y. Euliano1, M. Nguyen[2], D. Marossero[2], E. Tighe[1], R. K. Edwards[1];
[1]University of Florida, Gainesville, FL, [2]Convergent Engineering, Gainesville, FL

SOAP A-17 **CSF concentration does not predict onset or duration of spinal fentanyl for labor analgesia**
K. E. Nelson, J. C. Eisenach;
Wake Forest University, Winston-Salem, NC.

SOAP A-18 **Combined Spinal-Epidural Versus Epidural Analgesia in Multiparous Women**
S. R. Goodman, R. M. Smiley, M. A. Negron, P. A. Freedman, R. Landau;
Columbia University, New York, NY.

SOAP A-19 **Anesthesia-Related Maternal Mortality in Michigan: 1985-2003**
J. M. Mhyre1, M. N. Riesner[1], V. Grigorescu[2];
[1]University of Michigan Health System, Ann Arbor, MI, [2]Michigan Department of Community Health, Lansing, MI

Obstetric Medicine Update: Endocrine Disease in Pregnancy

Introduction: Joy L. Hawkins, MD
Speaker: Erin Joanne Keely, MD, FRCPC

Friday, April 28, 2006
9:00 – 10:00 a.m.

Learner Objective: The learner will become familiar with the pathophysiology and management of common endocrine diseases seen during pregnancy.

Update on Endocrine Disorders in Pregnancy

Erin Keely MD, FRCPC
University of Ottawa

Objectives

- Insulin resistance
  - Association of insulin resistance and obstetrical outcomes
  - Increasing use of oral agents in pregnancy
  - new insulin analogues in pregnancy
- Thyroid disorders
  - maternal and fetal risks of hyperthyroidism
  - prediction of fetal goiter
- Pheochromocytoma
  - clinical clues
  - diagnosis
  - management

"Our pregnant population is becoming older, younger, sicker, and heavier, with predictable challenges imposed upon all who provide anesthesia for the pregnant patient."

President's message, SOAP newsletter, Dec 2005

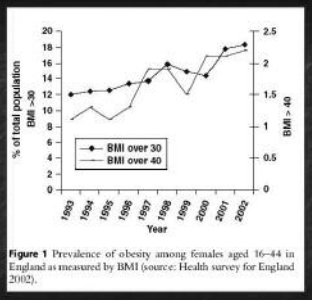


Figure 1 Prevalence of obesity among females aged 16–44 in England as measured by BMI (source: Health survey for England 2002).

Saravanakumar Anaesthesia 2006

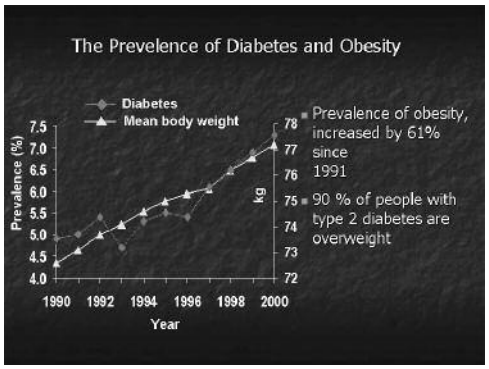
Obesity in women ages 20-39 the US (NHANES 1999-2002)

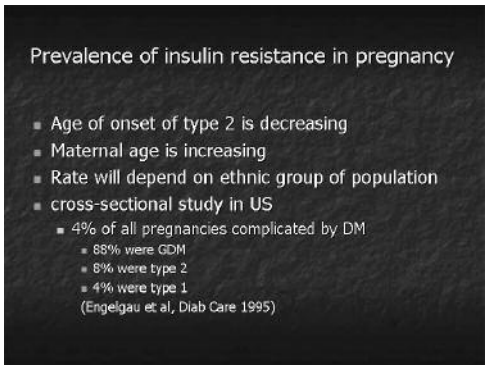
	All	Non-hispanic white	Non-hispanic black	Mexican American
BMI >25	54.5%	49.0%	70.3%	61.8%
BMI >30	29.1%	24.9%	46.6%	31.2%
BMI >40	5.6%	4.2%	11.8%	5.5%

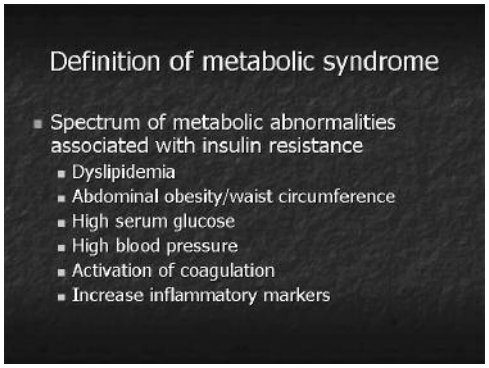
Hedley, JAMA 2004;291:2847-50

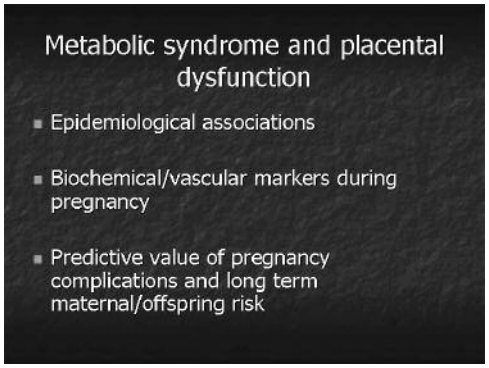
Obstetrical risks and obesity

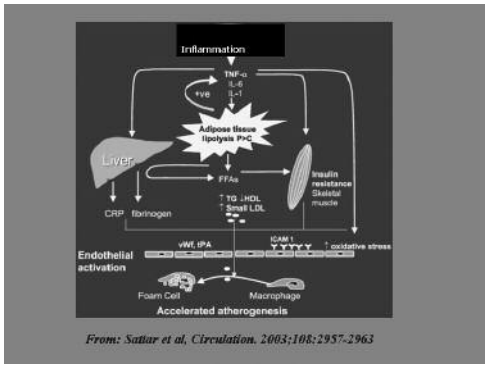
- Infertility
- Gestational or type 2 diabetes
- Preeclampsia
- Risk of c-section
- Surgical complications
  - Wound
  - Respiratory
  - thrombosis
- First trimester loss
- Late pregnancy loss
- Macrosomia
- Congenital anomalies
  - Neural tube
  - Cardiac
  - More difficult to diagnose
- Decreased breast feeding

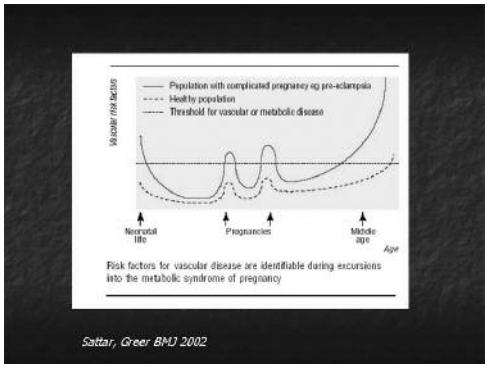

The Prevelence of Diabetes and Obesity
Diabetes
Mean body weight
Prevalence (%)
kg
Year
1990 1992 1994 1996 1998 2000
Prevalence of obesity, increased by 61% since 1991
90 % of people with type 2 diabetes are overweight


Prevalence of insulin resistance in pregnancy
Age of onset of type 2 is decreasing
Maternal age is increasing
Rate will depend on ethnic group of population
cross-sectional study in US
4% of all pregnancies complicated by DM
88% were GDM
8% were type 2
4% were type 1
(Engelgau et al, Diab Care 1995)


Definition of metabolic syndrome
Spectrum of metabolic abnormalities associated with insulin resistance
Dyslipidemia
Abdominal obesity/waist circumference
High serum glucose
High blood pressure
Activation of coagulation
Increase inflammatory markers


Metabolic syndrome and placental dysfunction
Epidemiological associations
Biochemical/vascular markers during pregnancy
Predictive value of pregnancy complications and long term maternal/offspring risk


Inflammation
TNF-α
IL-6
IL-1
↑VB
Adipose tissue lipolysis ↑FC
Liver
FFAs
Insulin resistance Skeletal muscle
↑TG ↓HDL ↑Small LDL
CRP fibrinogen
ICAM 1
vWf, tPA
↑ oxidative stress
Endothelial activation
Foam Cell
Macrophage
Accelerated atherogenesis
From: Sattar et al, Circulation. 2003;108:2957-2963


Vascular risk factors
Population with complicated pregnancy eg pre-eclampsia
Healthy population
Threshold for vascular or metabolic disease
Neonatal life
Pregnancies
Middle age
Age
Risk factors for vascular disease are identifiable during excursions into the metabolic syndrome of pregnancy
Sattar, Greer BMJ 2002

Association of adverse pregnancy outcomes with risk of diabetes or risk factors for coronary heart disease and vascular disease

Pregnancy outcome	Incidence in pregnancy (%)	Risk factors shown to be perturbed after pregnancy	Association or risk ratio (95% CI)
Gestational diabetes	1.9-5.0*	Lipids[1]	Increased risk of type 2 diabetes, especially if recurrence of gestational diabetes in a subsequent pregnancy. No data on coronary heart disease risk
		Blood pressure[2]	
		Large vessel function[3]	
		Small vessel function[3]	
Pre-eclampsia	2–4	Lipids[4] Clotting[4]	1.9 (1.0 to 3.5) *v* pregnancy induced hypertension alone
		Fasting insulin[5]	1.7 (1.3 to 2.2) *v* no pre-eclampsia[5]
		Large vessel function[6]	2.0 (1.5 to 2.6) *v* no pre-eclampsia[6]
Low birth weight (<2500 g)	5	Not studied	11.3 (3.5 to 36.1) *v* >3500 g[7]
			7.1 (2.6 to 18.7) *v* >3500 g[8]
Preterm delivery (<37 weeks)	5–6	Not studied	1.8 (1.3 to 2.5) *v* term delivery[9]
			2.1 (1.2 to 3.5) *v* term delivery[10]

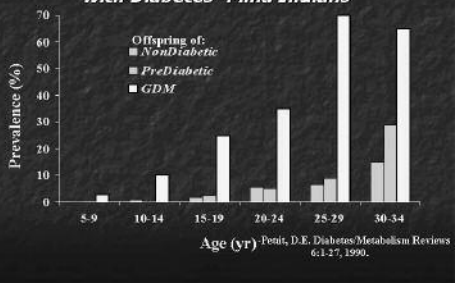
*Dependent on population studied, ethnic group, and diagnostic criteria

Sattar, Greer BMJ 2002

Diabetic intra-uterine environment has consequences for later life

Freinkel, 1980

Prevalence of Diabetes in Offspring from Women with Diabetes -Pima Indians



Petitt, D.E. Diabetes/Metabolism Reviews 6:1-27, 1990.

- 32 year old woman G1T0P0A1L0 has type 2 diabetes
- she is wanting another pregnancy and is referred to you for possible PCOD
- current medications: glyburide 10 mg bid, atorovastatin
- glucose control: HgbA1c 8.2%
- no known complications
- O/E
  - BP 135/92, BMI 30 kg/m2
  - acanthosis nigricans on neck

What's the difference between type 1 and 2 for pregnancy?

- **Comorbidities**
  - type 1 - autoimmunity, thyroid disorders
  - type 2 - hypertension, obesity, PCOD, (CAD)
- **treatment**
  - oral agents vs. insulin
  - oral agents now used as ovulation induction
- **prepregnancy care**
  - type 2 less likely to have specialist care
  - older, often recent immigrants

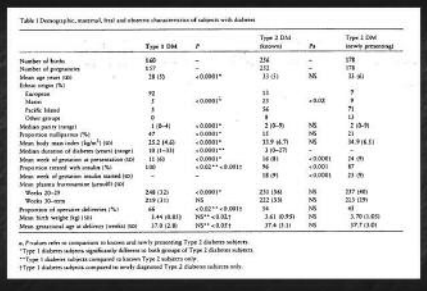
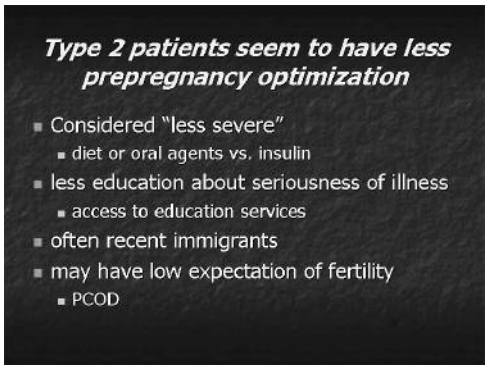
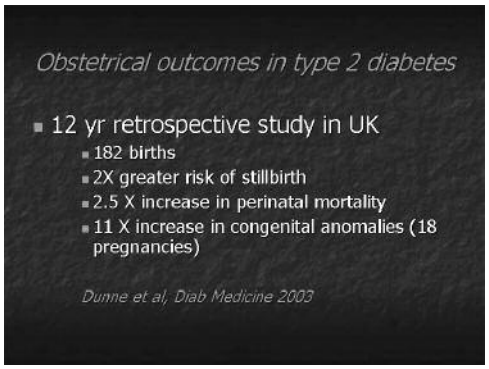


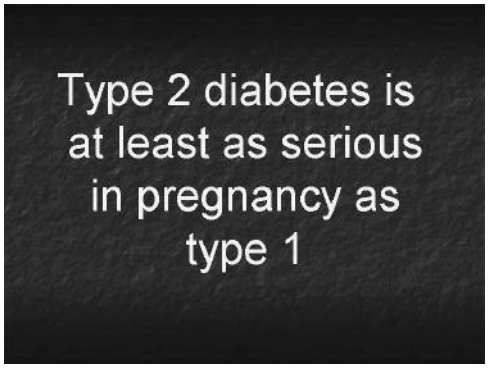
Table 1 Demographic, maternal, fetal and obstetric characteristics of subjects with diabetes

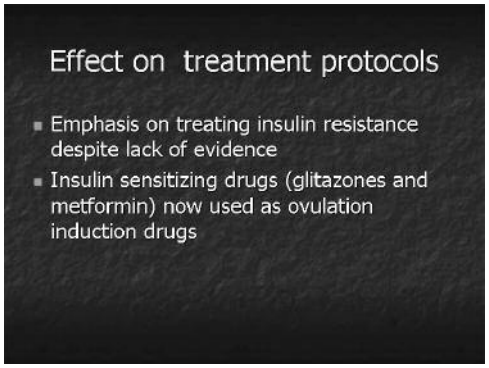
	Type 1 DM	P	Type 2 DM (known)	Pa	Type 2 DM (newly presenting)
Number of births	160	–	254	–	178
Number of pregnancies	537	–	252	–	178
Mean age years (SD)	28 (5)	<0.0001*	33 (5)	NS	31 (6)
Ethnic origin (%)					
European	92		11		7
Maori	5	<0.0001†	23	<0.02	9
Pacific Island	3		56		71
Other groups	0		9		13
Median parity (range)	1 (0–4)	<0.0001*	2 (0–5)	NS	2 (0–5)
Proportion nulliparous (%)	47	<0.0001*	15	NS	21
Mean body mass index (kg/m^2) (SD)	25.2 (4.2)	<0.0001*	33.9 (6.7)	NS	34.9 (6.1)
Median duration of diabetes (years) (range)	10 (1–31)	<0.0001**	3 (0–27)	–	–
Mean week of gestation at presentation (SD)	11 (6)	<0.0001*	16 (8)	<0.0001	24 (9)
Proportion treated with insulin (%)	100	<0.02** <0.0001†	96	<0.001	87
Mean week of gestation insulin started (SD)	–	–	18 (9)	<0.0001	25 (9)
Mean plasma homocysteine (µmol/l) (SD)					
Weeks 20–25	248 (32)	<0.0001*	251 (56)	NS	237 (48)
Weeks 30–term	259 (31)	NS	252 (53)	NS	213 (39)
Proportion of operative deliveries (%)	44	<0.02** <0.0001†	34	NS	41
Mean birth weight (kg) (SD)	3.44 (0.83)	NS** <0.02†	3.61 (0.95)	NS	3.70 (1.05)
Mean gestational age at delivery (weeks) (SD)	37.0 (2.8)	NS** <0.05†	37.4 (3.1)	NS	37.7 (3.0)

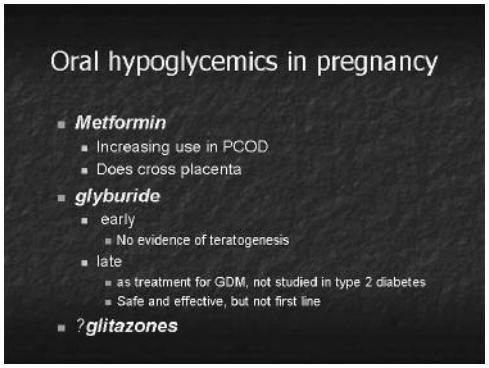
a, P-values refer to comparisons to known and newly presenting Type 2 diabetes subjects.
*Type 1 diabetes subjects significantly different to both groups of Type 2 diabetes subjects.
**Type 1 diabetes subjects compared to known Type 2 subjects only.
†Type 1 diabetes subjects compared to newly diagnosed Type 2 diabetes subjects only.

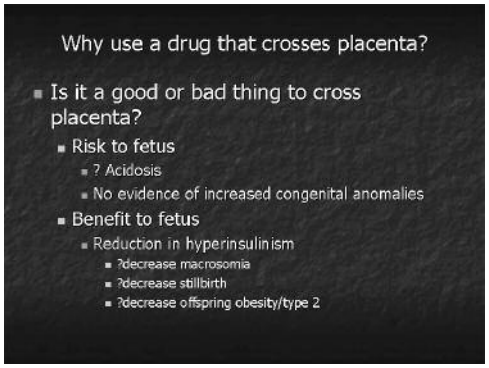

Type 2 patients seem to have less prepregnancy optimization
Considered "less severe"
diet or oral agents vs. insulin
less education about seriousness of illness
access to education services
often recent immigrants
may have low expectation of fertility
PCOD

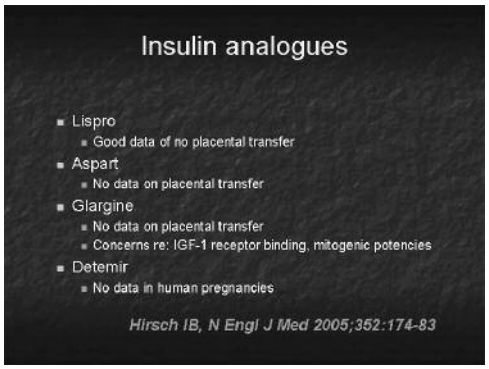

Obstetrical outcomes in type 2 diabetes
12 yr retrospective study in UK
182 births
2X greater risk of stillbirth
2.5 X increase in perinatal mortality
11 X increase in congenital anomalies (18 pregnancies)
Dunne et al, Diab Medicine 2003

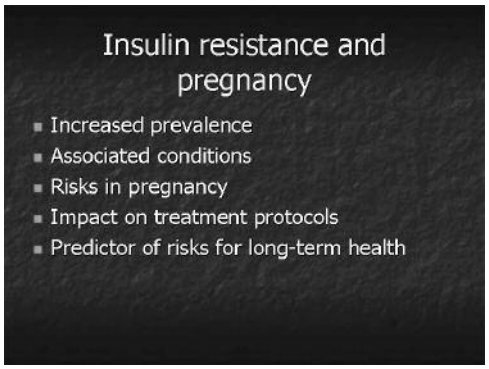

Type 2 diabetes is at least as serious in pregnancy as type 1

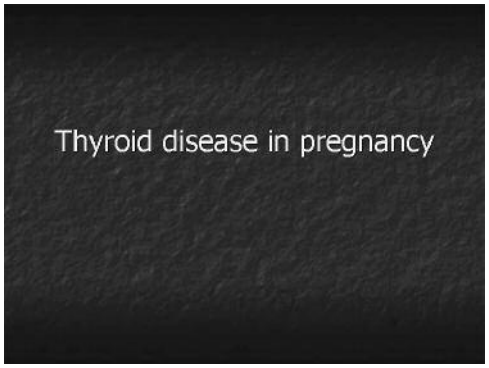

Effect on treatment protocols
Emphasis on treating insulin resistance despite lack of evidence
Insulin sensitizing drugs (glitazones and metformin) now used as ovulation induction drugs

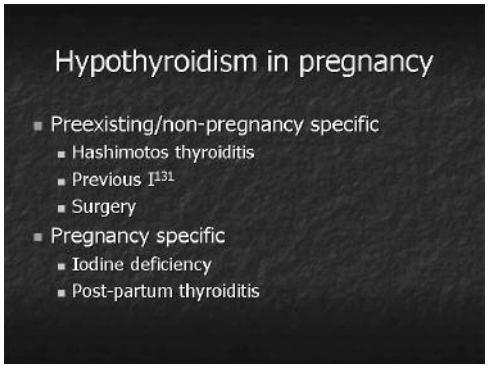

Oral hypoglycemics in pregnancy
Metformin
Increasing use in PCOD
Does cross placenta
glyburide
early
No evidence of teratogenesis
late
as treatment for GDM, not studied in type 2 diabetes
Safe and effective, but not first line
?glitazones

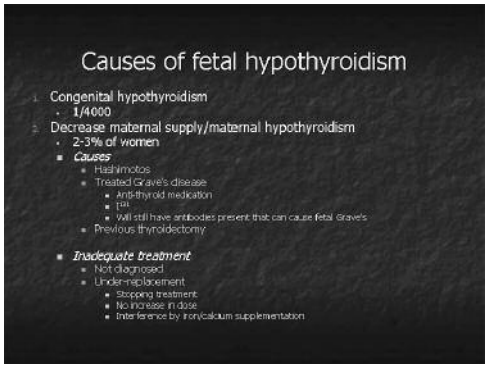

Why use a drug that crosses placenta?
Is it a good or bad thing to cross placenta?
Risk to fetus
? Acidosis
No evidence of increased congenital anomalies
Benefit to fetus
Reduction in hyperinsulinism
?decrease macrosomia
?decrease stillbirth
?decrease offspring obesity/type 2

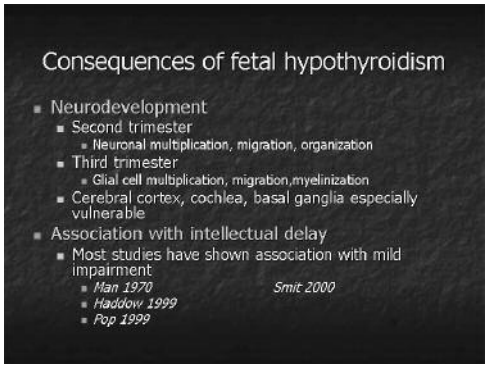

Insulin analogues
Lispro
Good data of no placental transfer
Aspart
No data on placental transfer
Glargine
No data on placental transfer
Concerns re: IGF-1 receptor binding, mitogenic potencies
Detemir
No data in human pregnancies
Hirsch IB, N Engl J Med 2005;352:174-83


Insulin resistance and pregnancy
Increased prevalence
Associated conditions
Risks in pregnancy
Impact on treatment protocols
Predictor of risks for long-term health


Thyroid disease in pregnancy


Hypothyroidism in pregnancy
Preexisting/non-pregnancy specific
Hashimotos thyroiditis
Previous I131
Surgery
Pregnancy specific
Iodine deficiency
Post-partum thyroiditis


Causes of fetal hypothyroidism
1. Congenital hypothyroidism
1/4000
2. Decrease maternal supply/maternal hypothyroidism
2-3% of women
Causes
Hashimotos
Treated Grave's disease
Anti-thyroid medication
I131
Will still have antibodies present that can cause fetal Grave's
Previous thyroidectomy
Inadequate treatment
Not diagnosed
Under-replacement
Stopping treatment
No increase in dose
Interference by iron/calcium supplementation


Consequences of fetal hypothyroidism
Neurodevelopment
Second trimester
Neuronal multiplication, migration, organization
Third trimester
Glial cell multiplication, migration,myelinization
Cerebral cortex, cochlea, basal ganglia especially vulnerable
Association with intellectual delay
Most studies have shown association with mild impairment
Man 1970
Haddow 1999
Pop 1999
Smit 2000

- Goiter
  - Risk of asphyxiation, arrested labour
  - Especially with iodine deficiency, drug induced hypothyroidism
- Cardiac
- Growth
- Breech presentation
  - *Pop et al, BJOG 2004;111:925-30*
  - OR 4.7 (1.1-19) for breech presentation with maternal fT4 at lowest 10% at 12 wks

Strategies to avoid fetal hypothyroidism

- Anticipate maternal hypothyroxinemia
  - Identify women at risk
  - Ensure adequate iodine intake
  - Avoid taking supplement with iron/calcium
  - Avoid T3 replacement
- Avoid overtreatment of hyperthyroidism with antithyroid medication

- Adjust dose of l-thyroxine proactively
  - *Alexander et al, NEJM 2004;351:241-9*
  - Mean increase of 47% of l-thyroxine dose
  - Need for increase happens early
    - Especially in ovulation induction
    - Increase at median of 8 weeks
  - ?increase by 2 tablets weekly until first visit

Hyperthyroidism in pregnancy

- Pre-existing/non-pregnancy specific
  - Graves
  - nodules
  - subacute thyroiditis
- pregnancy specific
  - first trimester thyrotoxicosis (gestational transient thyrotoxicosis)
  - hyperemesis gravidarum

Risks in pregnancy

- elevated T4
  - increase fetal loss, preterm delivery, SGA
  - Severe maternal thyrotoxicosis
- thyroid stimulating antibodies
  - may cross placenta causing fetal Graves disease
  - correlates to TSI titres in 3rd trimester

Effect of pregnancy on Graves

- Tends to improve due to decrease in TSI titre with "immunosuppression" of pregnancy
- often antithyroid medications may be withdrawn at 4-6 mths of gestation
- often worsens 6-12 wks postpartum due to "immune rebound"

Treatment of Graves Disease

- Goal is to maintain near normal free T4 levels in mother
  - Overtreatment may lead to fetal hypothyroidism/goiter
- Risk of methimazole vs. propylthiouracil
  - Aplasia cutis
  - Methimazole embryopathy
    - Choanal atresia
    - Tracheal-esophageal fistulae
    - Hypoplastic nipples
    - Facial anomalies

Fetal/Neonatal Graves

- Occurs in 2-10% of Graves pregnancies
  - fetal effects not noted until after 20 weeks
- risks to fetus/neonate
- detection
  - who to monitor
  - role of TSI
  - what if mom on PTU
- treatment

Predicting fetal/neonatal Graves Disease

3 groups of women with Graves Disease

1. previously treated with antithyroid medication and now in remission
   - Low risk as antibody titre likely low
2. currently on antithyroid medication
   - May mask fetal Graves and occur in neonatal period
3. previously treated with radioactive iodine or surgery and now euthyroid or hypothyroid on replacement
   - thyroid function of mother does not reflect antibody status
   - Check thyroid stimulating immunoglobulin, if titre high follow fetus for hyperthyoidism

Large goiter in utero

- Polyhydramnios
  - Esophageal and tracheal compression
- Dystocia
  - Neck hyperextension
- Neonatal asphyxia
  - Difficult intubation

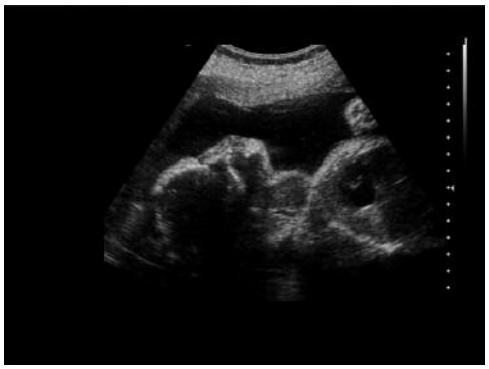
Case

- 33 yr old G1P0A0 referred at 23 weeks for fetal Graves
- Normal pregnancy
- History of Graves Disease 5 years prior to pregnancy
  - Mild ophthalmopathy
  - Treated with I131
  - Hypothyroid, on 88 ug L-thyroxine

- Prenatal visit at 19 wks
  - Fetal tachycardia – 200/min
  - ?iatrogenic hyperthyroidism – L-T4 stopped
  - Maternal indices
    - TSH 0.24 mU/L
    - Free T4 15 pmol/l

23 wks

- level 2 ultrasound
  - Fetal goiter (3 cm in diameter)
  - Normal growth
  - Oligohydramnios
  - Mild bilateral ventriculomegaly
- Echocardiography
  - Fetal HR 190-200 sinus
  - No structural heart anomalies
  - Distended atria suggesting high filling pressures
  - No pericardial effusion



Neonatal followup

- Received PTU, Lugols, propranolol
- Regression of heart hypertrophy
- Ventriculomegaly
  - Aquaduct stenosis
  - Required shunt

Pheochromocytoma in pregnancy

- 95% of chronic hypertension in pregnancy will be "essential"
- Most severe hypertension of new onset in pregnancy will be pre-eclampsia

But.....rare things can happen!!!

Secondary Causes of Hypertension

- Insulin resistance
- Renal
- Endocrine
  - Adrenal cortex
    - Mineralocorticoid excess
    - Glucocorticoid excess
  - Adrenal medualla
    - Pheochromocytoma
  - Thyroid disease
- Cardiovascular
- Exogenous
  - Eg. Cocaine, NSAID's

Case 1

- 23 yr old G1 diagnosed with hypertension at 23 weeks
- No previous HTN
- Associated with headaches, scotoma, nausea, occasional palpitations
- Hospitalized on several occasions for 1-3 days
- BP ranged from 100/60-140/115
- Treated with labetalol for 24 hrs but increase in headaches, nausea therefore stopped
- No proteinurea, change in LFTs, or thrombocytopenia
- Induced at 38 weeks, successful vaginal delivery

Is this a horse or a zebra?

- 23 yr old G1 diagnosed with hypertension at 23 weeks
- No previous HTN
- Associated with headaches, scotoma, nausea, occasional palpitations
- Hospitalized on several occasions for 1-3 days
- BP ranged from 100/60-140/115
- Treated with labetalol for 24 hrs but increase in headaches, nausea therefore stopped
- No proteinurea, change in LFTs, or thrombocytopenia
- Induced at 38 weeks, successful vaginal delivery

Four years later

- Increasing headaches, anxiety
- 2 episodes of right sided numbness with no residual deficit
  - BP 179/129
- Adopted
- On examination
  - BP 130/80 Rt, 128/84 Lt
  - No stigmata of MEN 2, neurofibromatosis
  - No renal bruit
  - Normal CVS exam

Investigations

- 24 hour urine
  - Total catecholamines 1221 nmol/d (<600)
  - Metanephrines 6.1 umol/d (<5.0)
  - VMA 32 umol/d (6-36)
- MRI
  - Rt adrenal lesion 4x2.3x2.0 cm
  - Hyperintense on T2 weighted images

Pheochromocytoma

- Tumour of chromaffin cells that produce catecholamines
  - 80% unilateral adrenal medulla
  - 10% bilateral adrenal medulla
  - 10%extra-adrenal - paragangliomas
- Most present with episodic or sustained hypertension
- May present with incidental adrenal mass, family history or associated condition

"Think of it, confirm it, find it and remove it"

EJ Ross, Proc R Soc Med, 1962

Pheochromocytoma in pregnancy

- The definition of "high risk pregnancy"
- 0.1-0.5% of all hypertension
- Incidence in pregnancy 0.002%
  - Northern Ireland population study
  - 5 pheos/270,000 live births

Harper MA et al. Br J Obstet Gynecol, 1989

Primary goals

- Early diagnosis
- Avoid hypertensive crisis during delivery
- Definitive surgical treatment

Effect of timing of diagnosis *1988-2000*

	During pregnancy	Post-partum
Fetal mortality	12% (6/49)	25% (4/16)
Maternal mortality	1% (1/49)	19% (3/16)

Mannelli, J Endocrinol Invest 2002;25:567-71

Effect of timing of diagnosis *1988-2000 vs. 1970-1979*

	During pregnancy	Post-partum
Fetal mortality	12% 42%	25% 56%
Maternal mortality	1% 4%	19% 50%

Mannelli, J Endocrinol Invest 2002;25:567-71

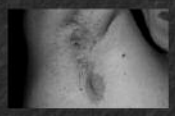
Clinical features in pregnancy

- Hypertension (>80%)
- Headache (62%)
- Palpitations (40%)
- Diaphoresis (38%)
- Blurred vision (18%)
- Anxiety (16%)
- others
- HTN may be sustained (1/3)
- Onset usually sudden
- May be precipitated by exercise, urination, defecation, anaesthesia, palpation of abdomen, uterine contractions
- Proteinuria may be present in up to 20%

Schenker JG. Aust NZ J Obstet Gynecol, 1982

Familial disorders associated with pheochromocytoma

- ***Multiple endocrine neoplasia 2A and 2B***
  - 2A
    - Medullary cell carcinoma of the thyroid
    - Hyperparathyroidism
  - 2B
    - Mucousal neuromas
    - Medullary cell carcinoma of the thyroid
    - Marfinoid habitus
- ***Von Hippal Lindau disease***
  - Retinal angiomas
  - Cerebellar hemangioblastoma
  - Renal/pancreatic cysts
  - Renal cell carcinoma
- ***Neurofibromatosis***



Clinical clues for pheo

- Paroxysmal symptoms
- HTN beginning before 20 wks
- HTN unresponsive to usual medical treatment
- Worsening of BP with beta-blockade/labetalol
- Sudden cardiovascular collapse
- Family history
- Evidence of neurocrestopathic syndromes
- Presence of diabetes (increased glycolysis)

Biochemical tests for screening

- Epinephrine and norepinephrine are released into circulation, metabolized by COMT, MAO to produce metanephrines, normetanephrines and VMA
- Renally excreted
- Can be measured as "free" or "total" in urine and/or plasma

Pregnancy changes in catecholamines

No increase in pregnancy except

- Employment related stress
  - 58-64% increase in urinary catecholamines on working vs non-working days of ICU nurses and female physicians
  - *Katz V et al. Obstet Gynecol 1991*
- Onset of labour to 18 hrs postpartum
- Hospitalization for preeclampsia, eclampsia
  - Increased placental production of norepinephrine through increase in tyrosine hydroxylase
  - *Manyonda IT et al, Br J Obstet Gynecol, 1998*

Test characteristics

	Sensitivity	Specificity
Plasma		
metanephrine	46%(28-65)	96%(92-98)
normetanephrine	92%(74-98)	87%(82-91)
met and normet	96%(80-99)	85%(79-89)
24 hr urine		
total metanephrines	71%(51-85)	99%(98-99.9)
norepinephrine	50%(31-69)	99%(98-99.9)
epinephrine	29%(15-49)	99%(98-99.9)
dopamine	8% (2-26)	100% (98-100)
catecholamines	71%(51-85)	99%(97-100)
metanephrines and catecholamines	88%(69-96)	99%(96-99)

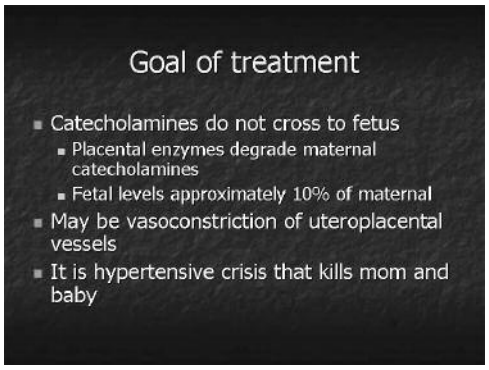
Kudva et al JCEM, 88:4533,2003

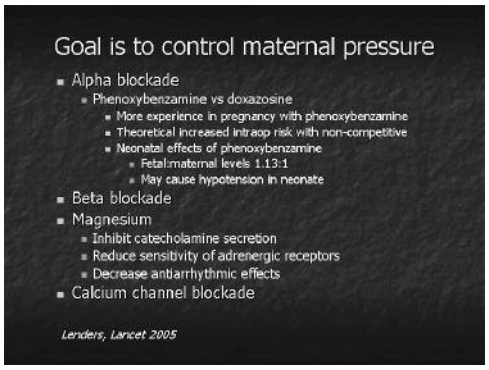
Reference range is 95% for a normal population, more appropriate cutoff is 2-fold higher than normal population

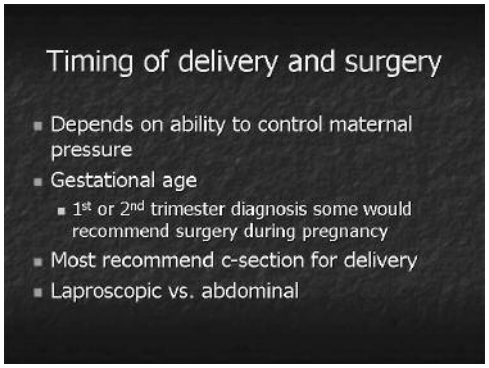
Medications that can cause false positive results

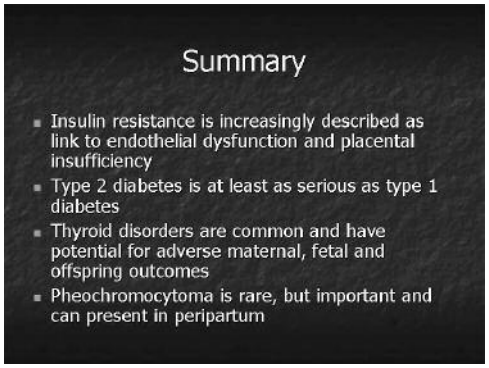
- Methyldopa, labetalol and sotalol (spectrophotometric assay only)
- Methyldopa may increase VMA production
- Tricyclic antidepressants
- Ethanol
- Clonidine withdrawal
- Acetaminophen and phenoxybenzamine (plasma metanephrines)

Talk to your lab personnel!


Goal of treatment
Catecholamines do not cross to fetus
Placental enzymes degrade maternal catecholamines
Fetal levels approximately 10% of maternal
May be vasoconstriction of uteroplacental vessels
It is hypertensive crisis that kills mom and baby


Goal is to control maternal pressure
Alpha blockade
Phenoxybenzamine vs doxazosine
More experience in pregnancy with phenoxybenzamine
Theoretical increased intraop risk with non-competitive
Neonatal effects of phenoxybenzamine
Fetal:maternal levels 1.13:1
May cause hypotension in neonate
Beta blockade
Magnesium
Inhibit catecholamine secretion
Reduce sensitivity of adrenergic receptors
Decrease antiarrhythmic effects
Calcium channel blockade
Lenders, Lancet 2005


Timing of delivery and surgery
Depends on ability to control maternal pressure
Gestational age
1st or 2nd trimester diagnosis some would recommend surgery during pregnancy
Most recommend c-section for delivery
Laproscopic vs. abdominal


Summary
Insulin resistance is increasingly described as link to endothelial dysfunction and placental insufficiency
Type 2 diabetes is at least as serious as type 1 diabetes
Thyroid disorders are common and have potential for adverse maternal, fetal and offspring outcomes
Pheochromocytoma is rare, but important and can present in peripartum

Poster Review #1

Moderator: Cynthia Wong, MD

Friday, April 28, 2006
10:30 – 11:30 a.m.

Learner Objective: To discuss and review updates and advances in the practice of obstetric anesthesia.

SOAP A-26 **Flow Dynamics of Multi-port Epidural catheters.**
A. Vasudevan, P. Hess, M. Hanna, A. Wall, B. Jakubowicz;
Beth Israel deconess Medical center, Boston, MA

SOAP A-27 **Chronobiology of spinal bupivacaine during intial phase of labor**
D. Chassard[1], E. Boselli[1], N. Thenoz[1], L. Bouvet[1], B. M. Scavone[2], B. Lemmer[3], B. Bryssine[1];
[1]Hotel Dieu Hospital, Lyon, France, [2]Northwestern Medical Faculty, Chicago, IL, [3]University Heidelberg, Mannheim, Germany

SOAP A-28 **Influence of Chronopharmacology on Duration of Intrathecal Fentanyl Labor Analgesia**
B. M. Scavone[1], R. J. McCarthy[1], C. A. Wong[1], J. T. Sullivan[1], D. Chassard[2];
[1]Northwestern University Feinberg School of Medicine, Chicago, IL, [2]Hopital de L'Hotel-Dieu, Lyon, France

SOAP A-29 **A Comparison of Combined Spinal-Epidural-PCA Analgesia with Continuous Epidural-PCA Analgesia Alone for Labor Pain**
S. Cohen, D. Zuker, C. B. Pantuck, C. W. Hunter, A. Solina, N. Prieto, D. New;
UMDNJ-RWJMS, New Brunswick, N

SOAP A-30 **The Use of Intrathecal Catheter After Accidental Dural Puncture**
W. Yi, M. Jackson, D. Santos;
Montefiore Medical Center/Albert Einstein College of Medicine, Bronx, NY.

SOAP A-31 **Women with Induced Labor do not Receive Benefit from Delaying Labor Epidural Analgesia**
P. E. Hess, A. Vasudevan, S. D. Pratt;
Beth Israel Deaconess Medical Center, Boston, MA

SOAP A-32 **The Influence of Severe Preeclampsiaon Maternal Cerebral Circulation Haemodynamics**
E. M. Shifman, E. G. Goumeniouk, A. A. Ivshin, S. E. Floka;
Republican Perinatal Center, Petrozavodsk, Russian Federation.

SOAP A-33 **Epidural Neostigmine-Bupivacaine for the Treatment of Labor Pain**
V. H. Ross, P. H. Pan, L. C. Harris, B. B. Clyne, V. S. Misa, M. D. Owen, J. C. Eisenach;
Wake Forest University Baptist Medical Center, Winston-Salem, NC.

SOAP A-34 **Development of an Assessment Tool for Evaluating Performance During General Anesthesia for Cesarean Section Utilizing a Human Patient Simulator**
C. L. Baysinger, B. Kendall, E. M. Lockhart, J. K. Boyle;
Vanderbilt University Departments of Anesthesiology and Center for Medical Simulation, Nashville, TN

Poster Review #1 (continued)

SOAP A-35 **Descriptors and Management of Patients Requiring Immediate Post-Partum Blood Transfusion: a Chart Review**
S. Dhumne[1], S. Kasodekar[1], M. Moore[1], M. Balki[1], G. Seaward[2], J. C. Carvalho[1];
[1]Department of Anesthesia, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada,
[2]Department of Obstetrics and Gynecology, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada

SOAP A-36 **Assessment of Coagulation in Preeclamptic Women with Thrombocytopenia**
L. Reed, R. Garrison, S. Sharma;
University of Texas southwestern medical center, Dallas, TX

SOAP A-37 **Evaluation of Labor Pain Using Hand Manometry**
N. P. Nonoy[1], D. B. Olson[2], J. R. Schultz[1], M. M. Neumann[2], H. Muir[1], J. Reynolds[1];
[1]Duke University Medical Center, Durham, NC, [2]Loma Linda University Medical Center, Loma Linda, CA

SOAP A-38 **Anesthesia for Cesarean delivery: A Survey of what Woman will Tolerate**
M. M. Cardoso, A. R. Amaro, M. R. Rosa, E. Lorenz;
Hospital e Maternidade Santa Joana, Sao Paulo, Brazil.

SOAP A-39 **Three Techniques for the Prophylaxis of Post-dural Puncture Headache Following Unintentional Dural Puncture in Paturients: A preliminary report.**
C. L. Baysinger, A. Robertson, J. W. Downing, E. Lockhart;
Vanderbilt University, Nashville, TN

SOAP A-40 **Incidence of Accidental Dural Puncture "Wet Tap" in Parturients with Disposable vs. Reusable Epidural Kits Among Anesthesia Residents in Training**
N. El-Shammaa, M. Soliman, C. Kaypekian, R. Beshara, R. Michael, A. R. Abadir;
The Brookdale University Hospital Medical Center, Brooklyn, NY

SOAP A-41 **The Benefits of Intraoperative Small-dose Ketamine on Postoperative Pain after Cesarean Section**
P. Kashefi;
Isfahan University of Medical Sciences, Isfahan, Iran (Islamic Republic of)

SOAP A-42 **Who Refuses Epidural Analgesia for Labor and Why? – A Survey of Two Populations**
K. E. Stack, R. Y. Gershon, C. Kerssens;
Emory University School of Medicine, Atlanta, GA

SOAP A-43 **Incidence of Postdural Puncture Headaches Following Labor Epidural Placement Comparing Loss of Resistance to Air versus Saline in an Academic Institution**
T. A. Saunders;
SUNY@Stony Brook, Stony Brook, NY

SOAP A-44 **The Transverse Approach of Lumbar Spine Ultrasound Provides Reliable Landmarks for Labor Epidurals**
J. Carvalho, C. Arzola, S. Davies, A. Rofaeel;
Department of Anesthesia and Pain Management, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada

Poster Review #1 (continued)

SOAP A-45 **Prevalence of Neonatal Hypoglycemia in Gestational Diabetic Women: Glyburide versus Diet-Controlled Diabetes Mellitus**
F. A. Ajayi, M. R. Hopkins, A. O. Famuyide;
Mayo Graduate School of Medicine, Rochester, MN

SOAP A-46 **The Effects of Adding Fentanyl and Epinephrine on the Minimum Local Analgesic Concentration of Bupivacaine for Labor Analgesia**
S. S. Shue, C. Tirado, A. Grinberg, J. J. Kraemer, P. E. Hess;
Beth Israel Deaconess Medical Center, Boston, MA

SOAP A-47 **The Association Between Breakthrough Pain and Request to Discontinue Second Stage Labor Epidural Analgesia and the Risk of Forceps Delivery**
P. Toledo, C. A. Wong, P. C. Fitzgerald, R. J. McCarthy;
Northwestern University, Chicago, IL

SOAP A-48 **Evaluation of a High-risk Obstetric Anesthetic Clinic Based in a Large Tertiary Obstetric Referral Center**
D. J. Horstman, A. Butwick, E. Riley, B. Carvalho;
Stanford University Medical Center, Stanford, CA

SOAP A-49 **Evaluation of Kybele Program for Croatia**
M. Perkovic[1], D. Kopic[1], M. D. Owen[2], A. Ujevic[1], S. Perkovic[1];
[1]University Hospital Split, Split, Croatia, [2]Wake Forest University School of Medicine, Winston-Salem, NC

SOAP A-50 **The New Labor Pain Scale (LPS): Description & Properties**
P. J. Angle[1], A. Kiss[2], J. Yee[1], R. Kung[1], Y. Murthy[1], S. Halpern[1], D. Streiner[3];
[1]Sunnybrook & Women's College HSC, Toronto, ON, Canada,
[2]Institute for Clinical Evaluative Sciences, Toronto, ON, Canada,
[3]Kunin-Lunenfeld Applied Research Unit, Baycrest Centre for Geriatric Care, Toronto, ON, Canada

SOAP A-51 **A Double-Blinded, Randomized, Placebo-Controlled Trial of Calcium Chloride for the Augmentation of Uterine Tone Following Cesarean Delivery**
E. Cappiello, L. Lugo, B. Kodali, D. Hepner, M. Harnett, L. C. Tsen;
Brigham & Women's Hospital, Boston, MA

SOAP A-52 **Minimum Local Anesthetic Dose (MLAD) of Intrathecal Levobupivacaine in Caesarean Section and the Effect of Intrathecal Sufentanil**
R. R. Parpaglioni, M. Frigo, A. Lemma, G. Barbati, D. Celleno;
Fatebenefratelli General Hospital, Rome, Italy

SOAP A-53 **Fentanyl and Sufentanil as Adjuncts for Patient Controlled Epidural Analgesia in Labor: An Equivalence Study**
S. Lilker, A. Rofaeel, M. Balki, J. Carvalho;
Department of Anesthesia and Pain Management, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada

SOAP A-54 **Use of a 360 Degree Evaluation Tool for Assessment of the ACGME General Competencies During an Obstetric Anesthesia Rotation**
R. Y. Fragneto, R. Schell;
University of Kentucky, Lexington, KY

Panel: Team Training in Obstetrics

Moderator: Stephen Pratt, MD

Panelists: Paul Preston, MD;
Benjamin Sachs, MD; David Birnbach, MD

Friday, April 28, 2006
11:30 a.m. – 1:00 p.m.

Learner Objective: Unavailable at the time of printing.

Patient Safety in L&D
Simulation in Kaiser Permanente
SOAP 2006

Paul Preston, MD
Anesthesiologist, San Francisco Medical Center
Physician Patient Safety Educator,
The Permanente Medical Group

Simulation Based Team Training

- Should we be doing this?
- Can we improve safety and emergency responses?
- What are we learning?

JCAHO Sentinel Event Alert, Issue 30, July 2004

- Conduct team training in perinatal areas to teach staff to work together and communicate more effectively
- High risk events (shoulder dystocia, STAT C/S, hemorrhage, neonatal resuscitation)- conduct drills to help staff prepare for such events, and debriefings to evaluate team performance and identify areas for improvement
- Apply evidence based guidelines to: FHR interpretation and communication, availability of personnel, neonatal resuscitation areas
- Why do they make these recommendations?

TADMUS

- Realistic, simulated environment for naval combat command center
- Variables- stress, fatigue, chaos, information overload
- These degrade performance, BUT
- Training under these conditions improves performance

Reoccurring Clinical Problems*

- Inability to recognize and respond to fetal distress,
- Inability to effect timely cesarean birth for fetal distress,
- Inability to resuscitate a depressed infant,
- Inappropriate use of pitocin, leading to uterine hyperstimulation, uterine rupture, & fetal distress.
- Inappropriate use of forceps / vacuum leading to fetal trauma and shoulder dystocia.
- "If you get these things right, you eliminate 80% of perinatal liability claims"- Eric Knox

*MMI Company data of 250 hospitals over 10 years

Medical Team Data

- **Critical Event Teams, Pittsburgh**
  - **30% "Patient" Survival, first scenario of four**
  - **95% Survival, last scenario of four**
- **Lou Halamek " No randomized prospective trial has shown that medical simulation changes outcomes…. But which airplane would you fly on?"**

Your Job- Improve This Culture

- What kind of industry would ask people to perform complex, emergency tasks very well, NOT give them state of the art training, and punish them for failure?
  - We have an obligation to train our people to help our patients

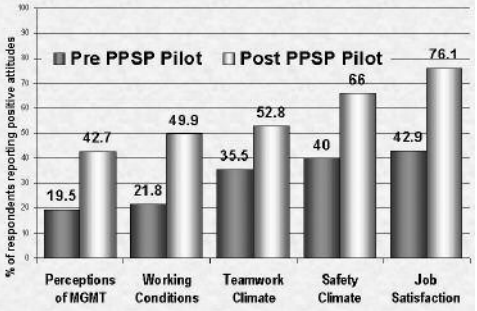
What makes you change?

- When we discover something meaningful for ourselves, we incorporate our thoughts and feelings by being personally involved in the learning event
- Independence, creativity and self reliance are all facilitated when self criticism and self evaluation are primary and evaluation by others secondary

Your Job- Improve This Culture

- You start with experts in medical care
- Provide concepts of error reduction, high reliability, human factors
- Back these up with data
- Better Training Techniques-Simulation, immersive learning, self debriefing of simulated performances (which you facilitate)

PPSP Pilot Scores



What Predicts Nurse Turnover?

- Job Satisfaction- I like what I do, OR
- Teamwork- I like who I do it with

Top 3 predictors of nursing turnover:

- Doctors and nurses work together as a team
- I can speak up if I disagree with physicians
- Disagreements in this unit are resolved with what is right for the patient

Reinforce Human Factors

- Human factors techniques are:
  - Briefings
  - Assertion
  - Situational awareness
  - SBAR for clear communications
- Human factors skills
  - Build teams
  - Improve communication
  - Reduce and trap the errors that will always occur.
- Teams will see these skills actually work.

I guarantee it

Get Everyone On Board

"I come from a state that raises corn and cotton and cockleburs and Democrats, and frothy eloquence neither convinces nor satisfies me. I am from Missouri. You have got to show me."

NOT a KP clinician (but could have been)

Identify and Fix System Problems

- What gets in the way of safety?
- Defer to your experts, the frontline workers who do the job!
- Work together as a team, leaders and frontline staff, to constructively address these things
- Follow up training in our units shows this is happening

Other Key Crisis Management Skills

- Declaring emergency:
  - Early
  - Clearly
- Leadership, optimal team structure
- Attention allocation
- Task prioritization and distribution
- Effective, efficient resource use
- Clear orders, cross check and verification

Make Routine Debriefing Part of Team Culture

- Look at routine and critical operations every day
- Recognize how regular debriefing is key to unit safety
- Practice skills on the CETT day
- Learn a constructive, blame free approach

Simulation in the 1990s

- Anesthesia Crisis Resource Management (ACRM)
  - David Gaba MD, Steve Howard MD, Jeff Cooper PhD, Robert Helmreich PhD, Key Dismukes PhD
  - Stanford, Harvard, Pittsburgh, Gainesville, Seattle, NASA Ames
  - Simulation as a tool to teach communications, crisis management, error reduction, some human factors

Where We Differ from ACRM

- Start with human factors
- Build a multidisciplinary team
  - Charged to improve their unit
- Train entire teams
  - All providers and staff + a few confederates
- Experienced providers
- Direct linkage to unit leaders
  - Purpose: Find and fix system problems- The Unit Manager records the debriefings

Other Differences

- Expensive simulators
- Center for Immersive Learning
- Training on site:
  - Hard on your nerves but great for finding real systems problems and being plausible
  - Designated Simulation Center: Predictable but artificial

CETT Training in 4 Hours

- **Quick review:**
  - Human factors, team skills
- **Orientation:**
  - Orientation to simulator
  - Confidential, blame free environment
- **Simulations:**
  - Actual occurrences used as basis for scenarios
  - Focus on apparent weaknesses in our system
  - Situations where assessment, communication are important
- **Video-augmented debrief**

How To Look Great (and rescue your patients)

- Optimum Location, people and equipment
- Floor RN, Brief the Team
- Know your environment
- Clear Leader- This may change
- Regain Situational Awareness
  - Chaos is Never OK
- Rapid Response Team
- We tell this to our participants up front!

CRITICAL EVENT DRILLS:

What are they?

- Lifelike
- Real time
- Normal noise - confusion - resources
- Situation must be diagnosed and managed by team exactly as in real life
- You will be doing your usual job at all times

OB Scenarios

Maternal
- STAT C/Section
- Shoulder dystocia,
- Difficult maternal airway
- Spinal in labor room
- Hemorrhage
- Fire in the OR
- Amniotic fluid embolism (AFE)
- Total spinal
- Seizures
- Anaphylaxis

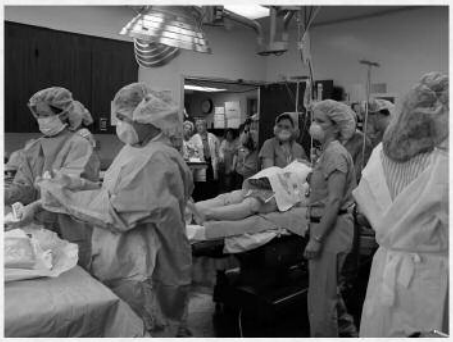
Neonate
- Neonatal resuscitation
- Meconium
- Premature birth
- Neural tube defect
- Diaphragmatic hernia
- Abdominal wall defect
- ECMO
- Hypovolemia
- Pneumothorax

Med/ Surg Scenarios

- Vfib on monitored patient
- Anaphylaxis
- Cardiogenic shock causing confusion, requiring emergency cardiac procedure
- Difficulty getting help from primary service
- Progressive respiratory deterioration
- Sepsis
- EGDT (Early Goal Directed Therapy)
- Bradycardia requiring pacing
- Difficult family members
- Most situations requiring rapid response or code teams

Other potential targets

- OR- Numerous scenarios exist
- Cardiac Cath Lab- PCI, tamponade, cardiac arrest, respiratory deterioration, anaphylaxis, IABP, Transport
- ED
- Pediatric emergencies
  - Major request by our regional chiefs of pediatrics



Low Tech Drills are Great

- Slow time on unit
- Volunteer to act as patient
- Call out the emergency and evolution of problem
- Good way to work out basic problems, train beginners in key tasks, improve team performance
- More realism does add value

Cautions for Conducting Simulations

- Simulation for beginners is different than simulation for expert teams
- Learn the tasks first before stressing the systems
- Be sensitive in running and debriefing drills

Simulation is Stressful

- Benefits:
  - Mimics reality
  - Reinforce learning
  - Improve real world performance
- The down side:
  - Can actually impair performance by excessive focus on what went wrong

DEBRIEFING: RULE # 1

Critique the performance

. . .

not the person

CRITICAL EVENT DEBRIEFING

- What went well?..... Why?
- What could be better?.....Why?
- What systems' problems did we find?
- What communication problems did we find?
- What teamwork glitches did we find?

Navy Observations on Simulations in OB

- Why don't you use call outs, crosschecks routinely?
  - Do we have a common mental model?
- Who is in charge?
  - VERY tricky question
- Who is supposed to be the situation commander?
  - The what?

What We've Learned: *We Have Good People*

- They care, they work hard, they know their jobs
- Very willing to cross cover and help out
  - If they know what needs covering and aren't tied up
- Good at catching errors
  - Not as adept at recognizing and reporting system flaws

What We've Learned: *Best Practices Exist*

- Every place has a great solution to some problem that vexes other facilities
  - They are not aware how great it is
  - It doesn't get shared

What We've Learned *Nursing*

- A nurse lead is needed to:
  - Stand back, big picture during critical event
  - Make sure other patients are covered
  - Reallocate work, flow control, family
  - Assist OB physician in maintaining situational awareness

Poor Communications Example: *Pediatrics*

- Needs a briefing
- What they need to hear:
  - Situation:
    - We need you: Where and how fast!
  - Background:
    - Gestational age, asphyxia, meconium, drugs
    - If possible: infection, diabetes, brief maternal history
  - Assessment:
    - Possible uterine rupture
  - Recommendation
    - Come STAT to OR 2!

What We've Learned: *Pediatrics*

- Great NRP in delivery rooms
- Problems with sick neonates in labor rooms
  - Stocking, preparing, locking up equipment and meds
  - Great checklist: Hayward
- Some issues with adequate pediatric teams
  - ALS Nurse is a neat idea

What We've Learned: *Anesthesia*

- OR equipment:
  - Great but not always checked
  - *Anesthesiology*, Feb. 2005
- Failed intubation
  - Equipment: Great
  - Communication and algorithm compliance: An opportunity
- Labor room preparations: Variable

What We've Learned: *Moving Patient to OR STAT*

- Call early for help
- Unplug all piggybacks, put main IV on bed
- Epidural pump on bed
- Clear person who gives the word to go
- Faster, IV stays in, less staff injury
- Less chance of inadvertent drug bolus

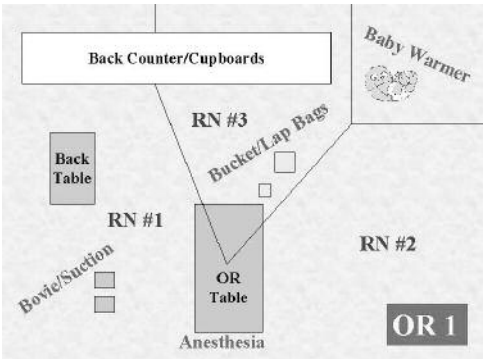
Dysfunctional At A Glance

What We've Learned: *Emergency Call Systems*

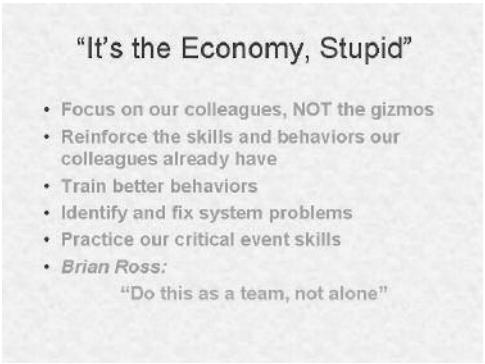
- Call a stat cesarean with one call
  - In house pagers, overhead backup?
- Get help in labor room stat, including MD
  - People run to OR, not labor room
- Need better pager / phone systems!

What We've Learned: *Room Readiness*

- The OR we never use
  - Except when it is really important!
  - Should be: Same layout in both rooms!
- Labor rooms: Location of equipment
- Stocking and locking of emergency supplies and drugs
  - Not there or you can't get to it!




What We've Learned:
Your Worst Nightmare
• Crash cart location
– Should be familiar
– Equipment and drug familiarity issues
• Calling a code:
– When do we call a code?
– Can I call a code?
– How?
• Where would we perform an emergency cesarean if mom has a cardiac arrest?


"It's the Economy, Stupid"
• Focus on our colleagues, NOT the gizmos
• Reinforce the skills and behaviors our colleagues already have
• Train better behaviors
• Identify and fix system problems
• Practice our critical event skills
• Brian Ross:
"Do this as a team, not alone"

NOTES

Scientific Program

SATURDAY, APRIL 29, 2006

7:00 - 8:00 am	**Breakfast with the Experts** Moderator: Robert Gaiser, MD Experts: Jodie Buxbaum, MD; Jose Carvalho, MD, PhD, FRCPC (Portuguese); Sergio Cerda, MD (Spanish); Helene Finegold, MD; Regina Fragneto, MD; David Hepner, MD (Spanish); Bupesh Kaul, MD; Gordon Lyons, FRCA; Edward McGonigal, MD; Mary McHugh, MD; Deborah Qualey, MD; Jayanthie Ranasinghe, MD; Edward Riley, MD; Gurinder M. S. Vasdev, MD; Lela Weems, MD
7:00 - 8:00 am	**Continental Breakfast; Posters**
8:15 - 9:15 am	**Gerard W. Ostheimer Lecture: What's New in OB Anesthesia?** Introduction: Brenda Bucklin, MD Roshan Fernando, FRCA
9:15 - 9:45 am	**Coffee Break; Posters**
9:45 - 10:45 am	**Poster Review #2 –** Moderator: Edward Riley, MD
10:45 - 11:45 am	**Fred Hehre Lecture** Introduction: William R. Camann, MD David Chestnut, MD
11:45 - 1:00 pm	**Lunch (On Your Own)**
1:00 - 2:30 pm	**Best Paper Presentations (6)** – Moderator: Gordon Lyons, MD Judges: William R. Camann, MD; Prof. Warwick Ngan Kee; Kiki Palacios, MD; Richard Smiley, MD, PhD
2:30 - 4:00 pm	**Panel: Obstetric Anesthesia and Coexisting Diseases** Moderator: Richard Wissler, MD, PhD Panelists: Brendan Carvalho, MB, BCh; Manuel Vallejo, DMD, MD; Richard Wissler, MD, PhD
4:00 - 5:00 pm	**Open Forum: Proposed Revisions to the ASA Practice Guidelines on Obstetric Anesthesia**
6:00 -11:00 pm	**SOAP Banquet**

NOTES

Breakfast with the Experts

Moderator: Robert Gaiser, MD

Saturday, April 29, 2006
7:00 – 8:00 a.m.

Experts:
Jodie Buxbaum, MD
Jose Carvalho, MD, PhD, FRCPC (Portuguese)
Sergio Cerda, MD (Spanish)
Helene Finegold, MD
Regina Fragneto, MD
David Hepner, MD (Spanish)
Bupesh Kaul, MD
Gordon Lyons, FRCA
Edward McGonigal, MD
Mary McHugh, MD
Deborah Qualey, MD
Jayanthie Ranasinghe, MD
Edward Riley, MD
Gurinder M. S. Vasdev, MD
Lela Weems, MD

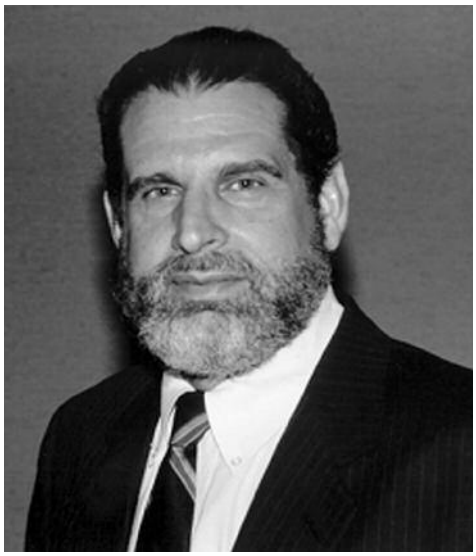
Learner Objective: Through guided discussion, the participant will be able to formulate an anesthetic plan for the management of a parturient with a major pre-existing or pregnancy-related co-morbidity.

The Gerard W. Ostheimer Lecture:

What's New in Obstetric Anesthesia?

Introduction: Brenda Bucklin, MD
Roshan Fernando, FRCA

Learner Objective: The learner will be able to describe the most important literature published during 2005 pertinent to the anesthetic management of the pregnant patient.



Gerard W. Ostheimer, MD
1950-1995

The Gerard W. Ostheimer Lecture:

What's New in Obstetric Anesthesia?

Roshan Fernando, FRCA • ***Consultant Anesthetist & Honorary Senior Lecturer***
Department of Anesthesia • Royal Free Hospital • London, UK

The following journals were hand searched (January – December 2005):

Anesthesia Journals

Anesthesiology
Anesthesia & Analgesia
Anaesthesia
Acta Anaesthesiologica Scandanavica
Acta Anaesthesiologica Belgica
Anesthesiology Clinics of North America
ASA Newsletter
British Journal of Anaesthesia
Canadian Journal of Anaesthesia
Critical Care Medicine
European Journal of Anaesthesiology
International Journal of Obstetric Anesthesia
Journal of Clinical Anesthesia
Obstetric Anesthesia Digest
Regional Anesthesia & Pain Medicine
Anaesthesia & Intensive Care
Current Opinion in Anaesthesiology

Obstetrics & Gynecology Journals

American Journal of Obstetrics & Gynecology
Australian & New Zealand Journal of Obstetrics & Gynaecology
British Journal of Obstetrics & Gynaecology
Clinical Obstetrics & Gynecology
Current Opinion in Obstetrics & Gynecology
European Journal of Obstetrics & Gynecology & Reproductive Biology Fertility & Sterility
International Journal of Gynecology & Obstetrics
Obstetrics & Gynecology
Obstetrical & Gynecological Survey
Acta Obstetricia et Gynecologica Scandinavica
Journal of Perinatology
Current Obstetrics & Gynecology
Gynecologic & Obstetric Investigation
Journal of Maternal-Fetal & Neonatal Medicine
Obstetrics & Gynecology Clinics of North America

General Journals

BMJ
JAMA
New England Journal of Medicine
Nature
Lancet
Science

Pediatric Journals

Pediatrics
Journal of Paediatrics & Child Health
Journal of Pediatrics

The following journals were electronically searched:

Heart
European Heart Journal
Journal of the American College of Cardiology
British Journal of Haematology
Cochrane Database

What's New in Obstetric Anesthesia?

There is a short summary after almost all the references in the syllabus. In addition, I have prefixed some references with a triple asterisk (***) if they were of particular interest to me. This system has nothing to do with the paper's relative scientific merit, but merely an indication that it "caught my eye" during my browsing of over 1,400 references in compiling this syllabus.

The index below is new and is a slight departure from previous years. I am very grateful to Professor Felicity Reynolds in helping to create it.

Maternal issues
- Coexisting disease
  - aging
  - autonomic dysfunction
  - cardiac
  - connective tissue
  - endocrine
  - fertility problems, assisted reproduction
  - gastrointestinal
  - hematologic
  - hepatic
  - hypertension
  - immunologic
  - infection
  - lymphatic
  - metabolic
  - musculoskeletal
  - neoplasm
  - neurologic
  - obesity
  - orthopedic
  - psychiatric
  - renal
  - respiratory
  - substance abuse
  - trauma
  - vascular
- Pharmacologic alterations in pregnancy
- Physiologic alterations in pregnancy
- Placental topics

Fetal issues
- Monitoring
- Surgery
- Macrosomia
- Resuscitation (intrauterine)

Newborn issues
- Evaluation
  - Acid-base balance
  - Behavior
  - Maternal fever and neonatal sepsis investigation
- Cerebral Palsy
- Low Birth Weight
- Meconium Aspiration
- Morbidity
- Mortality
- Pharmacology
- Respiratory Distress
- Resuscitation

Obstetric Complications
- Abdominal Pregnancy
- Amniotic Fluid Embolism
- Hemorrhage
- Hyperemesis Gravidarum
- Maternal Mortality
- Multiple Gestation
- Neurologic Injury
- Ovarian Hyperstimulation Syndrome
- PIH/Preeclampsia/Eclampsia
- Perineal Trauma/Lacerations
- Preterm Labor
- Pulmonary Embolism
- Retained Placenta
- Uterine Rupture

Analgesia and management of labor and delivery
- Techniques
  - Systemic (opioid)
  - Regional
  - Alternative Techniques
  - Support during labor

Regional analgesia
- Anatomy
- Pharmacology
- Physiology
- Insertion techniques & equipment
  - Epidural
  - CSE
  - Spinal / CSA
  - Test Dose
- Maintenance
  - Infusion / bolus doses
  - PCEA
  - Ambulation

Summary continued on next page

What's New in Obstetric Anesthesia?

Summary continued from previous page

- Indications, special circumstances
  - Induction and augmentation of labor
  - Breech and other abnormal presentation
  - Multiple pregnancy etc.
  - Previous cesarean section (VBAC)
- Outcome
  - Progress of labor
  - Instrumental or operative delivery
  - Complications
  - Fetal Effects
  - Breastfeeding
- Maternal education and consent
- Feeding during labor

Anesthesia for cesarean delivery

- Fetal/neonatal outcome
- General Anesthesia
- Regional Anesthesia
- Oxygenation
- Vasopressors and i.v. fluids

Anesthesia for non-obstetric surgery during pregnancy

- Cervical cerclage
- Tubal Ligation
- Termination of pregnancy

Complications of Anesthesia

- Airway
- Allergy
- Aspiration and Prophylaxis
- Cardiac Arrest
- Drug Error
- Equipment
- High Spinal
- Inadequate Anesthesia
- Infection
- Intravenous Toxicity
- Nausea/Vomiting
- Neurologic Injury
- Post dural puncture headache
- Prolonged Spinal Anesthesia
- Pruritus
- Respiratory Depression
- Seizures
- Shivering/Hypothermia

Postpartum Care

- Critical Care
- Pain Management
- Pharmacology
- Physiology

Miscellaneous

- Economics and Staffing
- Education/Residency/Registrar Training
- Ethics and Medicolegal Issues
- Genetics
- Research
- History
- Websites/Books/Leaflets/Journal Announcements/Special articles

Maternal issues

Coexisting disease

Aging

(1) Cleary-Goldman J, Malone FD, Vidaver J et al. Impact of maternal age on obstetric outcome. Obstet Gynecol 2005; 105:983-90.

Increasing maternal age is a risk factor for miscarriage, chromosomal abnormalities, Gestational diabetes, placenta praevia, placental abruption, cesarean delivery and perinatal loss.

(2) Kaaja RJ, Greer IA. Manifestations of chronic disease during pregnancy. Jama 2005; 294:2751-7.

Good review asking the question, does pregnancy unmask pre-existing chronic disease (e.g. diabetes, coronary artery disease, thrombophilia) or the potential to develop such diseases in later years.

(3) Ataullah I, Freeman-Wang T. The older obstetric patient. Curr Obstet Gynaecol 2005; 15:46-53.

Good review on the risks associated with being an "older" obstetric patient. Mortality overall is higher for older women from pulmonary embolism, hypertensive disease, amniotic fluid embolism, and psychiatric causes.

(4) Callaway LK, Lust K, McIntyre HD. Pregnancy outcomes in women of very advanced maternal age. Aust N Z J Obstet Gynaecol 2005; 45:12-6.

Large retrospective cohort study of women age > 45 yrs at time of delivery. 76 women reviewed. Maternal and neonatal outcomes were good although there was a significant increase in the cesarean section rate.

(5) Rai MR, Lua SH, Popat M, Russell R. Antenatal anaesthetic assessment of high-risk pregnancy: a survey of UK practice. Int J Obstet Anesth 2005; 14:219-22.

A UK OAA survey of how high risk antenatal anesthetic referrals are managed. Only 30% of units surveyed had formal clinics.

Autonomic dysfunction

(6) Freeman R. Autonomic peripheral neuropathy. Lancet 2005; 365:1259-70.

Review. Conditions discussed include diabetes, amyloid, infectious diseases and toxin related problems.

Cardiac

(7) *** Bonnin M, Mercier FJ, Sitbon O et al. Severe pulmonary hypertension during pregnancy: mode of delivery and anesthetic management of 15 consecutive cases. Anesthesiology 2005; 102:1133-7.

Low dose CSE used for some cesarean sections, but overall despite modern treatment efforts, mortality was still 36%.

(8) Kies SJ, Pabelick CM, Hurley HA et al. Anesthesia for patients with congenital long QT syndrome. Anesthesiology 2005; 102:204-10.

Anesthesia management of this condition.

(9) Hameed A, Akhter MW, Bitar F et al. Left atrial thrombosis in pregnant women with mitral stenosis and sinus rhythm. Am J Obstet Gynecol 2005; 193:501-4.

Three case reports of patients of atrial thrombus in MS despite sinus rhythm.

(10) Ladner HE, Danielsen B, Gilbert WM. Acute myocardial infarction in pregnancy and the puerperium: a population-based study. Obstet Gynecol 2005; 105:480-4.

An interesting study using data over a 10 yr period from the majority of deliveries in California. 151 cases reported within 5.4 million deliveries. Chronic hypertension, diabetes, advanced age, eclampsia and severe preeclampsia are independent risk factors for acute MI.

(11) Chapa JB, Heiberger HB, Weinert L et al. Prognostic value of echocardiography in peripartum cardiomyopathy. Obstet Gynecol 2005; 105:1303-8.

Review of cases between 1988 – 2001.

(12) Dwyer BK, Taylor L, Fuller A et al. Percutaneous transluminal coronary angioplasty and stent placement in pregnancy. Obstet Gynecol 2005; 106:1162-4.

Case rpt of a mother with a 3rd trimester MI treated with a stent and platelet inhibitors.

(13) Bendayan D, Hod M, Oron G et al. Pregnancy outcome in patients with pulmonary arterial hypertension receiving prostacyclin therapy. Obstet Gynecol 2005; 106:1206-10.

Three mothers with this condition treated with prostacyclin and LMWH.

(14) Evans A, Stacey M. Ambulatory cardiac monitoring during pregnancy. Anaesthesia 2005; 60:206-7.

Letter. Patient with sinus tachycardia given a commercial sports wristwatch HR monitor to regulate her HR with various activities during pregnancy.

(15) Eid L, Ginosar Y, Elchalal U et al. Caesarean section following the Fontan procedure: two different deliveries and different anaesthetic choices in the same patient. Anaesthesia 2005; 60:1137-40.

A case rpt of a mother who had 2 cesarean sections – one under GA and one under regional blk.

(16) Lewis S, Ryder I, Lovell AT. Peripartum presentation of an acute aortic dissection. Br J Anaesth 2005; 94:496-9.

Case report of a mother who underwent a successful repair of the dissection following a cesarean section, after the diagnosis at the initial presentation was missed.

(17) Okutomi T, Saito M, Amano K et al. Labour analgesia guided by echocardiography in a parturient with primary dilated cardiomyopathy. Can J Anesth 2005; 52:622-5.

Interesting case report of a mother with DCM who had a spinal catheter placed initially using fentanyl and later bupivacaine. Subsequent failure of the spinal catheter led to siting of a CSE culminating in a vaginal delivery. Echocardiography was used throughout to monitor and guide clinical management.

(18) Ioscovich A, Elstein D. Images in Anesthesia: Transesophageal echocardiography during Cesarean section in a Marfan's patient with aortic dissection. Can J Anaesth 2005; 52:737-8.

TEE was used for intraoperative management during general anesthesia for cesarean section.

(19) Wikstrom A-K, Haglund B, Olovsson M, Lindeberg SN. The risk of maternal ischaemic heart disease after gestational hypertensive disease. BJOG 2005; 112:1486-91.

A cohort study of a large section of the female Swedish population giving birth to their first child. Mothers who had severe hypertensive disease during pregnancy were more likely to have ischemic heart disease in later life.

(20) Morton A. Pregnancy outcome in a mother with alcoholic cardiomyopathy. Aust N Z J Obstet Gynaecol 2005; 45:328-30.

Case report. Management by careful drug therapy controlled cardiac failure in this mother – nifedipine, hydralazine and carvedilol.

(21) Denschlag D, Loop T, Klisch J et al. Thrombolytic therapy and combined cesarean section and hysterectomy in prosthetic mitral valve thrombosis in pregnancy. Acta Obstet Gynecol Scand 2005; 84:404-6.

Complicated case report of a mother at 27 weeks gestation with multiple cardiac problems that developed thrombus around the mitral valve and also in the basilar artery leading to neurological symptoms. Despite anticoagulation and thrombolytic therapy, the worsening clinical situation dictated delivery by cesarean section.

(22) Lapinsky SE. Cardiopulmonary complications of pregnancy. Crit Care Med 2005; 33:1616-22.

A short review of complications including a brief overview of maternal physiology.

(23) Murali S, Baldisseri MR. Peripartum cardiomyopathy. Crit Care Med 2005; 33:S340-6.

Review.

(24) Peters CW, Layon AJ, Edwards RK. Cardiac arrest during pregnancy. J Clin Anesth 2005; 17:229-34.

Case report and good discussion/commentary about the causes of cardiac arrest during pregnancy.

(25) Cuthill JA, Young S, Greer IA, Oldroyd K. Anaesthetic considerations in a parturient with critical coronary artery disease and a drug-eluting stent presenting for caesarean section. Int J Obstet Anesth 2005; 14:167-71.

Interesting case report of a 38 yr old woman who developed symptoms of coronary artery disease at 18 weeks' gestation. Eventually a drug-eluting stent and drug treatment with clopidogrel, aspirin and LMWH resolved her symptoms. She went on to have an elective cesarean section under general anesthesia.

(26) Behl S, Wauchob TD. Long QT syndrome: anaesthetic management at delivery. Int J Obstet Anesth 2005; 14:347-50.

A long QT interval can predispose to life threatening ventricular arrhythmias. The case report describes the successful spontaneous vaginal delivery of such a patient under CSE labor analgesia.

(27) Hamlyn EL, Douglass CA, Plaat F et al. Low-dose sequential combined spinal-epidural: an anaesthetic technique for caesarean section in patients with significant cardiac disease. Int J Obstet Anesth 2005; 14:355-61.

Four cases of mothers with significant cardiac disease (pulmonary hypertension, mitral stenosis, HOCM & aortic stenosis) who delivered by cesarean section using a low dose CSE technique.

(28) Matthews T, Dickinson JE. Considerations for delivery in pregnancies complicated by maternal hypertrophic obstructive cardiomyopathy. Aust N Z J Obstet Gynaecol 2005; 45:526-8.

Case report of a 27 year old mother with known HOCM. A cesarean section under CSE (low dose spinal + epidural topup) was performed with a phenylephrine infusion running. Invasive monitoring and transthoracic echocardiography provided cardiovascular optimization. In addition good multidisciplinary care throughout the pregnancy resulted in a good outcome.

(29) Hayek E, Gring CN, Griffin BP. Mitral valve prolapse. Lancet 2005; 365:507-18.

A good review on mitral valve prolapse including the pathophysiology and genetics of the condition.

(30) Dalziel SR, Walker NK, Parag V et al. Cardiovascular risk factors after antenatal exposure to betamethasone: 30-year follow-up of a randomised controlled trial. Lancet 2005; 365:1856-62.

Follow-up study of individuals at age 30 yrs whose mothers had participated in a randomized double blind placebo controlled study of antenatal betamethasone to prevent neonatal respiratory distress syndrome. There were no differences in cardiovascular risk factors.

(31) Nallamothu BK, Saint M, Saint S, Mukherjee D. Clinical problem-solving. Double jeopardy. N Engl J Med 2005; 353:75-80.

Case report of a 36 yr old mother at 34 weeks gestation presenting with chest pain. Diagnosis was of an acute coronary artery dissection.

(32) Cox PBW, Gogarten W, Marcus MAE. Maternal cardiac disease. Curr Opin Anaesthesiol 2005; 18:257–62.

Review which includes the management of patients with valvular disease, congenital heart disease, hypertrophic obstructive cardiomyopathy, Marfan syndrome and acute coronary syndromes.

(33) Doyle NM, Monga M, Montgomery B, Dougherty AH. Arrhythmogenic right ventricular cardiomyopathy with implantable cardioverter defibrillator placement in pregnancy. J Matern Fetal Neonatal Med 2005; 18:141-4.

Case report of a patient with ARVC who was admitted at 21 weeks gestation with palpitations which were the result of bigeminy and premature ventricular contractions. She was successfully treated with an ICD and went on to have an assisted forceps delivery under epidural analgesia.

(34) Gomar C, Errando CL. Neuroaxial anaesthesia in obstetrical patients with cardiac disease. Curr Opin Anaesthesiol 2005; 18:507–12.

Good basic review of various cardiac conditions seen in obstetric patients including, valvular conditions, ventricular septal defects, pulmonary hypertension and Eisenmenger's syndrome outlining the principles of anesthetic management. The role of regional blockade is also discussed.

(35) Meijer JM, Pieper PG, Drenthen W et al. Pregnancy, fertility, and recurrence risk in corrected tetralogy of Fallot. Heart 2005; 91:801-5.

Dutch national database study of people with congenital heart disease – including the largest Fallot/pregnancy series so far documented. 83 women had corrected Fallot's tetralogy. 29 of these patients had 63 pregnancies of which 50 were successful (in 26 patients). There was a 12% complication rate in 6 pregnancies, mainly due to right sided heart failure and/or arrhythmias. The authors advise specialist cardiology input before/during/after pregnancy.

(36) Meijboom LJ, Vos FE, Timmermans J et al. Pregnancy and aortic root growth in the Marfan syndrome: a prospective study. Eur Heart J 2005; 26:914-20.

Dutch prospective study in women with Marfan's syndrome (MS) – pregnancy can increase the rate of dilatation, dissection and aortic rupture. 127 with Marfan's syndrome were followed up between 1993 and 2004. 33 pregnant women had echocardiography for aortic root size estimation (throughout pregnancy and postpartum) and were compared with the control group of MS women who were not pregnant. There was no change in aortic size during / after pregnancy and no differences between controls. There were no cardiac complications.

(37) Meijboom LJ, Drenthen W, Pieper PG et al. Obstetric complications in Marfan syndrome. Int J Cardiol 2005.

Retrospective Dutch database study. Pregnancy in women with Marfan syndrome is associated with a high rate of premature deliveries, preterm premature rupture of membranes and increased mortality in the offspring.

(38) Vriend JW, Drenthen W, Pieper PG et al. Outcome of pregnancy in patients after repair of aortic coarctation. Eur Heart J 2005; 26:2173-8.

Retrospective review of 167 women using the Dutch CONCOR database. 54 women had 126 pregnancies. There were no cases of aortic rupture or dissection. Although there were no major maternal or neonatal problems after coarctation repair, there was an increased incidence of preeclampsia and miscarriage.

(39) *** Elkayam U, Bitar F. Valvular heart disease and pregnancy part I: native valves. J Am Coll Cardiol 2005; 46:223-30.

Review with discussion about maternal / fetal outcomes. Methods of analgesia / anesthesia are briefly mentioned. The authors state that the mode of delivery for the majority of these patients should be vaginal unless there is an obstetric indication for cesarean section.

(40) *** Elkayam U, Bitar F. Valvular heart disease and pregnancy: part II: prosthetic valves. J Am Coll Cardiol 2005; 46:403-10.

Good review of bioprosthetic (tissue) and mechanical heart valves in pregnancy. Several anticoagulation regimens for mechanical valves are given including the 2004 guidelines from the American College of Chest Physicians and the authors own regimen for pregnancy anticoagulation which is based on women of high or low risk.

(41) Abdel-Hady ES, El-Shamy M, El-Rifai AA et al. Maternal and perinatal outcome of pregnancies complicated by cardiac disease. Int J Gynaecol Obstet 2005; 90:21-5.

Observational study in a tertiary center in Egypt. 86 cases were admitted during a 1 year period. 90% were due to Rheumatic heart disease.

(42) Connolly HM. Pregnancy in women with congenital heart disease. Curr Cardiol Rep 2005; 7:305-9.

Review.

(43) van Mook WN, Peeters L. Severe cardiac disease in pregnancy, part I: hemodynamic changes and complaints during pregnancy, and general management of cardiac disease in pregnancy. Curr Opin Crit Care 2005; 11:430-4.

Review of pregnancy cardiac physiological changes. There is also an interesting table which gives mortality risks for various groups of pregnant patients with cardiac disease.

(44) van Mook WN, Peeters L. Severe cardiac disease in pregnancy, part II: impact of congenital and acquired cardiac diseases during pregnancy. Curr Opin Crit Care 2005; 11:435-48.

Review of many cardiac conditions including Fallot's tetralogy, Eisenmenger's syndrome, coarctation and ischemic heart disease. Of interest is a table with an extensive list of cardiac drugs with associated maternal and fetal effects as well as the FDA risk category and breastfeeding compatibility.

(45) *** Head CE, Thorne SA. Congenital heart disease in pregnancy. Postgrad Med J 2005; 81:292-8.

Good review with additional information (with line diagrams) about patients with transposition of the great arteries and those who have undergone a modified Fontan operation for a single functional ventricle. The brief section on anticoagulation for mechanical valves is particularly good and highlights the high risk of valve thrombosis with heparin only anticoagulation compared to warfarin.

(46) Abbas AE, Lester SJ, Connolly H. Pregnancy and the cardiovascular system. Int J Cardiol 2005; 98:179-89.

Review.

(47) McCrath DJ, Cerboni E, Frumento RJ et al. Thromboelastography maximum amplitude predicts postoperative thrombotic complications including myocardial infarction. Anesth Analg 2005; 100:1576-83.

Non-obstetric study of 240 patients. TEG MA > 68 was associated with increased postop thrombotic complications incld MI.

Connective tissue

(48) Chakravarty EF, Colon I, Langen ES et al. Factors that predict prematurity and preeclampsia in pregnancies that are complicated by systemic lupus erythematosus. Am J Obstet Gynecol 2005; 192:1897-904.

10 yr cohort study. Flare-ups occurred in most patients. Thrombocytopenia, hypertension, and prednisone use may be predictive factors for certain adverse outcomes.

(49) Sasaki H, Washio M, Ohara N, Maruo T. Acute onset of polymyalgia rheumatica in pregnancy. Obstet Gynecol 2005; 106:1194-6.

Case rpt.

(50) Douglas MJ, Ensworth S. Anesthetic management of the parturient with relapsing polychondritis. Can J Anesth 2005; 52:967-70.

A case report of a mother presenting for an emergency cesarean section with RP. Airway problems are a major feature of this disease which requires multidisciplinary management.

(51) Glynn JC, Yentis SM. Epidural analgesia in a parturient with classic type Ehlers-Danlos syndrome. Int J Obstet Anesth 2005; 14:78-9.

Letter. Inadequate block with a labor epidural. The authors postulate a potential resistance to local anesthetics in patients with this syndrome.

(52) Egerman RS, Ramsey RD, Kao LW et al. Hypertensive disease in pregnancies complicated by systemic lupus erythematosus. Am J Obstet Gynecol 2005; 193:1676-9.

Retrospective case notes study. Chronic hypertension was present in 28% of patients with SLE (n=48). The incidence of preeclampsia increased in all patients with SLE regardless of preexisting hypertension.

Endocrine

(53) Ahmed Z, Lockhart CH, Weiner M, Klingensmith G. Advances in diabetic management: implications for anesthesia. Anesth Analg 2005; 100:666-9.

Short review about recent advances in diabetes management.

(54) Langer O, Yogev Y, Most O, Xenakis EM. Gestational diabetes: the consequences of not treating. Am J Obstet Gynecol 2005; 192:989-97.

Untreated gestational diabetes mellitus carries significant risks for perinatal morbidity in all disease severity levels.

(55) Langer O, Yogev Y, Xenakis EM, Brustman L. Overweight and obese in gestational diabetes: the impact on pregnancy outcome. Am J Obstet Gynecol 2005; 192:1768-76.

Normal weight women treated with diet with good glycemic control had good outcomes, but obese women treated with diet therapy who achieved targeted levels of glycemic control, had a 2 to 3-fold increased risk for adverse pregnancy outcome when compared with overweight and normal weight patients with well-controlled GDM. In obese women with BMI > or =30 with GDM, achievement of targeted levels of glycemic control was associated with enhanced outcome only in women treated with insulin.

(56) Durnwald C, Landon MB. Glyburide: the new alternative for treating gestational diabetes? Am J Obstet Gynecol 2005; 193:1-2.

Editorial accompanying article by Jacobson et al.

(57) Jacobson GF, Ramos GA, Ching JY et al. Comparison of glyburide and insulin for the management of gestational diabetes in a large managed care organization. Am J Obstet Gynecol 2005; 193:118-24.

Oral glyburide was just as effective as insulin in patients unresponsive to diet, although there may be an increased risk of PET and neonatal phototherapy which may need further study.

(58) Spong CY. Subclinical hypothyroidism: should all pregnant women be screened? Obstet Gynecol 2005; 105:235-6.

Editorial accompanying paper by Casey et al.

(59) Casey BM, Dashe JS, Wells CE et al. Subclinical hypothyroidism and pregnancy outcomes. Obstet Gynecol 2005; 105:239-45.

Large prospective study investigating if subclinical hypothyroidism in pregnancy (high TSH, normal free T4) causes intellectual impairment in offspring. This study found an increased risk of preterm delivery (x2 risk) which may provide the link.

(60) Saade G. Gestational diabetes mellitus: a pill or a shot? Obstet Gynecol 2005; 105:456-7.

Editorial briefly reviewing the evidence about using oral hypoglycemics in pregnancy particularly glyburide.

(61) ACOG Practice Bulletin. Clinical management guidelines for obstetrician-gynecologists. Number 60, March 2005. pregestational diabetes mellitus. Obstet Gynecol 2005; 105:675-85.

(62) Lindheimer MD. Polyuria and pregnancy: its cause, its danger. Obstet Gynecol 2005; 105:1171-2.

Editorial accompanying article by Brewster and Hayslett.

(63) Brewster UC, Hayslett JP. Diabetes insipidus in the third trimester of pregnancy. Obstet Gynecol 2005; 105:1173-6.

Two case reports of a probable increase in placental vasopressinase production causing low levels of ADH.

(64) Miller C, Elkas JC. Conservative management of extra-adrenal pheochromocytoma during pregnancy. Obstet Gynecol 2005; 106:868.

A case report of a dopaminergic extra-adrenal pheochromocytoma managed conservatively (until delivery) and treated with an alpha blocker drug.

(65) Lacassie HJ, Muir HA, Millar S, Habib AS. Perioperative anesthetic management for Cesarean section of a parturient with gestational diabetes insipidus. Can J Anaesth 2005; 52:733-6.

An interesting case report of a mother with complex problems including GDI and severe hypernatremia (174 mmol / L) who presented for an emergency cesarean section!

(66) Harborne LR, Alexander CE, Thomson AJ et al. Outcomes of pregnancy complicated by thyroid disease. Aust N Z J Obstet Gynaecol 2005; 45:239-42.

Retrospective case note study of 70 pregnant women with thyroid problems over a 5 year period. Good pregnancy outcome in most cases.

(67) Carroll MA, Yeomans ER. Diabetic ketoacidosis in pregnancy. Crit Care Med 2005; 33:S347-53.

Review of the pathophysiology and management of DKA.

(68) Kariya N, Nishi S, Hosono Y et al. Cesarean section at 28 weeks' gestation with resection of pheochromocytoma: perioperative antihypertensive management. J Clin Anesth 2005; 17:296-9.

Case report of a hypertensive patient who had a combined resection of a pheochromocytoma and a cesarean section.

(69) Shankar KB, Posner M, Moore FD, Jr., O'Rourke N. Laryngeal nerve monitoring during thyroid surgery in pregnancy. J Clin Anesth 2005; 17:369-71.

Case report. An LMA was used as well as an endotracheal tube. A fiberoptic bronchoscope was passed via the LMA to visualize the vocal cords during partial thyroidectomy to minimize nerve injury.

(70) Browne I, Brady I, Hannon V, McKeating K. Anaesthesia for phaeochromocytoma and sickle cell disease in pregnancy. Int J Obstet Anesth 2005; 14:66-9.

Interesting case report of a mother with sickle cell disease diagnosed during her pregnancy to also have a pheochromocytoma. She subsequently underwent a cesarean section under CSE and later had her endocrine tumor resected.

(71) Casey B. Environmental contaminants and maternal thyroid function. Am J Obstet Gynecol 2005; 193:1889-90.

Editorial accompanying the paper by Foster et al.

(72) Foster WG, Holloway AC, Hughes J, Claude L. Dioxin-like activity and maternal thyroid hormone levels in second trimester maternal serum. Am J Obstet Gynecol 2005; 193:1900-7.

The authors were trying to find a link between dioxin-like compounds and maternal thyroid function. Serum samples were taken in 150 women attending an antenatal 2nd trimester amniocentesis clinic. Dioxin-like compounds which have been linked to developmental problems in children were found in the majority of samples. There was no correlation between these levels and levels of maternal thyroid hormone.

(73) Lao TT. Thyroid disorders in pregnancy. Curr Opin Obstet Gynecol 2005; 17:123-7.

Review of hypothyroid and hyperthyroid conditions and the effects on the neonate.

(74) Pop VJ, Vulsma T. Maternal hypothyroxinaemia during (early) gestation. Lancet 2005; 365:1604-6.

Commentary. Maternal hypothyroidism may affect fetal brain development. Should subclinical hypothyroidism be treated in early pregnancy?

(75) Gharib H, Tuttle RM, Baskin HJ et al. Subclinical thyroid dysfunction: a joint statement on management from the American Association of Clinical Endocrinologists, the American Thyroid Association, and the Endocrine Society. J Clin Endocrinol Metab 2005; 90:581-5.

Until large randomized studies are performed it is better to err on the side of caution and treat subclinical hypothyroidism.

(76) Mandel SJ, Spencer CA, Hollowell JG. Are detection and treatment of thyroid insufficiency in pregnancy feasible? Thyroid 2005; 15:44-53.

Report on a workshop on the impact of maternal thyroid disease on the developing fetus.

(77) Greene MF, Solomon CG. Gestational diabetes mellitus - time to treat. N Engl J Med 2005; 352:2544-6.

Editorial accompanying the paper by Crowther et al.

(78) Crowther CA, Hiller JE, Moss JR et al. Effect of treatment of gestational diabetes mellitus on pregnancy outcomes. N Engl J Med 2005; 352:2477-86.

Large study in almost 1000 women diagnosed with gestational DM randomized to receive intervention (dietary advice, blood glucose monitoring and insulin as needed) or routine care. Serious perinatal complications (death, shoulder dystocia, bone fracture, nerve palsy) was significantly less in the intervention group – 1% v 4%.

(79) American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care 2005; 28 Suppl 1:S37-42.

A position statement from the American Diabetes Association.

(80) Dabelea D, Snell-Bergeon JK, Hartsfield CL et al. Increasing prevalence of gestational diabetes mellitus (GDM) over time and by birth cohort: Kaiser Permanente of Colorado GDM Screening Program. Diabetes Care 2005; 28:579-84.

The incidence of GDM doubled from 1994 to 2002 with significant increases in all racial groups.

(81) Hyer SL, Shehata HA. Gestational diabetes mellitus. Curr Obstet Gynaecol 2005; 15:368-74.

Review on the diagnosis and treatment options for GDM. GDM is a future predictor of type 2 diabetes with a cumulative 5 year incidence of 50%.

(82) Gavrilova-Jordan LP, Edmister WP, Farrell MA, Watson WJ. Spontaneous adrenal hemorrhage during pregnancy: a review of the literature and a case report of successful conservative management. Obstet Gynecol Surv 2005; 60:191-5.

Case report of a patient presenting with abdominal pain and an abdominal mass (mass within the adrenal gland) at 33 weeks gestation and discussion of potential treatments for SAH.

(83) Schnatz PF, Thaxton S. Parathyroidectomy in the third trimester of pregnancy. Obstet Gynecol Surv 2005; 60:672-82.

Medline search to find 16 cases treated surgically in the 3rd trimester. The incidence of postoperative problems was low. Postoperative hypocalcemia was detected in 62% of mothers and 17% of neonates but was easily treated with calcium. Preeclampsia was present in 25% of cases. The authors suggest that surgical parathyroidectomy can safely be performed in the 3rd trimester with few problems.

(84) Weston G, Chaves N, Bowditch J. Sheehan's syndrome presenting post-partum with diabetes insipidus. Aust N Z J Obstet Gynaecol 2005; 45:249-50.

Case report of a mother who presented after an elective cesarean section with severe headache. Blood loss on the ward and hypotension were thought to have contributed.

(85) Jellish WS, Kartha V, Fluder E, Slogoff S. Effect of metoclopramide on gastric fluid volumes in diabetic patients who have fasted before elective surgery. Anesthesiology 2005; 102:904-9.

Fasted diabetic patients undergoing elective surgery had similar gastric volumes to healthy non-diabetic patients. Routine use of metoclopramide is not indicated unless with a history of reflux or dysphagia.

Fertility problems, assisted reproduction

(86) Porreco RP, Harden L, Gambotto M, Shapiro H. Expectation of pregnancy outcome among mature women. Am J Obstet Gynecol 2005; 192:38-41.

A study of women over 45 yrs (conceiving largely through ART) compared with a matched control gp less than 36 yrs at their EDD. Mature women who conceive largely through ART can expect newborn outcomes similar to younger women.

(87) Mitwally MF, Biljan MM, Casper RF. Pregnancy outcome after the use of an aromatase inhibitor for ovarian stimulation. Am J Obstet Gynecol 2005; 192:381-6.

Pregnancies after the use of this ovarian stimulator was associated with a lower multiple pregnancy risk.

(88) McDonald S, Murphy K, Beyene J, Ohlsson A. Perinatal outcomes of in vitro fertilization twins: a systematic review and meta-analyses. Am J Obstet Gynecol 2005; 193:141-52.

In vitro fertilization twins have increased rates of preterm birth compared with spontaneously conceived twins.

(89) Shevell T, Malone FD, Vidaver J et al. Assisted Reproductive Technology and Pregnancy Outcome. Obstet Gynecol 2005; 106:1039-45.

Database study. IVF patients have a much higher risk of preeclampsia, gestational hypertension, placental abruption, placenta previa, and risk of cesarean delivery.

(90) Kallen B, Finnstrom O, Nygren KG et al. In vitro fertilisation in Sweden: obstetric characteristics, maternal morbidity and mortality. BJOG 2005; 112:1529-35.

Swedish study of women known to have had IVF between 1982 and 2001. Women treated with IVF had an increased maternal morbidity.

(91) van Weering HG, Schats R, McDonnell J, Hompes PG. Ongoing pregnancy rates in in vitro fertilization are not dependent on the physician performing the embryo transfer. Fertil Steril 2005; 83:316-20.

As long as protocols are standardized within a center, IVF success rates do not differ between physicians.

(92) Brinton LA, Moghissi KS, Scoccia B et al. Ovulation induction and cancer risk. Fertil Steril 2005; 83:261-74.

Review article which looks at the evidence to link various types of cancer including, ovarian, breast and bowel cancers to the use of fertility drugs.

(93) *** Duffy DA, Nulsen JC, Maier DB et al. Obstetrical complications in gestational carrier pregnancies. Fertil Steril 2005; 83:749-54.

Follow-up of pregnancies in patients who had agreed to be "gestational carriers" for infertile couples. IVF cycles using oocytes from genetic mothers (or oocyte donors) were performed, with embryo transfer to gestational carriers! Some of the carriers experienced major obstetric complications. One carrier conceived a triplet pregnancy but with placenta accreta. She went on to have a hysterectomy and suffered cerebral infarcts and blindness! The authors urge proper obstetric risk assessment in gestational carriers before proceeding.

(94) Wang YA, Sullivan EA, Black D et al. Preterm birth and low birth weight after assisted reproductive technology-related pregnancy in Australia between 1996 and 2000. Fertil Steril 2005; 83:1650-8.

Retrospective cohort study of infants conceived through ART. Preterm births and low birth weight infants (in both twins and singleton pregnancies) were more common after fresh embryo transfer (as opposed to frozen embryo) and female related infertility.

(95) Dharia SP, Falcone T. Robotics in reproductive medicine. Fertil Steril 2005; 84:1-11.

Interesting review article on robotics in surgery including some pictures and detail about the da Vinci robotic system which is finding its way into our operating theatres!

(96) Klemetti R, Gissler M, Sevon T et al. Children born after assisted fertilization have an increased rate of major congenital anomalies. Fertil Steril 2005; 84:1300-7.

Database study using a large Finnish birth registry. IVF was associated with an increased risk of major congenital abnormalities in certain subgroups. However is it the treatment or some problem existing in the infertile couple?

(97) Olson CK, Keppler-Noreuil KM, Romitti PA et al. In vitro fertilization is associated with an increase in major birth defects. Fertil Steril 2005; 84:1308-15.

Retrospective cohort study with similar conclusions to Klemetti et al.

(98) Fauser BC, Devroey P, Macklon NS. Multiple birth resulting from ovarian stimulation for subfertility treatment. The Lancet 2005; 365:1807-16.

Review article on ARTs with details about therapies and associated risks. Problems are highlighted with the increasing number of multiple births and the increased risks to the mother and baby. Strategies are outlined to reduce multiple births after ART.

(99) Ola B, Ledger WL. In vitro fertilisation. Curr Obstet Gynaecol 2005; 15:314-23.

Good review article about modern IVF techniques and future directions.

(100) Filicori M, Cognigni GE, Gamberini E et al. Impact of medically assisted fertility on preterm birth. BJOG 2005; 112 Suppl 1:113-7.

Review. Multiple pregnancy due to ART is most often linked to preterm birth, but other factors such as IVF and ICSI (intracytoplasmic sperm injection) have also been associated with an increased incidence even with singleton pregnancies.

Gastrointestinal

(101) Choi SA, Park SJ, Lee HK et al. Preoperative diagnosis of small-bowel intussusception in pregnancy with the use of sonography. J Ultrasound Med 2005; 24:1575-7.

Case report. Apparently since the small bowel is displaced upwards by the enlarging uterus, diagnosis is difficult.

(102) *** Brown MA, Birchard KR, Semelka RC. Magnetic resonance evaluation of pregnant patients with acute abdominal pain. Semin Ultrasound CT MRI 2005; 26:206-11.

Excellent paper about the use of MRI to diagnose intra-abdominal problems during pregnancy (e.g. gastrointestinal, gynecological and renal). There are superb MRI scans of acute appendicitis, intussuception, hydronephrosis and small bowel obstruction.

(103) *** Thompson SK, Goldman SM, Shah KB et al. Acute non-traumatic maternal illnesses in pregnancy: imaging approaches. Emerg Radiol 2005; 11:199-212.

Another good review article in the use of radiological techniques during pregnancy. The advantages / disadvantages of ultrasound, CT, MRI and other techniques for various conditions such as acute appendicitis, pancreatitis, HELLP, subarachnoid hemorrhage, sagittal sinus thrombosis, pulmonary emboli and cardiomyopathy are discussed as well as the effect of radiation on the fetus.

(104) Kanai M, Noike M, Masaki C et al. Severe gastrointestinal bleeding during pregnancy in a case of blue rubber bleb nevus syndrome. Semin Thromb Hemost 2005; 31:284-9.

Case report of BRBNS, a rare disorder characterized by distinctive cutaneous and gastrointestinal venous malformations that can cause massive gastrointestinal hemorrhage. This patient underwent a laparotomy for bleeding at 19 weeks gestation, but subsequently went on to deliver successfully by cesarean section at term.

(105) Jeske HC, Borovicka J, von Goedecke A et al. The influence of postural changes on gastroesophageal reflux and barrier pressure in nonfasting individuals. Anesth Analg 2005; 101:597-600.

Volunteer (awake non-fasting) study measuring GER and barrier pressure in 20 degree head-up, supine and 20 degree head down positions. No differences in GER between positions.

Hematologic

(106) *** Russell Z, Riconda D, Pollack L et al. Thrombosis in a pregnant hemophilia A carrier after intrapartum recombinant factor VIII. Obstet Gynecol 2005;105:875-6.

Case report of such a patient being treated with rFVIIa given intrapartum and pre-epidural siting for an elective cesarean section. This patient developed a postpartum DVT.

(107) *** ACOG Practice Bulletin # 64: Hemoglobinpathies in Pregnancy. Obstet Gynecol 2005; 106:203-10.

Brief review of various hemoglobinopathies and their management during pregnancy.

(108) Dizon-Townson D, Miller C, Sibai B et al. The relationship of the factor V Leiden mutation and pregnancy outcomes for mother and fetus. Obstet Gynecol 2005; 106:517-24.

In women without a history of venous thromboembolism (VTE), Factor V Leiden carriers have a low risk of pregnancy related VTE.

(109) ACOG Practice Bulletin #68: Antiphospholipid Syndrome. Obstet Gynecol 2005; 106:1113-21.

Information on the diagnosis and treatment of this disease.

(110) Firth PG. Anaesthesia for peculiar cells - a century of sickle cell disease. Br J Anaesth 2005; 95:287-99.

A historical review of the disease including some aspects of management.

(111) Ranasinghe JS, Tjin ATEW, Lewis MC. An unusual presentation of idiopathic thrombocytopenic purpura in pregnancy. J Clin Anesth 2005; 17:66-8.

The condition was diagnosed after the patient returned to theatre post cesarean section for persistent bleeding.

(112) Butwick A, Findley I, Wonke B. Management of pregnancy in a patient with beta thalassaemia major. Int J Obstet Anesth 2005; 14:351-4.

The multidisciplinary approach to the management of this disease and pregnancy is discussed in this case report of a patient who delivered by cesarean section under spinal block.

(113) Harnett MJ, Walsh ME, McElrath TF, Tsen LC. The use of central neuraxial techniques in parturients with factor V Leiden mutation. Anesth Analg 2005; 101:1821-3.

Case report of a patient with FVL with a history of DVTs and miscarriages who started thromboprophylaxis with LMWH and was changed to unfractionated heparin (UH) at 35 weeks. The authors' conclusion of adopting this strategy in such patients is controversial.

(114) Al RA, Unlubilgin E, Kandemir O et al. Intravenous versus oral iron for treatment of anemia in pregnancy: a randomized trial. Obstet Gynecol 2005; 106:1335-40.

Intravenous iron sucrose was compared to oral iron in this randomized trial of 90 women with iron deficiency anemia. Intravenous iron was found to be superior.

(115) Casele H, Mandel J, Williams KC. Arm swelling in pregnancy. Obstet Gynecol 2005; 106:1388-91.
Case report and expert commentary on a case of arm swelling at 6 weeks gestation which turned out to be from an extensive upper limb venous thrombosis. Treatment with a therapeutic dose of LMWH resolved the problem within weeks.

(116) Gyamfi C, Eddleman KA. Alloimmune thrombocytopenia. Clin Obstet Gynecol 2005; 48:897-909.

Review of a condition in which maternal antibodies are formed to surface antigens on fetal platelets. The maternal IgG then crosses the placenta and binds to fetal platelets.

(117) Uchikova EH, Ledjev, II. Changes in haemostasis during normal pregnancy. Eur J Obstet Gynecol Reprod Biol 2005; 119:185-8.

Blood tests performed in pregnant women between 35-40 weeks gestation compared to controls showed marked differences in coagulation and fibrinolysis.

(118) Leticee N, Kaplan C, Lemery D. Pregnancy in mother with Glanzmann's thrombasthenia and isoantibody against GPIIb-IIIa: Is there a foetal risk? Eur J Obstet Gynecol Reprod Biol 2005; 121:139-42.

A case of fetal death at 31 weeks in a mother with this disease who appeared to have isoantibodies to platelets (from previous platelet transfusions) which caused fetal demise due to transplacental effects.

(119) Breymann C. Iron deficiency and anaemia in pregnancy: Modern aspects of diagnosis and therapy. Eur J Obstet Gynecol Reprod Biol 2005; 123 Suppl 2:S3-S13.

Review.

(120) Leung TN, Lau TK, Chung T. Thalassaemia screening in pregnancy. Curr Opin Obstet Gynecol 2005; 17:129-34.

Review outlining antenatal screening methods and prenatal diagnosis for high risk ethnic groups. The potential influence of molecular genetics and ultrasound screening is also discussed for the early diagnosis of thalassaemia major.

(121) Christiansen SC, Cannegieter SC, Koster T et al. Thrombophilia, clinical factors, and recurrent venous thrombotic events. Jama 2005; 293:2352-61.

Non-obstetric study. Prospective follow-up study of nearly 500 patients aged 18-70 yrs of the recurrence rate of thrombotic events (non-malignant associated) after a first thrombotic event. Prothrombotic abnormalities do not appear to play an important role in the risk of a recurrent thrombotic event and testing for such defects has little influence on prophylactic strategies.

(122) Kyrle PA, Eichinger S. Deep vein thrombosis. The Lancet 2005; 365:1163-74.

Good review on the pathophysiology, diagnosis and treatment of DVT. Various treatment regimens are discussed including the use of the new anticoagulants fondaparinux and Ximelagatran.

(123) Rund D, Rachmilewitz E. Beta-thalassemia. N Engl J Med 2005; 353:1135-46.

Good review article which includes information on treatments such as stem cell transplantation, use of anti-oxidants and experimental gene therapy.

(124) Jordaan DJ, Schoon MG, Badenhorst PN. Thrombophilia screening in pregnancy. Obstet Gynecol Surv 2005; 60:394-404.

Review article on inherited (e.g. Factor V Leiden, antithrombin III deficiency, Protein C, Protein S deficiency) and acquired thrombophilias (e.g. antiphospholipid syndrome). The association with fetal loss as well as preeclampsia, venous thromboembolism and intrauterine growth restriction is discussed as well as the role of thrombophilia screening.

(125) Hassell K. Pregnancy and sickle cell disease. Hematol Oncol Clin North Am 2005; 19:903-16.

Review which emphasizes the need for careful monitoring for obstetric and fetal complications and the recognition and early intervention for sickle cell-related complications.

(126) Hirota Y, Sakai M, Nakabayashi M. Changes in plasma coagulation markers with prophylactic treatment of low molecular weight heparin after cesarean section. Semin Thromb Hemost 2005; 31:253-60.

High risk and low risk cesarean section patients compared to a control group – all treated with the LMWH, Dalteparin. D-dimer levels were higher in the high risk group on postpartum days 3 and 7. However Dalteparin was given in a non-standardized way, by continuous infusion.

(127) Salomon O, Steinberg DM, Tamarin I et al. Plasma replacement therapy during labor is not mandatory for women with severe factor XI deficiency. Blood Coagul Fibrinolysis 2005; 16:37-41.

A retrospective cohort study of 62 women with severe FXI deficiency (<17 IU/dL) delivering by cesarean section or vaginal delivery. 70% had no bleeding problems. Some of these patients received prophylactic factor replacement (fresh frozen plasma or FXI concentrate). The authors question the routine use of factor replacement and recommend that it be used only when bleeding occurs.

(128) Franchini M, Veneri D. Inherited thrombophilia: an update. Clin Lab 2005; 51:357-65.

Review of the main inherited prothrombotic factors and the effects of pregnancy.

(129) Holmes VA, Wallace JM. Haemostasis in normal pregnancy: a balancing act? Biochem Soc Trans 2005; 33:428-32.

Review which discusses alterations in coagulation factors, coagulation inhibitors, fibrinolysis and markers of hemostasis in pregnancy.

(130) James AH, Brancazio LR. Prenatal screening for thrombophilia: the background and the approach. Gynecol Obstet Invest 2005; 60:47-57.

Review. An overview of pregnancy coagulation is given as well as the role of thrombophilias (acquired and genetic) in maternal thrombosis and miscarriage. Thrombophilia screening and thromboprophylaxis is also mentioned.

(131) Demers C, Derzko C, David M, Douglas J. Gynaecological and obstetric management of women with inherited bleeding disorders. J Obstet Gynaecol Can 2005; 27:707-32.

Consensus document from the Society of Obstetricians and Gynaecologists of Canada. Good clear guidelines based mainly on papers on von Willebrand's disease. The risks of bleeding and management with drugs such as Desmopressin and Tranexamic acid (for milder disorders) are given together with guidelines for regional anesthesia.

(132) Miall FM, Deol PS, Barnes TA et al. Coagulation status and complications of pregnancy. Thromb Res 2005; 115:461-7.

A study looking at coagulation in 600 unselected pregnant patients and correlating them to the TEG parameters. Blood samples were taken at booking for TEG and thrombophilia investigation. There was a significant correlation between TEG and PT / APTT, but none between TEG and thrombophilic defects (protein S, protein C, Factor V Leiden, certain gene mutations etc). TEG also correlated with mid-trimester loss but with no other pregnancy complication.

(133) Calderwood CJ, Greer IA. The role of factor V Leiden in maternal health and the outcome of pregnancy. Curr Drug Targets 2005; 6:567-76.

Review on Factor V Leiden and adverse maternal outcomes. The role of LMWH in these patients to reduce such problems is discussed.

(134) Pabinger I, Grafenhofer H, Kaider A et al. Risk of pregnancy-associated recurrent venous thromboembolism in women with a history of venous thrombosis. J Thromb Haemost 2005; 3:949-54.

Retrospective study of 159 patients (293 pregnancies) with at least one pregnancy after a VTE. 109 patients (197 pregnancies) who did not have thromboprophylaxis had a 6.2% risk of thrombosis, whereas no VTE occurred in 87 pregnancies with thromboprophylaxis. The authors conclude that the risk of recurrent VTE without prophylaxis is substantial.

(135) Garcia-Ferreira J, Hernandez-Palazon J, Garcia-Candel A, Verdu-Martinez T. Subarachnoid block in a patient with essential thrombocytemia. Anesth Analg 2005; 101:300. Letter. Non-obstetric case in a patient with potential platelet failure who had a spinal for a fem-pop bypass. Patient was also on LMWH and clopidogrel, but these risks were not mentioned!

Hepatic

(136) Joffe GM, Aisenbrey GA, Argubright KF. Budd-Chiari syndrome, systemic lupus erythematosus, and secondary antiphospholipid antibody syndrome in pregnancy. Obstet Gynecol 2005; 106:1191-4.

A case rpt of a mother on LMWH who developed these complications.

(137) Guntupalli SR, Steingrub J. Hepatic disease and pregnancy: an overview of diagnosis and management. Crit Care Med 2005; 33:S332-9.

Review of the presentation, diagnosis and management of several hepatic diseases encountered during pregnancy.

(138) McGrath BA, Singh M, Singh T, Maguire S. Spontaneous common bile duct rupture in pregnancy. Int J Obstet Anesth 2005; 14:172-4.

A complicated diagnostic problem with a CBD rupture which was originally thought to be preeclampsia with liver involvement.

(139) Li XM, Ma L, Yang YB et al. Clinical characteristics of fulminant hepatitis in pregnancy. World J Gastroenterol 2005; 11:4600-3.

Short report from China where the average mortality from FH is 60%! 25 pregnant and 30 non-pregnant women with FH were compared retrospectively in terms of complications. Hepatitis B virus was the most common cause in both groups with the pregnant group suffering more complications of FH (hepatic encephalopathy and hepato-renal syndrome).

(140) Fesenmeier MF, Coppage KH, Lambers DS et al. Acute fatty liver of pregnancy in 3 tertiary care centers. Am J Obstet Gynecol 2005; 192:1416-9.

Multicenter retrospective 10-yr study. Persistent nausea and vomiting in the 3rd trimester should prompt screening for this disease.

Hypertension

(141) Zetterstrom K, Lindeberg SN, Haglund B, Hanson U. Maternal complications in women with chronic hypertension: a population-based cohort study. Acta Obstet Gynecol Scand 2005; 84:419-24.

Chronic hypertensive disease was independently associated with an increased incidence of preeclampsia, gestational diabetes and placental abruption.

(142) Vidaeff AC, Carroll MA, Ramin SM. Acute hypertensive emergencies in pregnancy. Crit Care Med 2005; 33:S307-12.

Good review including drug treatments.

(143) Serreau R, Luton D, Macher MA et al. Developmental toxicity of the angiotensin II type 1 receptor antagonists during human pregnancy: a report of 10 cases. BJOG 2005; 112:710-2.

Study of 10 women exposed to ARAs during early pregnancy. Exposure to these drugs is associated with significant neonatal risk (mainly musculoskeletal and renal deformities).

Immunologic

(144) Gurjar M, Jagia M. Successful management of pregnancy-aggravated myasthenic crisis after complete remission of the disease. Aust N Z J Obstet Gynaecol 2005; 45:331-2.

Case report.

(145) Jadaon J, Shushan A, Ezra Y et al. Behcet's disease and pregnancy. Acta Obstet Gynecol Scand 2005; 84:939-44.

Behcet's disease (BD) is a multisystem inflammatory chronic disorder, which is characterized by relapsing oral and genital ulceration and iridocyclitis. Thirty one patients studied over 25 years. The miscarriage rate was higher, and the pregnancy complications and cesarean section rates were increased.

(146) Griffiths RJ, O'Sullivan G. C1-esterase inhibitor deficiency and elective caesarean section. Int J Obstet Anesth 2005; 14:263-4.

Case report. Spinal anesthesia was used. The authors describe other methods of treatment/prophylaxis using FFP or C1 esterase inhibitor concentrate.

(147) Noble LS, Kutteh WH, Lashey N et al. Antiphospholipid antibodies associated with recurrent pregnancy loss: prospective, multicenter, controlled pilot study comparing treatment with low-molecular-weight

heparin versus unfractionated heparin. Fertil Steril 2005; 83:684-90.

A comparison of low dose aspirin with either LMWH or UH (n=25 in each group). A small study which shows that LMWH appears to be as safe as UH.

(148) Quenby S, Mountfield S, Cartwright JE et al. Antiphospholipid antibodies prevent extravillous trophoblast differentiation. Fertil Steril 2005; 83:691-8.

In vitro study using placental tissues from women delivering by cesarean section at term. Antiphospholipid antibodies inhibited extravillous trophoblast differentiation in vitro. This could explain the pathological basis of this syndrome causing pregnancy loss.

(149) Stafford IP, Dildy GA. Myasthenia gravis and pregnancy. Clin Obstet Gynecol 2005; 48:48-56.

Review on the pathogenesis and treatment of MG together with complications and anesthetic implications.

(150) Ferrero S, Pretta S, Nicoletti A et al. Myasthenia gravis: management issues during pregnancy. Eur J Obstet Gynecol Reprod Biol 2005; 121:129-38.

Good review on the treatment and obstetric management of MG.

(151) Hughes RA, Cornblath DR. Guillain-Barre syndrome. Lancet 2005; 366:1653-66.

Detailed review on the subject.

Infection

(152) Morau EL, Lotthe AA, Morau DY et al. Bifocal tuberculosis highlighted by obstetric combined spinal-epidural analgesia. Anesthesiology 2005; 103:445-6.

Letter. Extensive spinal tuberculosis / epidural abscess revealed in lumbar spine following a CSE for labor analgesia.

(153) Thung SF, Grobman WA. The cost-effectiveness of routine antenatal screening for maternal herpes simplex virus-1 and -2 antibodies. Am J Obstet Gynecol 2005; 192:483-8.

Neonatal HSV infection can cause mortality rates of 20% with 80% of infections occurring at delivery. To minimize this risk, cesarean section is commonly used. This study found that routine screening for HSV was not effective.

(154) Boyer KM, Holfels E, Roizen N et al. Risk factors for Toxoplasma gondii infection in mothers of infants with congenital toxoplasmosis: Implications for prenatal management and screening. Am J Obstet Gynecol 2005; 192:564-71.

A study of 131 mothers with infants referred for a specialist study. Risk factors for a typical illness were present in less than 50% of mothers that might have predicted this disease during pregnancy. Only systematic serologic screening of all pregnant women at prenatal visits or of all newborn infants at birth would prevent or detect a higher proportion of these congenital infections.

(155) Plunkett BA, Grobman WA. Routine hepatitis C virus screening in pregnancy: a cost-effectiveness analysis. Am J Obstet Gynecol 2005; 192:1153-61.

Universal screening of low risk women for hepatitis C is not cost effective.

(156) Chen KT, Eskild A, Bresnahan M et al. Previous maternal infection with Toxoplasma gondii and the risk of fetal death. Am J Obstet Gynecol 2005; 193:443-9.

No increased risk of fetal death in this population based study.

(157) Santiago-Munoz P, Roberts S, Sheffield J et al. Prevalence of hepatitis B and C in pregnant women who are infected with human immunodeficiency virus. Am J Obstet Gynecol 2005; 193:1270-3.

Study of over 400 women over 11 yrs. 1 in 16 women with HIV also had hepatitis B or C.

(158) Little SE, Caughey AB. Acyclovir prophylaxis for pregnant women with a known history of herpes simplex virus: A cost-effectiveness analysis. Am J Obstet Gynecol 2005; 193:1274-9.

Acyclovir prophylaxis at 36 weeks of gestation for women with a remote history of herpes simplex virus leads to lower costs and better outcomes than no acyclovir treatment.

(159) Laibl VR, Sheffield JS, Roberts S et al. Clinical presentation of community-acquired methicillin-resistant Staphylococcus aureus in pregnancy. Obstet Gynecol 2005; 106:461-5.

MRSA is a hot political issue in the UK and appears to be an emerging problem in the US amongst pregnant women. It most commonly presents as a soft tissue infection at multiple sites.

(160) Brown ZA, Gardella C, Wald A et al. Genital herpes complicating pregnancy. Obstet Gynecol 2005; 106:845-56.

Good review of the topic.

(161) Whitty CJM, Edmonds S, Mutabingwa TK. Malaria in pregnancy. BJOG 2005; 112:1189-95.

Good review of malaria in pregnancy which is a worldwide cause of maternal morbidity. Various types of infection including "placental malaria" and drug treatment are detailed.

(162) McIntyre J. Preventing mother-to-child transmission of HIV: successes and challenges. BJOG 2005; 112:1196-203.

Review. This type of transmission is uncommon in developed nations compared to poor resource countries where it continues to be a major cause of infant mortality and morbidity. Drug treatments are reviewed.

(163) Read JS, Newell ML. Efficacy and safety of cesarean delivery for prevention of mother-to-child transmission of HIV-1. The Cochrane Database of Systematic Reviews 2005, Issue 4. Art. No.: CD005479.

Cochrane review – elective cesarean section is an effective way of reducing mother-to-child transmission among HIV-1 infected women not taking antiretroviral drugs or just taking zidovudine. It is unclear if this type of delivery is indicated in mothers with a low viral load or in the very early stages of the disease.

(164) Eskild A, Bruu A-L, Stray-Pedersen B, Jenum P. Epstein-Barr virus infection during pregnancy and the risk of adverse pregnancy outcome. BJOG 2005; 112:1620-4.

Women who had significant EBV reactivation had shorter pregnancy duration.

(165) Baker DA. Risk factors for herpes simplex virus transmission to pregnant women: A couples study. Am J Obstet Gynecol 2005; 193:1887-8.

Editorial accompanying the paper by Gardella et al.

(166) Gardella C, Brown Z, Wald A et al. Risk factors for herpes simplex virus transmission to pregnant women: A couples study. Am J Obstet Gynecol 2005; 193:1891-9.

This study shows that maternal infection from a male partner plays a major role in neonatal herpes infection. Retrospective analysis of 402 HIV infected women in New York between 1994-99. Women who also had HSV were more likely to deliver a baby with HIV.

(167) Moodley J, Wennberg JL. HIV in pregnancy. Curr Opin Obstet Gynecol 2005; 17:117-21.

Good review with an emphasis on reducing mother to child transmission during pregnancy.

(168) Greenwood BM, Bojang K, Whitty CJ, Targett GA. Malaria. Lancet 2005; 365:1487-98.

Review. Interesting article discussing the pathogenesis and drug treatment of malaria. New anti-malarial vaccines are also mentioned.

(169) Duff P. Immunotherapy for congenital cytomegalovirus infection. N Engl J Med 2005; 353:1402-4.

Editorial accompanying the paper by Nigro et al.

(170) Nigro G, Adler SP, La Torre R, Best AM. Passive immunization during pregnancy for congenital cytomegalovirus infection. N Engl J Med 2005; 353:1350-62.

Non-randomized trial of women in 2 groups. The therapy group consisted of women whose amniotic fluid contained either CMV or CMV DNA who were offered intravenous CMV hyperimmune globulin. The prevention group consisted of women with a recent primary infection before 21 weeks' gestation or who declined amniocentesis. This group was offered monthly hyperimmune globulin. Hyperimmune globulin appeared to be effective in the treatment and prevention of congenital CMV infection. Randomized trials are awaited.

(171) Hammer SM. Clinical practice. Management of newly diagnosed HIV infection. N Engl J Med 2005; 353:1702-10.

A clinical case of a woman diagnosed to have HIV infection following a routine insurance based examination is presented followed by an interesting review on the treatment options with modern antiretroviral therapy.

(172) Khare MM. Infectious disease in pregnancy. Curr Obstet Gynaecol 2005; 15:149-56.

Good review article discussing many conditions including TB, malaria, syphilis, group B streptococcal infection, HIV, CMV, Herpes Simplex 1 &2, Rubella, Varicella Zoster Virus (VZV) and hepatitis B/C/E.

(173) Jones JL, Schulkin J, Maguire JH. Therapy for common parasitic diseases in pregnancy in the United States: a review and a survey of obstetrician /gynecologists' level of knowledge about these diseases. Obstet Gynecol Surv 2005; 60:386-93.

Brief review of various parasitic infections including toxoplasmosis, cryptosporidiosis, giardiasis, amebiasis, cyclosporiasis, trichinellosis, ascariasis, and taeniasis. Many of these diseases can be passed on through poor hygiene or undercooked food. They are also not confined to the developing world! Drug treatment is also discussed with information on the safety of use during pregnancy.

(174) Cito G, Luisi S, Faldini E et al. Listeriosis in pregnancy: a case report. J Matern Fetal Neonatal Med 2005; 18:367-8.

Case report of a mother who developed an influenza-like illness together with CTG abnormalities. The diagnosis was only made following an emergency cesarean section.

(175) Boselli E, Guillier M, Freney J et al. Antibacterial activity of clonidine and neostigmine in vitro. Anesth Analg 2005; 101:121-4.

Clonidine, but not neostigmine showed conc. & time dependent bactericidal activity on Staph aureus and Staph epidermidis. E. coli was not affected.

Lymphatic

(176) Venizelos ID, Vakalopoulou S, Sioutopoulou D, Garipidou V. Recurrent Kikuchi's disease during pregnancy. Acta Obstet Gynecol Scand 2005; 84:406-7.

Case report of a patient with Kikuchi–Fujimoto disease, a type of necrotizing lymphadenitis, in the cervical/neck area who underwent a removal of the affected lymph nodes. Pregnancy outcome was good.

(177) Quack Loetscher KC, Jandali AR, Garzoli E et al. Axillary cavernous lymphangioma in pregnancy and puerperium. Gynecol Obstet Invest 2005; 60:108-11.

Case report of a 29 year old parturient with this condition which is a form of benign congenital abnormality.

(178) Guven S, Ozcebe OI, Tuncer ZS. Non-Hodgkin's lymphoma complicating pregnancy: a case report. Eur J Gynaecol Oncol 2005; 26:457-8.

Case report of a multiparous woman presenting with jaundice, night sweats and pancytopenia who eventually underwent a cesarean section at 34 weeks gestation and iliac lymph node biopsy. Following the diagnosis of NHL, the patient had chemotherapy.

Metabolic

(179) Spronsen FJ, Smit GP, Erwich JJ. Inherited metabolic diseases and pregnancy. BJOG 2005; 112:2-11. The authors performed a Medline search for glycogen storage diseases amongst others. The emphasis is on discussing the consequences of the disorder on the mother and the fetus.

(180) Ramsey PS, Biggio JR. Carnitine palmitoyltransferase deficiency in pregnancy. J Matern Fetal Neonatal Med 2005; 18:357-9.

CPT proteins are important in fatty acid metabolism. Since fatty acids are the main energy source of skeletal and cardiac muscle, deficiencies in the enzyme can lead to rhabdomyolysis. This case report outlines the management of a patient with this disease.

Musculoskeletal

(181) Gowri V, Jain R. Ollier's disease complicating pregnancy. BJOG 2005; 112:384-5.

Case report of a pregnant patient with endochondromatosis (multiple bone overgrowths). Evidence of pelvic endochondromatosis eventually led to an obstructed labor culminating in cesarean section.

(182) Molyneux MK. Anaesthetic management during labour of a manifesting carrier of Duchenne muscular dystrophy. Int J Obstet Anesth 2005; 14:58-61.

Case report. A CSE was eventually used to provide anesthesia for an emergency cesarean section.

(183) DeRenzo JS, Vallejo MC, Ramanathan S. Failed regional anesthesia with reduced spinal bupivacaine dosage in a parturient with achondroplasia presenting for urgent cesarean section. Int J Obstet Anesth 2005; 14:175-8.

A cesarean section was performed with a single shot spinal using 10mg bupivacaine +morphine 0.2mg. The patient was initially pain free until 40 min into a prolonged operation when IV supplementation was needed. A short discussion of general and regional anesthesia in patients with dwarfism is included.

(184) Borg-Stein J, Dugan SA, Gruber J. Musculoskeletal aspects of pregnancy. Am J Phys Med Rehabil 2005; 84:180-92.

Good review of conditions including carpal tunnel syndrome, meralgia paresthetica, femoral neuropathy and pubic symphysis subluxation. Reassuringly, the authors do not implicate regional anesthesia as being a major cause of neurological problems!

(185) Mehrotra S, Gupta KL. Cesarean section in a patient with advanced ankylosing spondylitis. Int J Gynaecol Obstet 2005; 89:272-3.

Case report. A mother presented with what appeared to be a "prolapsed" gravid uterus outside the abdomen. A cesarean section was performed under a regional block (this provided only a limited block) together with local infiltration.

Neoplasm

(186) Mackelfresh J, Chen SC, Monthrope YM. Pregnancy and changes in melanocytic nevi. Obstet Gynecol 2005; 106:857-60.

Case rpt and interesting review of the topic.

(187) Stevenson CB, Thompson RC. The clinical management of intracranial neoplasms in pregnancy. Clin Obstet Gynecol 2005; 48:24-37.

Good review which includes the natural history of gliomas, meningiomas and acoustic neuromas. The diagnostic options with MRI and CT are discussed as well as delivery considerations in mothers with raised ICP.

(188) Barthelmes L, Davidson LA, Gaffney C, Gateley CA. Pregnancy and breast cancer. BMJ 2005; 330:1375-8.

Clinical review based around an actual clinical case. Good discussion on the subject including radiotherapy / chemotherapy options and implications for the fetus. Future pregnancies following treatment for breast cancer is also discussed.

(189) Mackenzie AP, Levine G, Garry D, Figueroa R. Glioblastoma multiforme in pregnancy. J Matern Fetal Neonatal Med 2005; 17:81-3.

Case report of a 48 yr old mother presenting at 36 weeks gestation with motor weakness who underwent a cesarean section under general anesthesia followed by a craniotomy 2 days later to resect the tumor.

(190) Dunkelberg JC, Barakat J, Deutsch J. Gastrointestinal, pancreatic, and hepatic cancer during pregnancy. Obstet Gynecol Clin North Am 2005; 32:641-60.

Excellent review on the depressing subject of malignancy during pregnancy. Surgery, chemotherapy and radiotherapy for these malignancies are also discussed.

(191) Hurley TJ, McKinnell JV, Irani MS. Hematologic malignancies in pregnancy. Obstet Gynecol Clin North Am 2005; 32:595-614.

Good review on Hodgkin's lymphoma, non-Hodgkin's lymphoma and leukemia with case vignettes being used to illustrate the importance of early diagnosis on maternal and fetal prognosis. The treatment options are also discussed.

(192) Mesquita MM, Pestana A, Mota A. Successful pregnancy occurring with interferon-alpha therapy in chronic myeloid leukemia. Acta Obstet Gynecol Scand 2005; 84:300-1.

Case report.

(193) Sayar H, Lhomme C, Verschraegen CF. Malignant adnexal masses in pregnancy. Obstet Gynecol Clin North Am 2005; 32:569-93.

Review of ovarian tumors including dysgerminomas and endodermal sinus tumors. A multidisciplinary approach with specialist oncological input is highlighted to improve survival rates.

(194) Leslie KK, Koil C, Rayburn WF. Chemotherapeutic drugs in pregnancy. Obstet Gynecol Clin North Am 2005; 32:627-40.

The review includes information about fetal risks, breastfeeding and the effect of these drugs on future fertility.

Neurologic

(195) James AH, Bushnell CD, Jamison MG, Myers ER. Incidence and risk factors for stroke in pregnancy and the puerperium. Obstet Gynecol 2005; 106:509-16.

A database study looking at nearly 3,000 pregnancy related discharges after a stroke. African-American women and women > 35 yrs are at an increased risk. Risk factors include lupus, blood transfusion, and migraine headaches.

(196) Ali L, Stocks GM. Spina bifida, tethered cord and regional anaesthesia. Anaesthesia 2005; 60:1149-50.

Letter about a patient with these abnormalities.

(197) Karnad DR, Guntupalli KK. Neurologic disorders in pregnancy. Crit Care Med 2005; 33:S362-71.

A range of disorders discussed in this review including cerebral venous thrombosis, cerebral malaria, multiple sclerosis, intracranial hemorrhage and neoplasm.

(198) Alici HA, Cesur M, Erdem AF, Gursac M. Repeated use of epidural anaesthesia for caesarean delivery in a patient with Guillain-Barre syndrome. Int J Obstet Anesth 2005; 14:269-70.

Letter about the use of regional anesthesia for GBS.

(199) Young WL. Regional versus general anesthesia and the "Baconian" scientific method. Int J Obstet Anesth 2005; 14:277-8.

Editorial accompanying 2 papers / case reports of the management of parturients with neurofibromatosis type 2 (CNS involvement - compared to NF type 1, which has mainly peripheral lesions). The author discusses how we should weight case reports and make an informed clinical decision.

(200) Sakai T, Vallejo MC, Shannon KT. A parturient with neurofibromatosis type 2: anesthetic and obstetric considerations for delivery. Int J Obstet Anesth 2005; 14:332-5.

A general anesthetic was given for an elective cesarean section. A regional block was avoided due to multiple level spinal cord involvement of the disease.

(201) Spiegel JE, Hapgood A, Hess PE. Epidural anesthesia in a parturient with neurofibromatosis type 2 undergoing cesarean section. Int J Obstet Anesth 2005;14:336-9.

A similar case to Sakai et al, but with an epidural block being performed for repeat cesarean section without complication.

(202) Todorov L, Laurito CE, Schwartz DE. Postural headache in the presence of cerebral venous sinus thrombosis. Anesth Analg 2005;101:1499-500.

Case report of a CVT presenting after a postdural puncture headache following epidural analgesia in labor.

(203) Paech M. Maternal water intoxication during labour. Aust N Z J Obstet Gynaecol 2005; 45:541.

Letter describing a case of a mother drinking several liters of water and a sports drink in labor who eventually had a postpartum convulsion with a Na of 118 mmol/L.

(204) Malm H, Klaukka T, Neuvonen PJ. Risks associated with selective serotonin reuptake inhibitors in pregnancy. Obstet Gynecol 2005; 106:1289-96.

Finnish study which matched mothers taking SSRIs during pregnancy with controls. SSRIs were not associated with major malformations.

(205) Lattimore KA, Donn SM, Kaciroti N et al. Selective serotonin reuptake inhibitor (SSRI) use during pregnancy and effects on the fetus and newborn: a meta-analysis. J Perinatol 2005; 25:595-604.

SSRIs are commonly prescribed to treat antenatal / postnatal maternal depression. The review highlights potential long term neurobehavioral effects on the neonate.

(206) Martin SR, Foley MR. Approach to the pregnant patient with headache. Clin Obstet Gynecol 2005; 48:2-11.

A good review of various conditions giving rise to headaches and how pregnancy may modify them.

(207) Bennett KA. Pregnancy and multiple sclerosis. Clin Obstet Gynecol 2005; 48:38-47.

Very detailed review article. The consensus view nowadays is that MS does not have a higher relapse rate during pregnancy but that in the postpartum period 20-40% of patients may experience clinical relapse within 3 months.

(208) Mabie WC. Peripheral neuropathies during pregnancy. Clin Obstet Gynecol 2005; 48:57-66.

Review including discussion of conditions such as carpal tunnel syndrome, Bell's palsy and the Guillain-Barre syndrome.

(209) Kang AH. Traumatic spinal cord injury. Clin Obstet Gynecol 2005; 48:67-72.

Short review article on this subject with some discussion on autonomic dysreflexia which has important implications for labor.

(210) Tzeng DZ, Fein J, Boe N, Chan A. A pregnant woman with headaches, seizures, and hypertension. Lancet 2005; 365:2150.

A case of Moyamoya disease which is characterized by chronic progressive stenosis or occlusion of the terminal internal carotid arteries and / or the proximal anterior and middle cerebral arteries.

(211) Lowe SA, Sen R. Neurological disease in pregnancy. Curr Obstet Gynaecol 2005; 15:166-73.

Review of various conditions. Epilepsy and the use of antiepileptic drugs during pregnancy are discussed in detail with listings of the potential fetal and neonatal effects of these drugs. The review also covers (in brief) migraine, cerebral venous & sinus thrombosis, myasthenia gravis, multiple sclerosis and mononeuropathies, including traumatic / delivery induced.

(212) Silberstein SD. Headaches in pregnancy. J Headache Pain 2005; 6:172-4.

Short lecture based commentary about the treatment of migraine headache and associated symptoms such as nausea and vomiting.

(213) *** Dineen R, Banks A, Lenthall R. Imaging of acute neurological conditions in pregnancy and the puerperium. Clin Radiol 2005; 60:1156-70.

Good review article which includes multiple neurological conditions, apart from preeclampsia, which may present during pregnancy. There are also excellent MRI/CT/angiogram images of some of these conditions.

(214) Costa AL, Lopes-Cendes I, Guerreiro CA. Seizure frequency during pregnancy and the puerperium. Int J Gynaecol Obstet 2005; 88:148-9.

Prospective study of 50 pregnant patients with epilepsy diagnosed before pregnancy. Overall, most patients had the same seizure frequency during and after pregnancy as they did before they became pregnant.

(215) Ceccaldi PF, Bazin A, Gomis P et al. Persistent vegetative state with encephalitis in a pregnant woman with successful fetal outcome. BJOG 2005; 112:843-4.

Case report. Although this patient had a successful delivery of a healthy infant, she was left with bilateral deafness and mild ataxia.

Obesity

(216) LaCoursiere DY, Bloebaum L, Duncan JD, Varner MW. Population-based trends and correlates of maternal overweight and obesity, Utah 1991-2001. Am J Obstet Gynecol 2005; 192:832-9.

Overweight and obese women are at increased risk of cesarean delivery, preeclampsia, eclampsia, dystocia, and macrosomia, risks that increase as the body mass index rises.

(217) Rode L, Nilas L, Wojdemann K, Tabor A. Obesity-related complications in Danish single cephalic term pregnancies. Obstet Gynecol 2005; 105:537-42.

Over 8,000 women stratified into various BMI gps. Overweight women had a higher rate of diabetes, hypertension, preeclampsia and cesarean section. These risks increased with increased BMI.

(218) Santos IA, Stein R, Fuchs SC et al. Aerobic exercise and submaximal functional capacity in overweight pregnant women: a randomized trial. Obstet Gynecol 2005; 106:243-9.

Three 1 hr aerobic exercise lessons per week increased submaximal exercise capacity compared to a control group.

(219) Nohr EA, Bech BH, Davies MJ et al. Prepregnancy obesity and fetal death: a study within the Danish National Birth Cohort. Obstet Gynecol 2005; 106:250-9.

Prepregnancy obesity was associated with an increased risk of fetal death with advancing gestation.

(220) *** ACOG Committee Opinion #315. Obesity in pregnancy. Obstet Gynecol 2005; 106:671-5.

Highlights the early and active involvement of anesthesiologists in these patients.

(221) Usha Kiran TS, Hemmadi S, Bethel J, Evans J. Outcome of pregnancy in a woman with an increased body mass index. BJOG 2005; 112:768-72.

Analysis of a large pregnancy database in Wales, UK of healthy primigravida mothers (1990-1999) with a vertex presentation. Two groups were compared – BMI 20-30 v. BMI>30. The obese group had significant increases in the incidence of induced labor, shoulder dystocia, neonatal trauma, neonatal ICU admissions, cesarean section and blood loss at delivery.

(222) Hall LF, Neubert AG. Obesity and pregnancy. Obstet Gynecol Surv 2005; 60:253-60.

Review of obesity in pregnancy and associated complications. There is an interesting section about the management of pregnant patients who have had bariatric surgery (surgical treatment for obesity – e.g. gastric banding, Roux-en-Y jejuneal loop bypass) which has important obstetric and neonatal implications.

(223) Yeh J, Shelton JA. Increasing prepregnancy body mass index: Analysis of trends and contributing variables. Am J Obstet Gynecol 2005; 193:1994-8.

Interesting study using a perinatal database with data from 8 regions in upstate New York between 1999 – 2003. There was an increase in prepregnancy BMI across multiple subgroups including smokers, age, ethnicity, education, family income and previous live births.

(224) Robinson HE, O'Connell C M, Joseph KS, McLeod NL. Maternal outcomes in pregnancies complicated by obesity. Obstet Gynecol 2005; 106:1357-64.

Nova Scotia perinatal database analysis over a 15 year period comparing deliveries of obese (prepregnancy wt > 90Kg) with non-obese women. Prepregnancy maternal obesity increased the risk of preeclampsia, antepartum venous thromboembolism, labor induction, cesarean delivery, and wound infection.

(225) Haslam DW, James WP. Obesity. Lancet 2005; 366:1197-209.

Detailed review on the subject and its implications for global healthcare due to the increased risks of diabetes, cardiovascular disease and certain types of cancer (e.g. breast, colon, kidney and esophagus).

Orthopedic

(226) Padua L, Caliandro P, Aprile I et al. Back pain in pregnancy: 1-year follow-up of untreated cases. Eur Spine J 2005; 14:151-4.

Small prospective study of fewer than 60 patients. 50% still had backache 1 year postpartum.

(227) Kloen P, Flik K, Helfet DL. Operative treatment of acetabular fracture during pregnancy: a case report. Arch Orthop Trauma Surg 2005; 125:209-12.

Case report of a 26 week gestation woman involved in a car accident who underwent a general anesthetic for fixation of both an acetabular fracture and femoral shaft fracture.

Psychiatric

(228) Sanz EJ, De-las-Cuevas C, Kiuru A et al. Selective serotonin reuptake inhibitors in pregnant women and neonatal withdrawal syndrome: a database analysis. Lancet 2005; 365:482-7.

All SSRIs, especially paroxetine, were associated with neonatal convulsions and neonatal withdrawal.

Renal

(229) Vasiliou DM, Maxwell C, Shah P, Sermer M. Goodpasture syndrome in a pregnant woman. Obstet Gynecol 2005; 106:1196-9.

Case rpt – treated with dialysis, plasmapheresis and immunosupression.

(230) Kallen B, Westgren M, Aberg A, Olausson PO. Pregnancy outcome after maternal organ transplantation in Sweden. BJOG 2005; 112:904-9.

Database study with mainly kidney transplant patients. Pregnancy complications were increased after transplantation, but were similar to the complication rate before transplantation.

(231) Gammill HS, Jeyabalan A. Acute renal failure in pregnancy. Crit Care Med 2005; 33:S372-84.

Good review including a section on hemofiltration / hemodialysis in pregnancy.

(232) Ghanem ME, El-Baghdadi LA, Badawy AM et al. Pregnancy outcome after renal allograft transplantation: 15 years experience. Eur J Obstet Gynecol Reprod Biol 2005; 121:178-81.

Study of 67 pregnancies in 41 renal allograft recipients. Good outcomes are reported if graft function is stable and the post-transplant interval is more than 2 years.

(233) Pitukkijronnakorn S, Chittacharoen A, Herabutya Y. Maternal and perinatal outcomes in pregnancy with acute pyelonephritis. Int J Gynaecol Obstet 2005; 89:286-7.

Retrospective study comparing women with pyelonephritis to a control group. Almost 90% of women with pyelonephritis (n=80) had no complications. 3.77% had septic shock and 5.6% had premature labor pain.

Respiratory

(234) Gluck JC, Gluck PA. Asthma controller therapy during pregnancy. Am J Obstet Gynecol 2005; 192:369-80.

Review (using Medline / Embase / Cochrane) of the safety and efficacy of asthma control drugs during pregnancy as well as the FDA pregnancy ratings regarding such drugs.

(235) Yudin MH, Steele DM, Sgro MD et al. Severe acute respiratory syndrome in pregnancy. Obstet Gynecol 2005; 105:124-7.

A case report of SARS in pregnancy with a successful outcome.

(236) *** Harirah HM, Donia SE, Nasrallah FK et al. Effect of gestational age and position on peak expiratory flow rate: a longitudinal study. Obstet Gynecol 2005; 105:372-6.

Sitting, standing and supine position compared from 6 weeks + until postpartum. PEFR declined with increasing gestation in all positions, especially when supine. The rate of decline was 0.86L/min per week in the supine position.

(237) ACOG Committee Opinion #316: Smoking Cessation during Pregnancy. Obstet Gynecol 2005; 106:883-8.

(238) Murphy VE, Gibson P, Talbot PI, Clifton VL. Severe asthma exacerbations during pregnancy. Obstet Gynecol 2005; 106:1046-54.

Prospective cohort study of 146 women. Pregnancy exacerbation rate was high with lower neonatal birth wt.

(239) Budev MM, Arroliga AC, Emery S. Exacerbation of underlying pulmonary disease in pregnancy. Crit Care Med 2005; 33:S313-8.

Review of pregnancy outcomes and issues relating to pregnant women with cystic fibrosis, pulmonary hypertension and lung transplants.

(240) Hanania NA, Belfort MA. Acute asthma in pregnancy. Crit Care Med 2005; 33:S319-24.

Good review including the management of pregnant asthmatics.

(241) Goodnight WH, Soper DE. Pneumonia in pregnancy. Crit Care Med 2005; 33:S390-7.

Review on community acquired pneumonia and viral infections during pregnancy. Drug treatment is also discussed.

(242) Soto RG, Soares MM. Idiopathic pulmonary hemosiderosis in pregnancy: anesthetic implications. J Clin Anesth 2005; 17:482-4.

Case report of a mother diagnosed with IPH at 36 weeks gestation whose respiratory function subsequently deteriorated prompting an urgent cesarean section under general anesthesia and postoperative ventilation.

(243) Muammar M, Marshall P, Wyatt H, Skelton V. Caesarean section in a patient with cystic fibrosis. Int J Obstet Anesth 2005; 14:70-3.

A case report of a mother with a FEV1 34% of predicted who underwent a cesarean section under CSE.

(244) Demoly P, Daures J-P. Managing asthma during pregnancy. The Lancet 2005; 365:1212-3.

Letter re pregnancy asthma care.

(245) Busse, W. W. NAEPP expert panel report. Managing asthma during pregnancy: recommendations for pharmacologic treatment-2004 update. J Allergy Clin Immunol 2005; 115:34-46.

The National Asthma Education and Prevention Programme report on asthma during pregnancy.

(246) Tripi PA, Kandil ES, Arnold JE. Anesthetic management for laser excision of recurrent respiratory papillomatosis in a third trimester parturient. J Clin Anesth 2005; 17:610-3.

RRP is a recurring condition which can cause major airway problems due to laryngeal obstruction and often require multiple surgical excisions throughout life. This paper is a case report of surgical excision (including the use of laser) of such papillomas during pregnancy under general anesthesia in the same parturient 2 years apart.

(247) Sheiner E, Mazor M, Levy A et al. Pregnancy outcome of asthmatic patients: a population-based study. J Matern Fetal Neonatal Med 2005; 18:237-40.

Israeli perinatal database study of 140,000 singleton deliveries with / without asthma (n=963). Asthmatics were more likely to have adverse maternal outcomes (e.g. IUGR, hypertensive disorders, premature rupture of membranes). Perinatal outcomes did not differ.

(248) Cameron AJ, Skinner TA. Management of a parturient with respiratory failure secondary to cystic fibrosis. Anaesthesia 2005; 60:77-80.

Case report. Mother was managed with BiPAP (bilevel positive airway pressure ventilation) on the ward until delivered by cesarean section at 30 weeks using a CSE technique.

Substance abuse

(249) Warner DO. Preoperative smoking cessation: how long is long enough? Anesthesiology 2005; 102:883-4.

A review on the benefits of asking our patients to stop smoking preoperatively and current methods available to assist them.

(250) McCarthy JJ, Leamon MH, Parr MS, Anania B. High-dose methadone maintenance in pregnancy: Maternal and neonatal outcomes. Am J Obstet Gynecol 2005; 193:606-10.

Retrospective review of 81 mothers on high v low dose methadone showing no increased neonatal adverse effects in the high dose gp.

(251) Kennare R, Heard A, Chan A. Substance use during pregnancy: risk factors and obstetric and perinatal outcomes in South Australia. The Australian and New Zealand Journal of Obstetrics and Gynaecology 2005; 45:220-5.

Data analyzed from a perinatal database. 0.8% of women delivering in the region self-reported some form of substance abuse.

(252) Kuczkowski KM. Peripartum care of the cocaine-abusing parturient: are we ready? Acta Obstet Gynecol Scand 2005; 84:108-16.

Good review on this subject.

(253) Kuczkowski KM. Herbal ecstasy: cardiovascular complications of Khat chewing in pregnancy. Acta Anaesthesiol Belg 2005; 56:19-21.

Case report of a pregnant patient who developed cardiovascular problems after chewing Khat which contains compounds with an amphetamine like effect.

(254) Ricaurte GA, McCann UD. Recognition and management of complications of new recreational drug use. Lancet 2005; 365:2137-45.

Review designed to help physicians recognize and manage complications associated with new recreational drugs.

(255) Wolfe EL, Davis T, Guydish J, Delucchi KL. Mortality risk associated with perinatal drug and alcohol use in California. J Perinatol 2005; 25:93-100.

Large database study of 4.5 million birth records (1991-1998) used to identify drug / alcohol diagnosed births. 1.2% of records contained drug / alcohol discharge codes. Following multivariate analysis, cocaine use was independently associated with increased maternal mortality (doubled), although drug / alcohol abuse could be a surrogate for many other factors influencing maternal mortality such as poor / unstable housing, poor antenatal care and violence. Surprisingly drug and alcohol abuse was not associated with an increased risk of fetal or neonatal death.

Trauma

(256) El Kady D, Gilbert WM, Xing G, Smith LH. Maternal and neonatal outcomes of assaults during pregnancy. Obstet Gynecol 2005; 105:357-63.

Retrospective survey of 2000 women hospitalized after an assault compared to controls. Assaulted women were more likely to experience uterine rupture and increased maternal / fetal mortality as well as preterm birth.

(257) Pacheco LD, Gei AF, Vanhook JW et al. Burns in pregnancy. Obstet Gynecol 2005; 106:1210-2.

Interesting case rpt of a mother sustaining burns and her management.

(258) Chen SH, Sung YH, Chang PJ et al. The management of labour using continuous lumbar epidural analgesia with 0.2% ropivacaine in a parturient with traumatic brain injury. Eur J Anaesthesiol 2005; 22:634-6.

Letter. Mother admitted to hospital after a motor vehicle accident with subarachnoid hemorrhages. After going into labor an epidural was inserted successfully with a resultant vaginal delivery.

(259) Weinberg L, Steele RG, Pugh R et al. The pregnant trauma patient. Anaesth Intensive Care 2005; 33:167-80.

Brief overview of pregnancy physiology and a good review of the management of the pregnant trauma patient.

(260) Mattox KL, Goetzl L. Trauma in pregnancy. Crit Care Med 2005; 33:S385-9.

Review of maternal and fetal issues during trauma in pregnancy.

(261) Kuczkowski KM. Trauma during pregnancy: a situation pregnant with danger. Acta Anaesthesiol Belg 2005; 56:13-8.

Review of perioperative management.

(262) Brown MA, Sirlin CB, Farahmand N et al. Screening sonography in pregnant patients with blunt abdominal trauma. J Ultrasound Med 2005; 24:175-81.

Approximately 100 pregnant women retrospectively screened after blunt abdominal trauma. Sonography proved to be very useful in this setting. It is unclear however who performed the ultrasound examinations.

(263) Schiff MA, Holt VL. Pregnancy outcomes following hospitalization for motor vehicle crashes in Washington State from 1989 to 2001. Am J Epidemiol 2005; 161:503-10.

Retrospective cohort study. Women with non-severe (and of course severe) injuries had an increased risk of pre-term labor and placental abruption.

Vascular

(264) Nohe B, Ernemann U, Tepe G et al. Aortic dissection mimicking subarachnoidal hemorrhage. Anesth Analg 2005; 101:233-4.

Non-obstetric case of an aortic dissection causing severe headache and malperfusion of the carotid arteries – presenting with misleading signs of SAH.

(265) Tilak M, Smith J, Rogers D et al. Successful near-term pregnancy outcome after repair of a dissecting thoracic aortic aneurysm at 14 weeks gestation. Can J Anaesth 2005; 52:1071-5.

Case report of a patient with an 8cm dissecting thoracic aneurysm which was partially repaired in early pregnancy. She was later delivered by cesarean section at 32 weeks using a CSE technique (the epidural catheter was used and not the spinal for anesthesia). The full repair was later carried out several months postpartum.

Pharmacologic alterations in pregnancy

(266) Weiner CP, Buhimschi C, Swaan P. Drug-prescribing challenges during pregnancy. Curr Obstet Gynaecol 2005; 15:157-65.

Short review article based around 3 fictitious cases of pregnant women presenting to a family physician for various indications. Drug clearance / drug disposition and fetal drug interactions during pregnancy are discussed. The FDA pregnancy drug categories are also given.

(267) Reali A, Ximenes A, Cuzzolin L, Fanos V. Antibiotic therapy in pregnancy and lactation. J Chemother 2005; 17:123-30.

Review which focuses on the most frequently used antibiotics during pregnancy and lactation.

Physiologic alterations in pregnancy

(268) Arliss JM, Kaplan EN, Galvin SL. The effect of the lunar cycle on frequency of births and birth complications. Am J Obstet Gynecol 2005; 192:1462-4.

A retrospective analysis of over 500,000 births over 62 lunar cycles (5 yrs). There was no effect.

(269) Morton-Pradhan S, Bay RC, Coonrod DV. Birth rate and its correlation with the lunar cycle and specific atmospheric conditions. Am J Obstet Gynecol 2005; 192:1970-3.

No correlation found.

(270) Esplin MS, Fausett MB, Peltier MR et al. The use of cDNA microarray to identify differentially expressed labor-associated genes within the human myometrium during labor. Am J Obstet Gynecol 2005; 193:404-13.

DNA analysis used to identify genes in myometrium from patients in spontaneous labor.

(271) Bernstein IM, Thibault A, Mongeon JA, Badger GJ. The influence of pregnancy on arterial compliance. Obstet Gynecol 2005; 105:621-5.

3 month chart review of deliveries. MAP was lower in subsequent pregnancies. The shorter the interval between pregnancies the greater the MAP reduction. The authors speculate that pregnancy may alter CVS compliance. However only 47 patients were studied!

(272) McArthur J, Hill J, Paech MJ et al. Cerebrospinal fluid and serum concentrations of beta-trace protein during pregnancy. Anaesthesia 2005; 60:163-7.

Beta- trace protein (prostaglandin D synthase) concentrations were higher in CSF (obtained during spinal anesthesia for cesarean section) than blood. This ratio is higher than in non-pregnant women and men. The authors claim the measurement may be useful in diagnosing patients with CSF – cutaneous fistulae.

(273) Larsson L, Lindqvist PG. Low-impact exercise during pregnancy--a study of safety. Acta Obstet Gynecol Scand 2005; 84:34-8.

Low impact aerobic exercise appears to be safe in pregnancy in terms of avoiding maternal hyperthermia. There was also a reduction in SpO2 in the pregnant group (compared to control), although SpO2 did not fall below 95% in any patient.

(274) Yeomans ER, Gilstrap LC, 3rd. Physiologic changes in pregnancy and their impact on critical care. Crit Care Med 2005; 33:S256-8.

Mini-review.

(275) Hong JY, Park JW, Oh JI. Comparison of preoperative gastric contents and serum gastrin concentrations in pregnant and nonpregnant women. J Clin Anesth 2005; 17:451-5.

100 elective cesarean section patients (CSE anesthesia) compared with 100 non-pregnant women undergoing gynecological operations (general anesthesia). Gastric contents were higher in pregnant women, but this was not due to differences in gastrin concentration. Gastric contents were aspirated through a nasogastric tube in all patients before anesthesia was induced!

(276) Hayashi Y, Ueyama H, Mashimo T et al. Circulating mature adrenomedullin is related to blood volume in full-term pregnancy. Anesth Analg 2005; 101:1816-20.

Adrenomedullin has vasodilating properties. This study measured plasma and CSF concentrations of adrenomedullin in non-pregnant women, pregnant women between 15-18 weeks gestation and women at term. The second part of the study measured blood volume in term pregnant women using indocyanine green dye and a non-invasive pulse spectrophotometry (a technique used in Ueyama's classic cesarean section preload paper in 1999). The active form of the hormone increased with gestational age in plasma but not CSF. This also correlated with blood volume per unit body weight.

This study does NOT imply a cause and effect relationship, merely an association!

(277) Richani K, Soto E, Romero R et al. Normal pregnancy is characterized by systemic activation of the complement system. J Matern Fetal Neonatal Med 2005; 17:239-45.

Maternal and control blood samples were analyzed for complement breakdown products, C3a, C4a and C5a. Higher concentrations were of these were found in maternal plasma compared to control. This did not change with gestational age.

Placental topics

(278) Moises EC, de Barros Duarte L, de Carvalho Cavalli R et al. Pharmacokinetics and transplacental distribution of fentanyl in epidural anesthesia for normal pregnant women. Eur J Clin Pharmacol 2005; 61:517-22.

Study on 10 women undergoing elective cesarean section under epidural anesthesia using 100 mcg fentanyl with a bupivacaine / lidocaine / epinephrine mixture. The study showed a large transplacental transfer of fentanyl.

(279) *** Wu S, Kocherginsky M, Hibbard JU. Abnormal placentation: twenty-year analysis. Am J Obstet Gynecol 2005; 192:1458-61.

The rate of placenta accreta increased in conjunction with cesarean deliveries; the most important risk factors were previous cesarean delivery, placenta previa, and advanced maternal age.

(280) Usta IM, Hobeika EM, Abu Musa AA et al. Placenta previa-accreta: Risk factors and complications. Am J Obstet Gynecol 2005; 193:1045-9.

20 yr review of cases. Hypertensive disorders, smoking, and previous cesarean are risk factors for accreta in placenta previa patients. However there were similar neonatal outcomes compared with an isolated placenta previa.

(281) Nishijima K, Shukunami K, Arikura S, Kotsuji F. An operative technique for conservative management of placenta accreta. Obstet Gynecol 2005; 105:1201-3.

Two case reports. A vertical incision in the anterior uterine wall and complete eversion of the uterus may help in manually removing placenta accreta.

(282) *** Weinstein A, Chandra P, Schiavello H, Fleischer A. Conservative management of placenta previa percreta in a Jehovah's Witness. Obstet Gynecol 2005; 105:1247-50.

Case report of a mother with 9 previous cesarean sections managed with uterine embolization and leaving the uterus and placenta untouched in situ after delivery.

(283) Weiniger CF, Elram T, Ginosar Y et al. Anaesthetic management of placenta accreta: use of a pre-operative high and low suspicion classification. Anaesthesia 2005; 60:1079-84.

Anesthesiologists should be prepared for major hemorrhage in all cases of suspected placenta accreta, although use of a system to grade level of suspicion may identify those at greater risk.

(284) Palacios Jaraquemada JM, Bruno CH. Magnetic resonance imaging in 300 cases of placenta accreta: surgical correlation of new findings. Acta Obstet Gynecol Scand 2005; 84:716-24.

Three hundred patients with an ultrasound diagnosis of placenta accreta were studied using MRI. MRI findings modified the final surgical technique.

(285) Shih J-C, Liu K-L, Shyu M-K. Temporary balloon occlusion of the common iliac artery: New approach to bleeding control during cesarean hysterectomy for placenta percreta. Am J Obstet Gynecol 2005; 193:1756-8.

A known case of placenta accreta with bladder invasion who had balloon catheters inserted into both common iliac arteries at 34 weeks under local anesthesia before a cesarean section under general anesthesia. Blood loss during delivery of the infant was controlled by inflation of both balloon catheters. A hysterectomy was eventually performed with a blood loss of less than 1000 ml.

(286) Olive EC, Roberts CL, Algert CS, Morris JM. Placenta praevia: maternal morbidity and place of birth. Aust N Z J Obstet Gynaecol 2005; 45:499-504.

Perinatal database study from an Australian hospital in Sydney. In a 4 year period 1,600 mothers had significant placenta previa. These were compared to mothers without placenta previa. Among women with placenta previa, 61% delivered in hospitals with 24-h on-site blood banks, 33% in hospitals with on-call blood bank services after hours and 6% in hospitals with no blood bank! Morbidity was different between

hospitals with a 24 hr blood bank compared to other hospitals (40% v 55%; P = 0.06).

(287) Ananth CV, Oyelese Y, Yeo L et al. Placental abruption in the United States, 1979 through 2001: Temporal trends and potential determinants. Am J Obstet Gynecol 2005; 192:191-8.

National Hospital Discharge Summary data was used (1979 – 2001) to look at risk factors for abruption. The rate of placental abruption in the US has increased sharply amongst black women and to a smaller extent in white women in a 20 yr period.

(288) Toivonen S, Keski-Nisula L, Romppanen EL et al. Endothelial nitric oxide synthase polymorphism is not associated with placental abruption in Finnish women. Fetal Diagn Ther 2005; 20:508-11.

116 pregnant women with placental abruption and 113 healthy controls were genotyped for Glu298Asp polymorphism in the eNOS gene. No differences were found between the groups.

(289) Moise KJ, Jr. Umbilical cord stem cells. Obstet Gynecol 2005;106:1393-407.

Interesting review article about the use of harvesting cord blood after delivery and storing it in specialized cord banks. The hematopoietic stem cells may later be used for transplantation.

(290) Boyle JJ, Katz VL. Umbilical cord prolapse in current obstetric practice. J Reprod Med 2005; 50:303-6.

Retrospective chart review in 2 hospitals between 1995 and 2000 in which 51 cases of cord prolapse were identified. There was a lack of significant neonatal morbidity and mortality identified in this study presumably reflecting modern obstetric practice managing cord prolapse – widespread use of electronic fetal monitoring and the availability to rapidly perform a cesarean section if needed. 2 fetal deaths in the series were caused by severe prematurity.

(291) Nizard J, Cromi A, Molendijk H, Arabin B. Neonatal outcome following prolonged umbilical cord prolapse in preterm premature rupture of membranes. BJOG 2005; 112:833-6.

Outcome of 13 neonates 2 years after delivery. All had normal neurodevelopmental outcome.

Fetal issues

Monitoring

(292) Heyborne KD, Porreco RP, Garite TJ et al. Improved perinatal survival of monoamniotic twins with intensive inpatient monitoring. Am J Obstet Gynecol 2005; 192:96-101.

Retrospective study which showed improved neonatal survival and decreased perinatal morbidity in the group of twin mothers who were admitted electively for inpatient fetal monitoring.

(293) *** Vintzileos AM, Nioka S, Lake M et al. Transabdominal fetal pulse oximetry with near-infrared spectroscopy. Am J Obstet Gynecol 2005; 192:129-33.

Traditional transvaginal fetal pulse oximetry depends on a degree of cervical dilatation with ruptured membranes. Transabdominal fetal pulse oximetry is a relatively new technique being developed to be used without such restrictions. This study was carried out in 6 pregnant volunteers and showed the measured values were similar to those obtained (from other studies) with the transvaginal technique.

(294) *** Klauser CK, Christensen EE, Chauhan SP et al. Use of fetal pulse oximetry among high-risk women in labor: a randomized clinical trial. Am J Obstet Gynecol 2005; 192:1810-7.

360 women randomized to receive CTG + oximetry or CTG alone. No changes to the rate of cesarean delivery, although oximetry did reduce decision-to-incision time. Neonatal outcomes were similar.

(295) Althaus JE, Petersen SM, Fox HE et al. Can electronic fetal monitoring identify preterm neonates with cerebral white matter injury? Obstet Gynecol 2005; 105:458-65.

Preterm births constitute 30% of all cases of cerebral palsy. Case control study which failed using CTG to identify cases with cerebral white matter injury.

(296) ACOG Practice Bulletin #62. Intrapartum fetal heart rate monitoring. Obstet Gynecol 2005; 105:1161-9.

(297) ACOG Practice Bulletin #70: Intrapartum fetal heart rate monitoring. Obstet Gynecol 2005; 106:1453-60.

This replaces Guideline 62 published earlier in 2005. Again a very good evidence based review of FHR monitoring in labor.

(298) Amer-Wahlin I, Ingemarsson I, Marsal K, Herbst A. Fetal heart rate patterns and ECG ST segment changes preceding metabolic acidaemia at birth. BJOG 2005; 112:160-5.

Data from a Swedish randomized trial – mothers monitored with CTG alone versus CTG + fetal ECG ST analysis – was used to look at a subset of cases with metabolic acidosis (pH<7.05). Two blinded obstetricians performed the interpretation of the data. The inter-observer agreement was higher based on the need to intervene if CTG and ST analysis was combined.

(299) Siira SM, Ojala TH, Vahlberg TJ et al. Marked fetal acidosis and specific changes in power spectrum analysis of fetal heart rate variability recorded during the last hour of labour. BJOG 2005; 112:418-23.

Prospective study fetal heart rate changes of 334 fetuses divided into 2 gps according to pH (> or < 7.05). Severe fetal acidosis was associated with frequency specific changes in FHR variability.

(300) Taylor MJO, Thomas MJ, Smith MJ et al. Non-invasive intrapartum fetal ECG: preliminary report. BJOG 2005; 112:1016-21.

Interesting study using a new composite device with multiple abdominal electrodes to record fetal heart rate, fetal ECG, maternal ECG and uterine contractions. Although fetal ECG is not a new technique it normally requires a fetal scalp electrode. This non-invasive technique needs only 12 abdominal electrodes. The authors managed to obtain good quality readings in 12 out of 15 patients, although the current drawback of this system is the data is analyzed off-line.

(301) Li X, Zheng D, Zhou S et al. Approximate entropy of fetal heart rate variability as a predictor of fetal distress in women at term pregnancy. Acta Obstet Gynecol Scand 2005; 84:837-43.

Approximate entropy (ApEn) is a mathematical approach to analyze the FHR trace. It was used in this study to correlate fetal outcome using umbilical cord gases. The ApEn of FHR variability decreased during fetal asphyxia, including hypoxia, hypercapnia, and both respiratory and metabolic acidosis. The ApEn values may be used as a predictor of fetal distress in women at term pregnancy.

(302) Ayres-de-Campos D, Costa-Santos C, Bernardes J. Prediction of neonatal state by computer analysis of fetal heart rate tracings: the antepartum arm of the SisPorto multicentre validation study. Eur J Obstet Gynecol Reprod Biol 2005; 118:52-60.

Computer analysis of CTGs of mothers scheduled for elective cesarean section was used to predict neonatal outcome in multiple centers. The system had a good discriminative capacity to predict 1 min and 5 min Apgar scores.

(303) Rosen KG. Fetal electrocardiogram waveform analysis in labour. Curr Opin Obstet Gynecol 2005; 17:147-50.

Review which details the published trials on this technology which analyzes ST changes on the fetal ECG during labor.

(304) Okosun H, Arulkumaran S. Intrapartum fetal surveillance. Curr Obstet Gynaecol 2005; 15:18-24.

Review on intrapartum fetal monitoring with information on the use and interpretation of CTG, fetal scalp blood sampling, fetal ECG waveform monitoring and fetal pulse oximetry.

(305) Gribbin C, James D. Assessing fetal health. Curr Obstet Gynaecol 2005; 15:221-7.

Review article on antenatal assessment and not intrapartum assessment. There is a critical review of 11 methods including Doppler FHR assessment, ultrasound to assess fetal growth, amniotic fluid measurement, CTG (+ computerized) analysis, fetal umbilical artery & uterine artery Dopplers and placental grading. It is interesting to note that most stillbirths are in "low-risk" women.

(306) Bakr AF, Al-Abd M, Karkour T. Fetal pulse oximetry and neonatal outcome: a study in a developing country. J Perinatol 2005; 25:759-62.

Prospective study in Egypt of 415 deliveries with abnormal FHR CTG tracings recruited to have fetal pulse oximetry and fetal scalp blood gas measurement at study entry followed by umbilical cord blood gases at delivery. There were only 150 complete sets of results. The diagnostic value of a fetal pulse oximetry saturation value (30%) compared well to fetal blood gas scalp measurements in predicting umbilical cord gases with a pH<7.15.

(307) Nioka S, Izzetoglu M, Mawn T et al. Fetal transabdominal pulse oximeter studies using a hypoxic sheep model. J Matern Fetal Neonatal Med 2005; 17:393-9.

A NIRS (Near InfraRed Spectroscopy) technique was used for this experiment in 4 anaesthetized pregnant sheep and correlated with directly measured arterial oxygen saturations. Of note the position of the NIRS source and detector were placed near the fetal head (abdominally) after direct visualization of the head position when the abdomen was open. It is unclear if this technique could be applied without prior knowledge of the fetal position in the uterus to guide placement of the NIRS probe.

(308) *** Dildy GA, 3rd. Intrapartum assessment of the fetus: historical and evidence-based practice. Obstet Gynecol Clin North Am 2005; 32:255-71.

Excellent review on monitoring techniques including fetal pulse oximetry. There is a good section of EFM, fetal scalp blood sampling and neonatal outcomes.

(309) Smith JF, Jr., Onstad JH. Assessment of the fetus: intermittent auscultation, electronic fetal heart rate tracing, and fetal pulse oximetry. Obstet Gynecol Clin North Am 2005; 32:245-54.

Review of these techniques. The section on fetal pulse oximetry is particularly good.

(310) Kakogawa J, Sumimoto K, Ho E, Kanayama N. Transabdominal measurement of oxygenation of the placenta by near-infrared spectroscopy. Semin Thromb Hemost 2005; 31:297-301.

NIRS used in 11 patients. Not as straightforward as it seems since ultrasound had to be used to confirm placental location before the NIRS was used.

(311) *** Sanderson PM, Watson MO, Russell WJ. Advanced patient monitoring displays: tools for continuous informing. Anesth Analg 2005; 101:161-8.

Review of advanced display technology monitoring during anesthesia including configural graphic displays, head-mounted displays and continuous auditory displays.

(312) Bickler PE, Feiner JR, Severinghaus JW. Effects of skin pigmentation on pulse oximeter accuracy at low saturation. Anesthesiology 2005; 102:715-9.

Volunteer study using multiple pulse oximeters and radial arterial lines. Pulse oximeters overestimated Hb-O2 saturation during hypoxia in dark skinned individuals.

Surgery

(313) Van de Velde M, Van Schoubroeck D, Lewi LE et al. Remifentanil for fetal immobilization and maternal sedation during fetoscopic surgery: a randomized, double-blind comparison with diazepam. Anesth Analg 2005; 101:251-8.

Remifentanil was superior to diazepam for producing maternal sedation and fetal immobilization, although ABGs showed increased CO2 and reduced pH and respiratory rate in the remifentanil gp.

(314) Sepulveda W, Surerus E, Vandecruys H, Nicolaides KH. Fetofetal transfusion syndrome in triplet pregnancies: Outcome after endoscopic laser surgery. Am J Obstet Gynecol 2005; 192:161-4.

Results of 10 cases during a 6 yr period treated with endoscopic laser ablation.

(315) Adelberg A, Blotzer A, Koch G et al. Impact of maternal-fetal surgery for myelomeningocele on the progression of ventriculomegaly in utero. Am J Obstet Gynecol 2005; 193:727-31.

No differences between in utero v postnatal repair.

(316) Yamamoto M, Murr LE, Robyr R et al. Incidence and impact of perioperative complications in 175 fetoscopy-guided laser coagulations of chorionic plate anastomoses in fetofetal transfusion syndrome before 26 weeks of gestation. Am J Obstet Gynecol 2005; 193:1110-6.

All done percutaneously under local anesthesia.

(317) Faria A, Fonseca C, Sampaio C et al. Ex utero intrapartum procedure for delivery of a fetus with a large cervical mass. Eur J Anaesthesiol 2005;22:642-3.

Letter. EXIT procedure performed under GA for the delivery of a fetus with a giant cervical mass.

(318) *** Quintero RA, Huhta J, Suh E et al. In utero cardiac fetal surgery: Laser atrial septotomy in the

treatment of hypoplastic left heart syndrome with intact atrial septum. Am J Obstet Gynecol 2005; 193:1424-8.

First case report of a Neodymium-YAG laser being used to perform an atrial septotomy to improve blood flow from left to right atrium. Good colour Doppler pictures help to illustrate the changes created from the surgery.

(319) Jani J, Gratacos E, Greenough A et al. Percutaneous Fetal Endoscopic Tracheal Occlusion (FETO) for Severe Left-Sided Congenital Diaphragmatic Hernia. Clin Obstet Gynecol 2005;48:910-22.

Interesting description of the technique.

(320) Bruner JP, Tulipan N. Intrauterine Repair of Spina Bifida. Clin Obstet Gynecol 2005; 48:942-55.

A fascinating description of the open repair of myelomeningocele through a hysterotomy.

(321) Gardiner HM, Kumar S. Fetal Cardiac Interventions. Clin Obstet Gynecol 2005; 48:956-63.

An emerging field with information about interventions for aortic valve stenosis / atresia and pulmonary valve stenosis/atresia.

(322) Yamamoto M, Ville Y. Twin-to-Twin Transfusion Syndrome: Management Options and Outcomes. Clin Obstet Gynecol 2005; 48:973-80.

Percutaneous endoscopy directed laser coagulation of placental anastomoses is described together with the management of related complications.

(323) Lee SJ, Ralston HJ, Drey EA et al. Fetal pain: a systematic multidisciplinary review of the evidence. Jama 2005; 294:947-54.

Very interesting review on the existence of fetal pain. Legal issues are explored as well as various anesthetic / analgesic techniques for fetal surgery.

Macrosomia

(324) Coomarasamy A, Connock M, Thornton J, Khan KS. Accuracy of ultrasound biometry in the prediction of macrosomia: a systematic quantitative review. BJOG 2005; 112:1461-6.

Macrosomia is an estimated birth weight > 4kg. This systematic review found no difference between ultrasonic measurement of estimated fetal weight and fetal abdominal circumference in terms of predicting macrosomia.

Resuscitation (intrauterine)

(325) *** Simpson KR, James DC. Efficacy of intrauterine resuscitation techniques in improving fetal oxygen status during labor. Obstet Gynecol 2005;105:1362-8.

Randomized study comparing the effect of a fluid bolus, maternal positions and oxygen administration during labor on fetal oxygen saturation. A 1000ml iv bolus, lateral positioning and O2 administration at 10L/min were the most effective at increasing fetal oxygen saturation.

Newborn issues

Evaluation

Acid-base balance

(326) Nodwell A, Carmichael L, Ross M, Richardson B. Placental compared with umbilical cord blood to assess fetal blood gas and acid-base status. Obstet Gynecol 2005; 105:129-38.

Placental cord blood (taken after the delivery of the placenta) provided a very close estimate of fetal Hb and base excess, but with more error for PO2 (O2 sat) and PCO2 (pH) probably due to continued blood gas exchange across the placenta after cord clamping.

(327) Holcroft CJ, Graham EM, Aina-Mumuney A et al. Cord gas analysis, decision-to-delivery interval, and the 30-minute rule for emergency cesareans. J Perinatol 2005; 25:229-35.

Retrospective cohort study of all cesarean sections performed for a non-reassuring fetal status at the authors' institution during a 16 month period. Delivery proceeded sooner for those cases with the worst cord gases. Most infants born for this indication after 30 minutes had normal cord gases!

Behavior

(328) *** Ramchandani P, Stein A, Evans J, O'Connor TG. Paternal depression in the postnatal period and child development: a prospective population study. Lancet 2005; 365:2201-5.

Large population based cohort study looking at the presence of depression in 13,351 mothers and 12,844 fathers 8 weeks after birth of their child. Fathers were reassessed after 21 months. Children were then assessed at 3.5 years for any behavioral and emotional problems. The study found that apart from maternal depression, paternal postpartum depression was also linked to behavioral problems in the children. Even after controlling for maternal depression and other factors, the children of fathers with depression were still at increased risk.

Maternal fever and neonatal sepsis investigation

(329) Alexander JM. Epidural analgesia for labor pain and its relationship to fever. Clin Perinatol 2005; 32:777-87.

Review article which concludes by saying that any rise in temperature associated with epidurals is unlikely to affect the fetus.

(330) Fernandez-Guisasola J, Delgado Arnaiz C, Rodriguez Caravaca G et al. [Epidural obstetric analgesia, maternal fever and neonatal wellness parameters]. Rev Esp Anestesiol Reanim 2005; 52:217-21.

Prospective study of over 4,000 women in labor who gave birth over a 3 year period. 5.7% of women developed intrapartum fever and of these 93% had epidurals (low dose bupivacaine / fentanyl) but this had no effect on neonatal Apgar scores, cord gases and neonatal sepsis evaluation.

Cerebral Palsy

(331) *** Spong CY. Therapy for hypoxic ischemic encephalopathy: a cool idea. Obstet Gynecol 2005; 106:1226-7.

Editorial accompanying the paper by Higgins et al. The author summarizes some of the evidence behind the practice of cooling neonates after a hypoxic / ischemic intrapartum insult.

(332) *** Higgins RD. Hypoxic ischemic encephalopathy and hypothermia: a critical look. Obstet Gynecol 2005; 106:1385-7.

Excellent review article summarizing the 2 recent papers on cooling after hypoxic ischemic encephalopathy and providing information of several major trials which are currently underway to look at the issue of body cooling in neonates who have suffered this type of intrapartum insult.

(333) *** Cooke R. Head cooling in neonatal hypoxic-ischaemic encephalopathy. Lancet 2005; 365:632-4.

Editorial accompanying Gluckman et al's paper.

(334) *** Gluckman PD, Wyatt JS, Azzopardi D et al. Selective head cooling with mild systemic hypothermia after neonatal encephalopathy: multicentre randomised trial. Lancet 2005; 365:663-70.

The CoolCap Study, an important multicenter randomized controlled study assessing the neuroprotective effects of head cooling. 234 neonates fitting the entry criteria were randomized to receive the head cooling device or conventional care. The commercially available cooling device placed around the head was activated (within 6 hours of birth) and maintained a rectal

temperature of 34-35°C for 72 hours. There were no differences in neonatal death / severe disability at 18 months, but there was a significant improvement in outcome in neonates with less severe EEG abnormalities.

(335) *** Papile L-A. Systemic Hypothermia -- A "Cool" Therapy for Neonatal Hypoxic-Ischemic Encephalopathy. N Engl J Med 2005;353:1619-20.

Editorial accompanying the paper by Shankaran et al, which explores some of the differences between this and the Gluckman trial.

(336) *** Shankaran S, Laptook AR, Ehrenkranz RA et al. Whole-Body Hypothermia for Neonates with Hypoxic-Ischemic Encephalopathy. N Engl J Med 2005; 353:1574-84.

Another important randomized trial looking at the effects of whole body cooling to improve outcomes after hypoxic ischemic encephalopathy. 239 infants were randomized into receiving whole body cooling to a core temperature of 33.5°C (using commercially available water cooling blankets) within 6 hours of entry and maintained at this temperature for 72 hours or conventional treatment. Cooling reduced by 18% the risk of death or moderate / severe disability compared to the control group.

(337) MacLennan A, Nelson KB, Hankins G, Speer M. Who will deliver our grandchildren? Implications of cerebral palsy litigation. Jama 2005; 294:1688-90.

Excellent commentary on the medicolegal aspects of childbirth / cerebral palsy. It summarizes the evidence regarding EFM and obstetric outcome and attempts to provide solutions to reduce medicolegal malpractice claims, which is reducing the number of practicing obstetricians in some US states.

(338) Neufeld MD, Frigon C, Graham AS, Mueller BA. Maternal infection and risk of cerebral palsy in term and preterm infants. J Perinatol 2005; 25:108-13.

Large case-control database study using the Washington state birth certificate data linked to hospital discharge data (1987-1999). Infection categories (using hospital codes) included chorioamnionitis, urinary tract infection and maternal fever / infection. Maternal infection was associated with doubling the risk of cerebral palsy in both term and pre-term infants.

(339) West CR, Curr L, Battin MR et al. Antenatal antecedents of moderate or severe neonatal encephalopathy in term infants--a regional review. Aust N Z J Obstet Gynaecol 2005; 45:207-10.

Retrospective review of maternal records after identification of infants with a diagnosis of NE from a national database over a 4 year period. Substandard FHR monitoring was a major contributor to NE.

Low Birth Weight

(340) Skilton MR, Evans N, Griffiths KA et al. Aortic wall thickness in newborns with intrauterine growth restriction. Lancet 2005; 365:1484-6.

Aortic wall thickness (a marker of early atherosclerosis), assessed by ultrasonography, was found to be increased in babies with IUGR compared to controls.

Meconium Aspiration

(341) Liu BY, Wang CC, Lau TK et al. Meconium-stained liquor during labor is associated with raised neonatal cord blood 8-iso-prostaglandin F2 (alpha) concentration. Am J Obstet Gynecol 2005; 192:289-94.

Oxidative stress and resulting free radical production has been implicated in perinatal brain injury. 8-iso-prostaglandin F2 (alpha) is a product of free radical generation and can be found in cord blood. Moderate or thick meconium stained liquor is an independent factor for increased oxidative stress in pregnancy.

(342) Ross MG. Meconium aspiration syndrome--more than intrapartum meconium. N Engl J Med 2005; 353:946-8.

Editorial accompanying paper by Fraser et al.

(343) Fraser WD, Hofmeyr J, Lede R et al. Amnioinfusion for the prevention of the meconium aspiration syndrome. N Engl J Med 2005; 353:909-17.

A large international multicenter study which randomized almost 2000 women with thick meconium staining of amniotic fluid to receive intrapartum amnioinfusion or standard care. The women were initially stratified depending on the presence or absence of variable fetal heart rate decelerations before randomization. Intrapartum amnioinfusion was performed using a transcervical catheter through which a bolus and then an infusion of sterile saline were administered. There were no differences between the groups in terms meconium aspiration syndrome, perinatal death or other major outcomes.

(344) Ahanya SN, Lakshmanan J, Morgan BL, Ross MG. Meconium passage in utero: mechanisms, consequences, and management. Obstet Gynecol Surv 2005; 60:45-56.

Good review on the subject.

Morbidity

(345) Dupuis O, Silveira R, Dupont C et al. Comparison of "instrument-associated" and "spontaneous" obstetric depressed skull fractures in a cohort of 68 neonates. Am J Obstet Gynecol 2005; 192:165-70.

Retrospective case controlled study of every neonate admitted with a depressed skull fracture over a 10 yr period. Depressed skull fractures associated with instrumental delivery are more frequent and more likely to be associated with intracranial injuries than fractures after a spontaneous vaginal delivery. Isolated vacuum extraction did not cause any depressed skull fractures.

(346) Di Renzo GC, Mignosa M, Gerli S et al. The combined maternal administration of magnesium sulfate and aminophylline reduces intraventricular hemorrhage in very preterm neonates. Am J Obstet Gynecol 2005; 192:433-8.

The combined administration of Mg sulfate and aminophylline was associated with a reduction in IVH in neonates born at < 30 weeks gestation.

(347) Caughey AB, Washington AE, Laros J, Russell K. Neonatal complications of term pregnancy: Rates by gestational age increase in a continuous, not threshold, fashion. Am J Obstet Gynecol 2005; 192:185-90.

Rates of newborn infants with UA pH < 7.0, base excess < -12, and severe neonatal complications increase after 42 weeks gestation.

(348) Fogel I, Pinchuk I, Kupferminc MJ et al. Oxidative stress in the fetal circulation does not depend on mode of delivery. Am J Obstet Gynecol 2005; 193:241-6.

Comparison of cord blood samples – cesarean section v. vaginal delivery.

(349) Allen VM, O'Connell CM, Baskett TF. Maternal and perinatal morbidity of caesarean delivery at full cervical dilatation compared with caesarean delivery in the first stage of labour. BJOG 2005; 112:986-90.

Database cohort study – 1997 to 2002 – in Nova Scotia. Women undergoing cesarean section at full dilatation were more likely to have intraoperative trauma and neonates with perinatal asphyxia.

(350) Lee J, Croen LA, Backstrand KH et al. Maternal and infant characteristics associated with perinatal arterial stroke in the infant. Jama 2005; 293:723-9.

PAS is a common cause of hemiplegic cerebral palsy. Retrospective case control study of infants born between 1997 and 2002 in Northern California using a detailed review of brain imaging scans and medical notes. On multivariate analysis, risk factors independently associated with PAS were infertility history, preeclampsia, prolonged rupture of membranes and chorioamnionitis. No information is given on coagulation factors / inflammatory markers and only a few placentas were available for histological examination. This information could have helped in analyzing causation.

(351) Mortensen EL, Michaelsen KF, Sanders SA, Reinisch JM. A dose-response relationship between maternal smoking during late pregnancy and adult intelligence in male offspring. Paediatr Perinat Epidemiol 2005; 19:4-11.

Database study using the Copenhagen perinatal cohort born between 1959 and 1961 which includes data on smoking during pregnancy. IQ tests at age 18 / 19 yrs of sons born to this cohort were correlated to various levels of smoking. The authors found that young men whose mothers smoked 20+ / day had IQs that were on average 6.2 points below those of non-smokers.

(352) Pignotti MS, Indolfi G, Ciuti R, Donzelli G. Perinatal asphyxia and inadvertent neonatal intoxication from local anaesthetics given to the mother during labour. BMJ 2005; 330:34-5.

Two case reports of neonatal seizures which turned out to be secondary to high local anesthetic blood concentrations after absorption from the perineal area.

(353) Mukherjee RA, Hollins S, Abou-Saleh MT, Turk J. Low level alcohol consumption and the fetus. BMJ 2005; 330:375-6.

Editorial advising complete abstinence from alcohol during pregnancy to be absolutely safe from potential adverse fetal effects.

(354) Kassim Z, Sellars M, Greenough A. Underwater birth and neonatal respiratory distress. BMJ 2005; 330:1071-2.

Case report of water aspiration after an underwater birth in a hospital birthing pool.

(355) Thoeni A, Zech N, Moroder L, Ploner F. Review of 1600 water births. Does water birth increase the risk of neonatal infection? J Matern Fetal Neonatal Med 2005; 17:357-61.

Good results are reported in this Italian study of primiparous women with a shorter first stage of labor and reduced analgesia requirements for water births. However this is a non-randomized study in which the mothers were allowed to choose their delivery position.

(356) Wayenberg JL. Threshold of metabolic acidosis associated with neonatal encephalopathy in the term newborn. J Matern Fetal Neonatal Med 2005; 18:381-5.

Arterial blood gases were taken from babies who had persistent abnormal neurological, respiratory or cardiovascular signs 30 minutes after delivery. The base deficit was then correlated with the incidence of neonatal encephalopathy. The authors suggest that a base deficit of > 14 mmol/L at 30 minutes is more likely to be associated with a moderate to severe neonatal encephalopathy. However there is no control group included in this study.

Mortality

(357) Smith GCS. Estimating risks of perinatal death. Am J Obstet Gynecol 2005; 192:17-22.

Reviews the clinical epidemiologic issues and statistical approaches to asses the risk of perinatal death.

(358) Foley ME, Alarab M, Daly L et al. Term neonatal asphyxial seizures and peripartum deaths: Lack of correlation with a rising cesarean delivery rate. Am J Obstet Gynecol 2005; 192:102-8.

Retrospective study of women greater than 37 weeks gestation delivering over a 12 yr period. Despite a large increase in the cesarean section rate (6.9% to 15.1%), the seizure rate and overall peripartum death rate at term did not alter significantly.

(359) Yang Q, Wen SW, Chen Y et al. Neonatal death and morbidity in vertex-nonvertex second twins according to mode of delivery and birth weight. Am J Obstet Gynecol 2005; 192:840-7.

This was increased in the 2nd twin after vaginal delivery of the 1st.

(360) Bacak SJ, Baptiste-Roberts K, Amon E et al. Risk factors for neonatal mortality among extremely-low-birth-weight infants. Am J Obstet Gynecol 2005; 192:862-7.

These included severe anomalies, gestational age, maternal age and delivery mode.

(361) Mattatall FM, O'Connell CM, Baskett TF. A review of intrapartum fetal deaths, 1982 to 2002. Am J Obstet Gynecol 2005; 192:1475-7.

A 20 yr review of unexpected neonatal deaths (n=82). Eleven of these were classified as viable and six were said to be preventable.

(362) Little MP, Brocard P, Elliott P, Steer PJ. Hemoglobin concentration in pregnancy and perinatal mortality: a London-based cohort study. Am J Obstet Gynecol 2005; 193:220-6.

There is an optimal range of lowest hemoglobin concentration in pregnancy, and on either side of this perinatal mortality is increased. The effect of lowest hemoglobin is mainly through associations with preterm birth and IUGR.

(363) Gould JB, Qin C, Chavez G. Time of birth and the risk of neonatal death. Obstet Gynecol 2005; 106:352-8.

After adjusting for case mix, Californian babies born between early (7pm to 12am) and late night (1am to 6 am) have a 12% and 16% increase in neonatal mortality respectively.

(364) Yuan H, Platt RW, Morin L et al. Fetal deaths in the United States, 1997 vs 1991. Am J Obstet Gynecol 2005; 193:489-95.

Reduced risk seen with induction of labor at term or after term.

(365) de Galan-Roosen AE, Kuijpers JC, Rosendaal FR et al. Maternal and paternal thrombophilia: risk factors for perinatal mortality. BJOG 2005;112:306-11.

Prospective data from a perinatal Dutch database. The risk of having thrombophilia is doubled in men who have fathered pregnancies which ended in perinatal death as well as in the mothers of such pregnancies.

(366) Smith GCS, Shah I, White IR et al. Mode of delivery and the risk of delivery-related perinatal death among twins at term: a retrospective cohort study of 8073 births. BJOG 2005; 112:1139-44.

UK retrospective cohort study from 1985 to 2001. Planned cesarean section may reduce the risk of perinatal death of twins at term by approximately 75% compared with attempting vaginal birth, mainly due to reducing the risk of death of the second twin due to intrapartum anoxia. The authors' claim that planned cesarean section would reduce the risk of perinatal death due to anoxia of the 2nd twin.

(367) Barros FC, Victora CG, Barros AJ et al. The challenge of reducing neonatal mortality in middle-income countries: findings from three Brazilian birth cohorts in 1982, 1993, and 2004. Lancet 2005; 365:847-54.

An interesting insight into obstetric care in Brazil with a large increase in cesarean section rates especially in the unregulated private sector where it reached 82% in 2004! Although preterm births increased mainly as a result of cesarean sections or inductions, neonatal mortality rates have been stable from 1990.

(368) Lawn JE, Cousens S, Zupan J. 4 million neonatal deaths: When? Where? Why? The Lancet 2005; 365:891-900.

One of a series of articles about achieving the Millennium Development Goals (MDGs) which are an attempt to address global poverty and ill health. The fourth goal, MDG-4, commits the international community to reducing mortality in children under 5 yrs by two thirds between 1990 and 2015. 38% of child deaths occur in the neonatal period with 450 babies dying every hour, mainly from preventable causes.

(369) Darmstadt GL, Bhutta ZA, Cousens S et al. Evidence-based, cost-effective interventions: how many newborn babies can we save? Lancet 2005; 365:977-88.

MDG series paper. Sixteen interventions are listed which can improve neonatal survival.

(370) Knippenberg R, Lawn JE, Darmstadt GL et al. Systematic scaling up of neonatal care in countries. Lancet 2005; 365:1087-98.

MDG series paper.

(371) Martines J, Paul VK, Bhutta ZA et al. Neonatal survival: a call for action. Lancet 2005; 365:1189-97.

Another paper in the MDG series. This one addresses issues relating to improving neonatal survival.

(372) Basso O, Olsen J. Subfecundity and neonatal mortality: longitudinal study within the Danish national birth cohort. BMJ 2005; 330:393-4.

Data from a large Danish database which showed that subfecundity (long time to pregnancy) was associated with an increased risk of neonatal death.

(373) Johnson KC, Daviss BA. Outcomes of planned home births with certified professional midwives: large prospective study in North America. BMJ 2005; 330:1416.

Interesting prospective cohort study of over 5,000 women expected to deliver in 2000 supported by accredited midwives who planned a home delivery. Planned home births had similar rates of intrapartum and neonatal mortality to those of low risk hospital births. Surprisingly, medical intervention rates for planned home births were lower than for planned low risk hospital births.

Pharmacology

(374) Nandi R, Fitzgerald M. Opioid analgesia in the newborn. Eur J Pain 2005; 9:105-8.

Review outlining the functional differences in opioid sensitivity of neonates compared to adults.

Respiratory Distress

(375) Blickstein I, Shinwell ES, Lusky A, Reichman B. Plurality-dependent risk of respiratory distress syndrome among very-low-birth-weight infants and antepartum corticosteroid treatment. Am J Obstet Gynecol 2005; 192:360-4.

Preterm (24-32 wks) very low birth wt twins / triplets have an increased risk of respiratory distress syndrome despite full antenatal corticosteroid treatment.

(376) Steer PJ. Giving steroids before elective caesarean section. BMJ 2005; 331:645-6.

Editorial accompanying the paper by Stutchfield et al.

(377) Stutchfield P, Whitaker R, Russell I. Antenatal betamethasone and incidence of neonatal respiratory distress after elective caesarean section: pragmatic randomised trial. BMJ 2005; 331:662.

Randomized multicenter study of almost 1000 women randomized at decision to deliver by cesarean section to either receive two intramuscular doses of betamethasone in the 48 hrs before delivery or routine treatment. Antenatal steroid and delaying delivery until 39 weeks both reduced admissions to the neonatal intensive care with respiratory distress after elective cesarean at term.

(378) Parmigiani S, Solari E, Bevilacqua G. Current concepts on the pulmonary surfactant in infants. J Matern Fetal Neonatal Med 2005; 18:369-80.

Detailed review of pulmonary surfactant which helps with understanding the problems underlying neonatal respiratory problems.

Resuscitation

(379) Lyng K, Braakhuis M, Froen JF et al. Inflammation increases vulnerability to hypoxia in newborn piglets: effect of reoxygenation with 21% and 100% O2. Am J Obstet Gynecol 2005; 192:1172-8.

Room air is just as effective as 100% oxygen.

(380) 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care: Neonatal Resuscitation Guidelines. Circulation 2005; 112: IV 188-95.

(381) *** Gordon A, McKechnie EJ, Jeffery H. Pediatric presence at cesarean section: Justified or not? Am J Obstet Gynecol 2005; 193:599-605.

Prospective cohort study of 45,000 deliveries over 13 years comparing resuscitation of infants during elective / emergency cesarean section with vaginal delivery. There were no differences between in the need for resuscitation between elective cesarean section under regional anesthesia and vaginal delivery. However resuscitation needs were increased with emergency cesarean section under GA or regional block, fetal distress and non-cephalic presentation.

(382) Gungor S, Teksoz E, Ceyhan T et al. Oronasopharyngeal suction versus no suction in normal, term and vaginally born infants: a prospective randomised controlled trial. Aust N Z J Obstet Gynaecol 2005; 45:453-6.

The no suction group had lower mean heart rates and better SpO2 for the first 6 min after birth.

(383) Gungor S, Kurt E, Teksoz E et al. Oronasopharyngeal suction versus no suction in normal and term infants delivered by elective cesarean section: a prospective randomized controlled trial. Gynecol Obstet Invest 2005;61:9-14.

Similar findings to the vaginal delivery study with the no suction group showing better SpO2 and lower mean heart rates.

(384) Klinger G, Beyene J, Shah P, Perlman M. Do hyperoxaemia and hypocapnia add to the risk of brain injury after intrapartum asphyxia? Arch Dis Child Fetal Neonatal Ed 2005; 90:F49-52.

Retrospective cohort study of 218 infants who needed mechanical ventilation for resuscitation at birth. Survivors had follow-up development assessments at 2 years. After adjusting for the severity of birth asphyxia, exposure to either peak PaO2 values exceeding 200 mmHg or trough PaCO2 values of 20 mmHg or lower during the first 20-120 min of life was associated with an increased risk of death or poor neurodevelopmental outcome.

(385) Wyckoff MH, Perlman JM, Laptook AR. Use of volume expansion during delivery room resuscitation in near-term and term infants. Pediatrics 2005; 115:950-5.

Retrospective database study of approximately 38,000 infants - 23 received CPR (CPR; defined as >1 minute of positive-pressure ventilation and chest compressions, with or without the administration of medications) including 13 infants who received volume infusion. The study is too small to make any firm conclusions.

(386) Leone TA, Rich W, Finer NN. Neonatal intubation: success of pediatric trainees. J Pediatr 2005; 146:638-41.

Retrospective database review of 5,000 successful intubations over a 10 year period in a hospital. The authors conclude that the exposure provided for residents to become proficient at intubations is inadequate within their training scheme.

(387) *** Paneth N. The evidence mounts against use of pure oxygen in newborn resuscitation. J Pediatr 2005; 147:4-6.

Excellent editorial accompanying the paper by Spector et al.

(388) *** Spector LG, Klebanoff MA, Feusner JH et al. Childhood cancer following neonatal oxygen supplementation. J Pediatr 2005; 147:27-31.

Data from the Collaborative Perinatal Project (CPP) of nearly 55,000 children born between 1959 and 1966 and followed up until 8 yrs of age. The data was used to find out any relationship between neonatal oxygen therapy and childhood cancer. An exposure to oxygen for more than 3 minutes was associated with a greater risk of developing childhood cancer despite controlling for other cancer risk factors. The risk is however very small. In a population of 10,000 the study results would suggest 18 cases of cancer may occur in those exposed to > 3 min of oxygen compared to 6 cases if not exposed. This study does not rule out any other factor potentially not controlled for in this study. In addition there is no information about the oxygen concentrations received by the neonates. Interestingly no cancers developed in children who as neonates had the longest duration of oxygen therapy (> 10min exposure)!

(389) Haumont D. Management of the neonate at the limits of viability. BJOG 2005; 112 Suppl 1:64-6.

Review exploring the issues surrounding aggressive perinatal care when babies are born between 22 and 25 weeks gestation.

(390) *** Miller NM, Fisk NM, Modi N, Glover V. Stress responses at birth: determinants of cord arterial cortisol and links with cortisol response in infancy. BJOG 2005; 112:921-6.

Interesting prospective observational study. Cortisol levels (as an indicator of fetal stress) were measured in cord blood at delivery. Cortisol levels were highest for an assisted vaginal delivery followed by a normal vaginal delivery > intrapartum cesarean section > elective cesarean section. Cord cortisol levels also negatively correlated with pH, with lower pHs associated with higher cortisol levels. CSE analgesia in labor was also associated with lower cord cortisol levels. When these infants returned at 8 weeks for a vaccination, salivary cortisol levels in response to the vaccination were highest in those who had high levels at birth.

Obstetric Complications-

Abdominal Pregnancy

(391) Ekele BA, Ahmed Y, Nnadi D, Ishaku K. Abdominal pregnancy: ultrasound diagnosis aided by the balloon of a Foley catheter. Acta Obstet Gynecol Scand 2005; 84:701-2.

A difficult diagnosis on imaging with ultrasound helped after a Foley catheter was passed transcervically and inflated with water.

(392) Roberts RV, Dickinson JE, Leung Y, Charles AK. Advanced abdominal pregnancy: still an occurrence in modern medicine. Aust N Z J Obstet Gynaecol 2005; 45:518-21.

Case report. IVF mother who at a 35 week scan was diagnosed to have an intraabdominal pregnancy and went on to have a live fetus delivered by laparotomy under general anesthesia. The mother went on to have a further operation to remove remaining placental tissue.

Amniotic Fluid Embolism

(393) Harnett MJ, Hepner DL, Datta S, Kodali BS. Effect of amniotic fluid on coagulation and platelet function in pregnancy: an evaluation using thromboelastography. Anaesthesia 2005; 60:1068-72.

In vitro study using a TEG. Profiles were found to be hypercoagulable with no evidence of fibrinolysis.

(394)Tuffnell DJ. United Kingdom Amniotic Fluid Embolism Register. BJOG 2005; 112:1625-9.

UK voluntary register from 1997 to 2004. Only 44 cases included. Mortality is high, but the majority of mothers with a clinical AFE diagnosis will survive, although there is still significant maternal and neonatal morbidity in survivors.

(395) Moore J, Baldisseri MR. Amniotic fluid embolism. Crit Care Med 2005; 33:S279-85.

Review of the pathophysiology and management of AFE.

(396) Nagar MP, Gratrix AP, O'Beirne HA, Enright SM. Survival following amniotic fluid embolism and cardiac arrest complicated by sub-capsular liver haematoma. Int J Obstet Anesth 2005; 14:62-5.

Case report.

(397) Robillard J, Gauvin F, Molinaro G et al. The syndrome of amniotic fluid embolism: A potential contribution of bradykinin. Am J Obstet Gynecol 2005; 193:1508-12.

Case report of a mother who developed symptoms suggestive of AFE including DIC. Laboratory blood samples, which were later analyzed for bradykinin related activity, suggests a role for this protein in the etiology of AFE.

Hemorrhage

(398) Norberg A, Brauer KI, Prough DS et al. Volume turnover kinetics of fluid shifts after hemorrhage, fluid infusion, and the combination of hemorrhage and fluid infusion in sheep. Anesthesiology 2005; 102:985-94.

Sheep model to look at fluid shifts during hemorrhage and fluid infusion.

(399) Maarek JM, Holschneider DP, Yang J et al. Transcutaneous fluorescence dilution cardiac output and circulating blood volume during hemorrhagic hypovolemia. Anesthesiology 2005; 102:774-82.

Rabbit study using fluorescence dilution cardiac output with indocyanine green with an ear probe. Measurements during hemorrhage were comparable with measurements using a thermodilution catheter placed at the same time. It could be a promising non-invasive cardiac output technique in the future.

(400) Neff TA, Fischler L, Mark M et al. The influence of two different hydroxyethyl starch solutions (6% HES 130/0.4 and 200/0.5) on blood viscosity. Anesth Analg 2005; 100:1773-80.

Laboratory and clinical study (head injury patients). HES 130/0.4 had advantages in terms of a smaller increase in plasma viscosity.

(401) Katori N, Tanaka KA, Szlam F, Levy JH. The effects of platelet count on clot retraction and tissue plasminogen activator-induced fibrinolysis on thrombelastography. Anesth Analg 2005; 100:1781-5.
Reopro (abciximab) - modified TEG study using lab generated platelet rich plasma to produce varying platelet counts. Abciximab binds to the glycoprotein (GP) lIb/IIIa platelet receptor which in turn prevents platelet aggregation. Using Abciximab helped to distinguish between clot retraction (due mainly to platelets) and fibrinolysis.

(402) Hamm J, Russell Z, Botha T et al. Buccal misoprostol to prevent hemorrhage at cesarean delivery: a randomized study. Am J Obstet Gynecol 2005; 192:1404-6.

The combination of buccal misoprostol and a dilute oxytocin infusion reduced additional oxytocic agents during cesarean section, but had no effect on postpartum hemorrhage or postoperative Hb level.

(403) Salihu HM, Bekan B, Aliyu MH et al. Perinatal mortality associated with abruptio placenta in singletons and multiples. Am J Obstet Gynecol 2005; 193:198-203.

The risk of abruption rises with the number of fetuses per pregnancy, although perinatal mortality declines.

(404) Magann EF, Evans S, Chauhan SP et al. The length of the third stage of labor and the risk of postpartum hemorrhage. Obstet Gynecol 2005; 105:290-3.

Prospective observational study with the active management of 3rd stage of labor. A 3rd stage > 18 min was associated with a greater risk of PPH and after 30 min the risk was 6 times higher.

(405) Magann EF, Evans S, Hutchinson M et al. Postpartum hemorrhage after vaginal birth: an analysis of risk factors. South Med J 2005; 98:419-22.

Risk factors included Asian race, maternal blood disorders, prior PPH, history of retained placenta, multiple pregnancy, antepartum hemorrhage, genital tract lacerations, macrosomia (>4 kg), and induction of labor.

(406) Davies GA, Tessier JL, Woodman MC et al. Maternal hemodynamics after oxytocin bolus compared with infusion in the third stage of labor: a randomized controlled trial. Obstet Gynecol 2005; 105:294-9.
MAP and HR compared in 2 gps – 10 IU bolus versus an infusion @ 2.5 IU / hr. MAP was higher over a 30 min period in the bolus gp. Blood loss was greater in the infusion group – not surprising considering only 2.5 IU / hr was administered. There were no adverse CVS events.

(407) Pereira A, Nunes F, Pedroso S et al. Compressive uterine sutures to treat postpartum bleeding secondary to uterine atony. Obstet Gynecol 2005; 106:569-72.

Case series of 7 women with failed medical treatment of uterine atony and hemorrhage. Multiple sutures applied longitudinally and transversally around the uterus were an effective treatment.

(408) Spahn DR, Tucci MA, Makris M. Is recombinant FVIIa the magic bullet in the treatment of major bleeding? Br J Anaesth 2005; 94:553-5.

Interesting editorial on the use of rFVIIa in bleeding – also accompanying several articles on the use of the drug in major surgery.

(409) *** Ahonen J, Jokela R. Recombinant factor VIIa for life-threatening post-partum haemorrhage. Br J Anaesth 2005; 94:592-5.

Case series of 12 patients in which the drug was used for severe hemorrhage.

(410) Butwick AJ, Riley ET, Ahonen J, Jokela R. Recombinant factor VIIa for life-threatening post-partum haemorrhage. Br J Anaesth 2005; 95:558; author reply.

Letter to original Ahonen rFVIIa paper emphasizing use of surgical methods and blood component replacement before resorting to rFVIIa.

(411) Roberts HR. Recombinant factor VIIa: how safe is the stuff? Can J Anaesth 2005; 52:8-11.

Editorial outlining the mechanism of action of the drug and its potential problems.

(412) *** Samama CM, Djoudi R, Lecompte T et al. Perioperative platelet transfusion: recommendations of the Agence Francaise de Securite Sanitaire des Produits de Sante (AFSSaPS) 2003. Can J Anaesth 2005; 52:30-7.

Interesting summary by an expert group based mainly on consensus opinions. In the absence of platelet dysfunction, there is no hemorrhagic risk regardless of surgery when the PC > 50,000. A PC of 50,000 is deemed sufficient for spinal anesthesia and 80,000 for epidural anesthesia.

(413) Lanzinger MJ, Niklason LE, Shannon M, Hill SE. Use of hemoglobin raffimer for postoperative life-threatening anemia in a Jehovah's Witness. Can J Anaesth 2005; 52:369-73.

Hb raffimer is a purified, cross-linked, human Hb solution. It is isolated from outdated units of packed RBCs. The Hb is extracted, heat treated and then cross-linked with o-raffinose. US clinical trails were suspended due to an increased incidence of MI in cardiac patients. FDA approval was sought for the emergency treatment of this non-obstetric patient with a Hb of 3.2 gm/dL who was rapidly deteriorating. It proved a life saving measure.

(414) Hall RI. The utility of hemoglobin based oxygen carriers (HBOC) - can animal studies help? Can J Anaesth 2005; 52:895-8.

Editorial accompanying paper by Freitag et al.

(415) Freitag M, Standl TG, Gottschalk A et al. Enhanced central organ oxygenation after application of bovine cell-free hemoglobin HBOC-201. Can J Anesth 2005;52:904-14.

Tissue oxygen tensions (tpO2) were measured in the gastrocnemius muscle using a polarographic needle probe, and in the liver using a flexible polarographic electrode in dogs during isovolemic hemodilution and administration of a HBOC (hemoglobin based oxygen carrier). Increased oxygen extraction was shown in both organs during the experiment. The use of HBOCs still remains mainly experimental.

(416) Porcu G, Roger V, Jacquier A et al. Uterus and bladder necrosis after uterine artery embolisation for postpartum haemorrhage. BJOG 2005; 112:122-3.

Case report. Problems occurred 21 days after embolisation leading eventually to a sub-total hysterectomy.

(417) Catling S, Joels L. Cell salvage in obstetrics: the time has come. BJOG 2005;112:131-2.

A short editorial expounding the benefits of cell salvage in obstetrics and seeking to allay fears about amniotic fluid embolism.

(418) Hofmeyr GJ, Walraven G, Gulmezoglu AM et al. Misoprostol to treat postpartum haemorrhage: a systematic review. BJOG 2005; 112:547-53.

Misoprostol in a dose of at least 200 mcg orally + 400 mcg sublingually significantly reduces the blood loss of 500ml or more during an ongoing PPH.

(419) Frenzel D, Condous GS, Papageorghiou AT, McWhinney NA. The use of the 'tamponade test' to stop massive obstetric haemorrhage in placenta accreta. BJOG 2005; 112:676-7.

Case report of a Sengstaken-Blakemore esophageal catheter being used transcervically into the uterine cavity during cesarean section to arrest bleeding.

(420) Porteous AOR, Appleton DS, Hoveyda F, Lees CC. Acquired haemophilia and postpartum haemorrhage treated with internal pudendal embolisation. BJOG 2005; 112:678-9.

Case report of a patient with acquired Factor VIII inhibitor who had a PPH following a vaginal delivery. She subsequently underwent successful embolization.

(421) Reches A, Almog R, Pauzner D et al. Spontaneous splenic rupture in pregnancy after heparin treatment. BJOG 2005; 112:837-8.

A case report of splenic rupture in a woman receiving LMWH for thrombophilia.

(422) Walraven G, Blum J, Dampha Y et al. Misoprostol in the management of the third stage of labour in the home delivery setting in rural Gambia: a randomised controlled trial. BJOG 2005; 112:1277-83.

Double blind randomized controlled trial set within 26 rural villages in Gambia (Africa). 600 mcg of oral misoprostol (compared to 2mg ergometrine orally) was found to be a promising drug to prevent life-threatening PPH in this type of setting, although the reduction in blood loss was not statistically significant between the groups.

(423) Hwu Y-M, Chen C-P, Chen H-S, Su T-H. Parallel vertical compression sutures: a technique to control bleeding from placenta praevia or accreta during caesarean section. BJOG 2005; 112:1420-3.

The authors describe an alternative to the B-Lynch suture to control severe bleeding during cesarean section.

(424) Henry A, Birch M-R, Sullivan EA et al. Primary postpartum haemorrhage in an Australian tertiary hospital: a case-control study. The Australian and New Zealand Journal of Obstetrics and Gynaecology 2005; 45:233-6.

Case controlled study of women delivering vaginally at a tertiary center - 125 cases and 125 controls. Risk factors (multivariate analysis) included past history of PPH, second stage labour > 60 min, forceps delivery, and incomplete placenta/ragged membranes.

(425) Yamada T, Mori H, Ueki M. Autologous blood transfusion in patients with placenta previa. Acta Obstet Gynecol Scand 2005; 84:255-9.

Retrospective review of cases of placenta previa some of whom also received an autologous blood transfusion. The authors recommend starting blood collection and storage at 32 weeks' gestation and to phlebotomize 400 ml per week to reach a volume of stored blood of 1200-1500 ml.

(426) Baksu A, Kalan A, Ozkan A et al. The effect of placental removal method and site of uterine repair on postcesarean endometritis and operative blood loss. Acta Obstet Gynecol Scand 2005;84:266-9.

Randomized study looking at various methods of removing the placenta at cesarean section. Manual removal resulted in more blood loss and a higher incidence of endometritis.

(427) Tanchev S, Platikanov V, Karadimov D. Administration of recombinant factor VIIa for the management of massive bleeding due to uterine atonia in the post-placental period. Acta Obstet Gynecol Scand 2005; 84:402-3.

Small series of patients given rFVIIa. Insufficient detail presented about other resuscitation measures prior to administration of the drug.

(428) Verspyck E, Resch B, Sergent F, Marpeau L. Surgical uterine devascularization for placenta accreta: immediate and long-term follow-up. Acta Obstet Gynecol Scand 2005; 84:444-7.

Small case series. Conservative treatment (for uterine conservation) during cesarean section by a bilateral uterine and ovarian surgical devascularization procedure.

(429) Ojala K, Perala J, Kariniemi J et al. Arterial embolization and prophylactic catheterization for the treatment for severe obstetric hemorrhage. Acta Obstet Gynecol Scand 2005; 84:1075-80.

Case series of 22 patients who underwent arterial embolization. Of these patients, 7 also had balloon catheterization performed antenatally due to antenatal diagnosis of abnormal placentation. In this case series arterial embolization was of significant help in controlling major hemorrhage.

(430) Thomas D. Facilities for blood salvage (cell saver technique) must be available in every obstetric theatre - Proposer. Int J Obstet Anesth 2005; 14:48-50.

(431) Clark V. Facilities for blood salvage (cell saver technique) must be available in every obstetric theatre - Opposer. Int J Obstet Anesth 2005; 14:50-2.

OAA Controversies in Obstetric Anesthesia debate with Thomas D.

(432) Hollnberger H, Gruber E, Seelbach-Goebel B. Major post-partum hemorrhage and treatment with recombinant factor VIIa. Anesth Analg 2005; 101:1886-7.

Letter. Three case reports with a conclusion that perhaps rFVIIa should be used before a severe acidosis occurs or after its correction during resuscitation.

(433) Welsby IJ, Monroe DM, Lawson JH, Hoffmann M. Recombinant activated factor VII and the anaesthetist. Anaesthesia 2005; 60:1203-12.

Good review article on the use of the drug for various indications.

(434) Fowler SJ. Provision for major obstetric haemorrhage: An Australian and New Zealand survey and review. Anaesth Intensive Care 2005; 33:784-93.

A questionnaire survey of units within this region. Interesting differences in facilities are highlighted especially in some units with fewer than 500 deliveries per year. Other data showed that 90 hospitals (38.1%) were without an on-site blood bank, and 12 did not have a supply of blood for emergencies. Half of all units (n=121) had on-site intensive care or high dependency facilities and 72.9% (n=175) had an on-site cardiac arrest team. Only 58.8% of units (n=141) had a written hemorrhage protocol.

(435) Feinberg EC, Molitch ME, Endres LK, Peaceman AM. The incidence of Sheehan's syndrome after obstetric hemorrhage. Fertil Steril 2005; 84:975-9.

Questionnaire survey with a 55% response rate. Clinical questions were asked regarding potential hypopituitarism after hemorrhage. Patients were then followed up with blood tests. The incidence of clinical signs of this condition was very low and did not correlate with laboratory findings.

(436) Hoj L, Cardoso P, Nielsen BB et al. Effect of sublingual misoprostol on severe postpartum haemorrhage in a primary health centre in Guinea-Bissau: randomised double blind clinical trial. BMJ 2005; 331:723.

Misoprostol 600 mcg was given sublingually immediately after vaginal delivery and reduced the incidence of severe postpartum hemorrhage.

(437) Harrington D, Black RS. Massive or recurrent antepartum haemorrhage. Curr Obstet Gynaecol 2005; 15:267-71.

Two fictitious case reports (placenta previa & intrauterine death / placental abruption) used to illustrate some general points about the management of antepartum hemorrhage.

(438) Jansen AJ, van Rhenen DJ, Steegers EA, Duvekot JJ. Postpartum hemorrhage and transfusion of blood and blood components. Obstet Gynecol Surv 2005; 60:663-71.

Basic review on blood loss during delivery and transfusion triggers for red blood cells, platelets and fresh frozen plasma.

(439) Magann EF, Cummings JE, Niederhauser A et al. Antepartum bleeding of unknown origin in the second half of pregnancy: a review. Obstet Gynecol Surv 2005; 60:741-5.

Review based on a Medline search of antepartum bleeding after the 20th week of gestation of unknown origin – exclusion of placenta previa, placental abruption etc (10 studies identified). The authors estimate that this complication will occur in approximately 2% of pregnancies with an increase in the incidence of stillbirth, preterm labor and fetal anomalies.

(440) Santoso JT, Saunders BA, Grosshart K. Massive blood loss and transfusion in obstetrics and gynecology. Obstet Gynecol Surv 2005; 60:827-37.

Good review on the subject with a useable massive blood loss transfusion algorithm. Surprisingly there is no mention of the use of recombinant factor VIIa during massive blood loss.

(441) Sheiner E, Sarid L, Levy A et al. Obstetric risk factors and outcome of pregnancies complicated with early postpartum hemorrhage: a population-based study. J Matern Fetal Neonatal Med 2005; 18:149-54.

Israeli perinatal database study of 154,000 deliveries which were complicated by PPH in 0.4% of cases (n=666). Hypertensive disorders, failure to progress during labor second stage, oxytocin augmentation, vacuum extraction and large for gestational age fetuses were found to be major risk factors for severe PPH.

(442) Kozek-Langenecker SA. Effects of hydroxyethyl starch solutions on hemostasis. Anesthesiology 2005; 103:654-60.

HES solutions with slow degradation can affect hemostasis mainly by reducing FVIII, vWF and platelet function. Rapidly degradable HES solutions have minimal influence on hemostasis.

(443) Soma LR, Uboh CE, Guan F et al. The Pharmacokinetics of Hemoglobin-Based Oxygen Carrier Hemoglobin Glutamer-200 Bovine in the Horse. Anesth Analg 2005; 100:1570-5.

Study on a 1st generation Hb based O2 carrier (HBOC-200) in a horse model.

(444) *** Tremper KK. Hemoglobin-based oxygen carrying solutions: will they replace red blood cells? Anesth Analg 2005; 100:910-1.

Editorial accompanying paper by Torres-Filho. Brief overview about the types available, the rationale regarding using HBOCs and particularly their side effects especially one of pancreatitis in patients treated with diaspirin-crosslinked Hb.

(445) Torres Filho IP, Spiess BD, Barbee RW et al. Systemic Responses to Hemodilution after Transfusion with Stored Blood and with a Hemoglobin-Based Oxygen Carrier. Anesth Analg 2005; 100:912-20.

Rat study using Hb-raffimer, a polymerized human Hb. Critical O2 delivery was no different down to 50% volume replacement (of native Hb) by either stored blood or Hb-raffimer, although MAP and total peripheral resistance increased in the HBOC gp.

(446) *** Thyes C, Spahn DR. Current status of artificial O2 carriers. Anesthesiol Clin North America 2005; 23:373-89.

Review outlining the 2 types of carriers – modified Hb solutions (which transport and unload oxygen) and perflurocarbons (PFC – which carry oxygen as dissolved gas) emulsions. The review traces the history of some of these compounds including those products which have been withdrawn due to their side effect profile. Of interest there is some information about the exciting development of Hb containing liposomes, Hb lipid vesicles and nano-dimension artificial red blood cells (some may actually be able to contain substrates and enzymes!), many of which are still undergoing animal testing.

(447) Yildiz K, Dogru K, Dalgic H et al. Inhibitory effects of desflurane and sevoflurane on oxytocin-induced contractions of isolated pregnant human myometrium. Acta Anaesthesiol Scand 2005; 49:1355-9.

Laboratory study. The results suggest that 0.5 MAC of both agents and 1.0 MAC of desflurane may not be associated with uterine atony and hemorrhage when oxytocin is given during cesarean section.

(448) Hunt BJ, Lyons G. Thromboelastography should be available in every labour ward. Int J Obstet Anesth 2005; 14:324-5.

Proposer - A debate during an OAA Controversies meeting in 2005.

(449) Watson HG. Thromboelastography should be available in every labour ward. Int J Obstet Anesth 2005; 14:325-7.

Opposer in the same debate.

Hyperemesis Gravidarum

(450) Bailit JL. Hyperemesis Gravidarum: Epidemiologic findings from a large cohort. Am J Obstet Gynecol 2005; 193:811-4.

Babies born to mothers with this condition are more likely to have a low birth wt and be small for gestational age.

(451) Lee RH, Pan VL, Wing DA. The prevalence of Helicobacter pylori in the Hispanic population affected by hyperemesis gravidarum. Am J Obstet Gynecol 2005; 193:1024-7.

IgG levels for H pylori analyzed and compared to controls. No differences seen.

(452) Trogstad LIS, Stoltenberg C, Magnus P et al. Recurrence risk in hyperemesis gravidarum. BJOG 2005; 112:1641-5.

Cohort study using a Norwegian database. The main finding was the high risk of recurrence observed in women with hyperemesis in the first pregnancy.

(453) Welsh A. Hyperemesis, gastrointestinal and liver disorders in pregnancy. Curr Obstet Gynaecol 2005; 15:123-31.

Review of these conditions. Liver disorders discussed include obstetric cholestasis, Acute Fatty Liver of Pregnancy, HELLP and viral hepatitis.

(454) Verberg MF, Gillott DJ, Al-Fardan N, Grudzinskas JG. Hyperemesis gravidarum, a literature review. Hum Reprod Update 2005; 11:527-39.

Literature review of papers from 1966 onwards summarizing the etiology and pathogenesis of the condition.

Maternal Mortality

(455) *** Gomez R, Santolaya J. Being mothers too early. Am J Obstet Gynecol 2005; 192:340-1.

Editorial accompanying the paper by Conde-Agudelo et al.

(456) *** Conde-Agudelo A, Belizan JM, Lammers C. Maternal-perinatal morbidity and mortality associated with adolescent pregnancy in Latin America: Cross-sectional study. Am J Obstet Gynecol 2005; 192:342-9.

A database review (1985 – 2003) comparing the neonatal and maternal outcomes for 344,000 pregnant adolescents, including 33,000 who were under 15 yrs old to outcomes in over 500,000 women aged 20-24 yrs. All age gps of adolescents had increased adverse pregnancy outcomes including PPH, operative vaginal delivery, preterm delivery and low birth wt.

(457) *** Sullivan SA, Hill EG, Newman RB, Menard MK. Maternal-fetal medicine specialist density is inversely associated with maternal mortality ratios. Am J Obstet Gynecol 2005; 193:1083-8.

Interesting paper using information from a national database. The population density of maternal-fetal medicine specialists is inversely associated with state-specific maternal mortality ratios. An increase of 5 maternal-fetal medicine specialists per 100,000 live births results in a 27% reduction in the risk of maternal death even after controlling for factors such as poverty, race, age etc.

(458) Katz VL. Maternal mortality: the correct assessment is everything. Obstet Gynecol 2005;106:678-9.

Editorial accompanying paper by Deneux-Tharaux et al.

(459) Deneux-Tharaux C, Berg C, Bouvier-Colle MH et al. Underreporting of Pregnancy-Related Mortality in the United States and Europe. Obstet Gynecol 2005;106:684-92.

This study highlights the limitations of statistics based on International Classification of Diseases cause-of-death codes alone.

(460) Ngan Kee WD. Confidential enquiries into maternal deaths: 50 years of closing the loop. Br J Anaesth 2005; 94:413-6.

Editorial accompanying the review articles about the most recent UK Confidential Enquires into Maternal Deaths published in late 2004.

(461) Clutton-Brock T. Maternal deaths from anaesthesia. An extract from Why Mothers Die 2000-2002, the Confidential Enquiries into Maternal Deaths in the United Kingdom: Chapter 17: Trends in intensive care. Br J Anaesth 2005; 94:424-9.

Summary of key findings and key recommendations.

(462) Cooper GM, McClure JH. Maternal deaths from anaesthesia. An extract from Why Mothers Die 2000-2002, the Confidential Enquiries into Maternal Deaths in the United Kingdom: Chapter 9: Anaesthesia. Br J Anaesth 2005; 94:417-23.

Summary of key findings and key recommendations.

(463) Heath M. CEMACH report: oesophageal intubation. Br J Anaesth 2005; 95:426.

Letter. A personal view on esophageal intubations in obstetrics following the review by Cooper and McClure.

(464) Bullough C, Meda N, Makowiecka K et al. Current strategies for the reduction of maternal mortality. BJOG 2005; 112:1180-8.

Review outlining global strategies for reducing maternal mortality.

(465) Tsu VD. Appropriate technology to prevent maternal mortality: current research requirements. BJOG 2005; 112:1213-8.

Review of global strategies to address the main causes of maternal mortality especially in poor resource countries - hemorrhage, puerperal sepsis, unsafe abortion, pre-eclampsia / eclampsia and obstructed labor.

(466) Hussein J. Obstetric first aid: time for resuscitation. BJOG 2005; 112:1219-20.

Short commentary on basic procedures to treat hemorrhage and other conditions in a poor resource setting.

(467) Hofmeyr GJ, Say L, Gulmezoglu AM. WHO systematic review of maternal mortality and morbidity: the prevalence of uterine rupture. BJOG 2005; 112:1221-8.

This review summarizes global causes of uterine rupture. In developed countries it is related to cesarean section.

(468) Fawcus SR, van Coeverden de Groot HA, Isaacs S. A 50-year audit of maternal mortality in the Peninsula Maternal and Neonatal Service, Cape Town (1953-2002). BJOG 2005; 112:1257-63.

The maternal mortality rate for all causes of maternal death declined significantly from 1953 to 1981 as a result of several interventions. From 1999, there was a non-significant increase in MMR (maternal mortality rates), mainly due to HIV/AIDS-related mortality.

(469) Singhal SR, Sharma D, Singhal SK. Acute mesenteric ischemia: an unknown cause of immediate postcesarean mortality. Acta Obstet Gynecol Scand 2005; 84:299-300.

Case report. Severe postoperative abdominal pain eventually resulted in laparotomy which showed acute mesenteric ischemia.

(470) McClure J, Cooper G. Fifty years of confidential enquiries into maternal deaths in the United Kingdom: should anaesthesia celebrate or not? Int J Obstet Anesth 2005; 14:87-9.

Editorial on the 2000-2002 CEMD report published in November 2004. The urgent need for airway training is emphasized.

(471) Loar III PV, Sanchez-Ramos L, Kaunitz AM et al. Maternal death caused by midgut volvulus after bariatric surgery. Am J Obstet Gynecol 2005; 193:1748-9.

A tragic case of a patient who previously had undergone Roux-en-Y gastric bypass surgery.

(472) Berg CJ, Harper MA, Atkinson SM et al. Preventability of pregnancy-related deaths: results of a state-wide review. Obstet Gynecol 2005; 106:1228-34.

All pregnancy related deaths (n=108) were reviewed in North Carolina between 1995-99. 40% of deaths were preventable with more preventable deaths in African-American women compared to white women (46%versus 33%). Better medical care could have reduced the mortality.

(473) Bartlett LA, Mawji S, Whitehead S et al. Where giving birth is a forecast of death: maternal mortality in four districts of Afghanistan, 1999-2002. The Lancet 2005; 365:864-70.

Retrospective cohort study of women of reproductive age (15-49 yrs) in four Afghanistan districts. Maternal mortality was high especially in the most remote areas. Most maternal deaths were due to antepartum hemorrhage.

(474) Neilson JP. Maternal mortality. Curr Obstet Gynaecol 2005; 15:375-81.

Short review based on the UK Confidential Enquiry into Maternal Deaths (CEMD). Suicide as the leading cause of maternal death in the UK is highlighted.

(475) Shadigian EM, Bauer ST. Pregnancy-associated death: a qualitative systematic review of homicide and suicide. Obstet Gynecol Surv 2005; 60:183-90.

Interesting review on homicide and suicide as causes of maternal death. Certainly in the UK suicide is the most common cause of maternal death. The authors call for greater awareness and antenatal screening for partner violence and other risk factors for homicide and suicide.

(476) Warner MA. Perioperative mortality: intraoperative anesthetic management matters. Anesthesiology 2005; 102:251-2.

Editorial accompanying paper by Arbous et al.

(477) *** Arbous MS, Meursing AE, van Kleef JW et al. Impact of anesthesia management characteristics on severe morbidity and mortality. Anesthesiology 2005; 102:257-68.

A very interesting multicentre case-control study of all patients (a very small number were OB) undergoing anesthesia between 1995-7. Several anesthesia related factors decreased mortality & morbidity including: equipment check with protocol and checklist, a directly available anesthesiologist, no change of anesthesiologist during anesthesia and 2 people present at emergence.

(478) Chalmers B. Maternity care in the former Soviet Union. BJOG 2005; 112:495-9.

Interesting commentary about the standards of maternity care in the former Soviet Union and current developments.

Multiple Gestation

(479) Yang Q, Wen SW, Chen Y et al. Occurrence and clinical predictors of operative delivery for the vertex second twin after normal vaginal delivery of the first twin. Am J Obstet Gynecol 2005; 192:178-84.

Abdominal and vaginal operative delivery rates were 6.3% and 8.3% respectively, in the vertex 2nd twin after normal vaginal delivery of the 1st twin. The most important predictors for operative delivery were cord prolapse and fetal distress.

(480) McGrail CD, Bryant DR. Intertwin time interval: how it affects the immediate neonatal outcome of the second twin. Am J Obstet Gynecol 2005; 192:1420-2.
30 minutes is often used as the cut off point of intertwin birth times. This study confirmed that longer intertwin birth time is associated with a continuous slow decline in umbilical cord pH. However, the small differences in pH were not large enough to impact clinical management.

(481) Francois K, Ortiz J, Harris C et al. Is peripartum hysterectomy more common in multiple gestations? Obstet Gynecol 2005; 105:1369-72.

Historical cohort study. Multiple gestations had a significantly higher occurrence of peripartum hysterectomy than singletons.

(482) Ayres A, Johnson TR. Management of multiple pregnancy: prenatal care-part I. Obstet Gynecol Surv 2005; 60:527-37.

Series of three CME review articles on the subject with parts 1 and 2 concentrating on antepartum management.

(483) Ayres A, Johnson TR. Management of multiple pregnancy: prenatal care--part II. Obstet Gynecol Surv 2005; 60:538-49.

(484) Ayres A, Johnson TR. Management of multiple pregnancy: labor and delivery. Obstet Gynecol Surv 2005; 60:550-4.

Final part of the series which looks at the indications for a vaginal delivery versus cesarean section in twin pregnancies and includes the particular challenges faced by the anesthesiologist managing a women with twins. Triplet pregnancy is only briefly mentioned.

(485) Alexander GR, Slay Wingate M, Salihu H, Kirby RS. Fetal and neonatal mortality risks of multiple births. Obstet Gynecol Clin North Am 2005; 32:1-16.

An assessment of the trends in fetal / neonatal mortality and how various maternal characteristics may influence them.

Neurologic Injury

(486) Case AS, Ramsey PS. Spontaneous epidural hematoma of the spine in pregnancy. Am J Obstet Gynecol 2005; 193:875-7.

Spontaneous thoracic hematoma treated with a laminectomy immediately following a cesarean section. Full neurological function returned several months later.

(487) Pool-Goudzwaard AL, Slieker ten Hove MC, Vierhout ME et al. Relations between pregnancy-related low back pain, pelvic floor activity and pelvic floor dysfunction. Int Urogynecol J Pelvic Floor Dysfunct 2005; 16:468-74.

Cross-sectional study of 77 patients. Women with pregnancy related low back pain were more likely to have pelvic floor dysfunction.

(488) Gilleran JP, Zimmern P. An evidence-based approach to the evaluation and management of stress incontinence in women. Curr Opin Urol 2005; 15:236-43.

Review which confirms that there is increasing evidence that cesarean section may have a protective role against pelvic floor damage due to labor.

Ovarian Hyperstimulation Syndrome

(489) Tummon I, Gavrilova-Jordan L, Allemand MC, Session D. Polycystic ovaries and ovarian hyperstimulation syndrome: a systematic review. Acta Obstet Gynecol Scand 2005; 84:611-6.

Ten studies analyzed. Care should be taken in women with PCO due to undergo assisted reproduction techniques.

(490) Budev MM, Arroliga AC, Falcone T. Ovarian hyperstimulation syndrome. Crit Care Med 2005; 33:S301-6.

Good overview of the problem.

(491) Mathur R, Evbuomwan I, Jenkins J. Prevention and management of ovarian hyperstimulation syndrome. Curr Obstet Gynaecol 2005; 15:132-8.

Review of the condition and management of associated problems.

PIH / Preeclampsia / Eclampsia

(492) *** Santos AC, Birnbach DJ. Spinal anesthesia for cesarean delivery in severely preeclamptic women: don't throw out the baby with the bathwater! Anesth Analg 2005; 101:859-61.

Editorial accompanying papers by Visalyaputra et al and Aya et al on the issue of spinal v epidural for cesarean section in severe PET. Good overview of some relevant papers including earlier studies by Aya's group. The editorial poses some outstanding questions such as small dose spinal (with CSE) and potential effect on hemodynamic stability as well which drugs should we be using to treat hypotension during regional blk in severe PET – ephedrine or phenylephrine.

(493) *** Visalyaputra S, Rodanant O, Somboonviboon W et al. Spinal versus epidural anesthesia for cesarean delivery in severe preeclampsia: a prospective randomized, multicenter study. Anesth Analg 2005; 101:862-8.

Large prospective randomized study of (approx 120) severe PET patients in 5 centers. The epidural group had lidocaine and epinephrine! The Santos editorial gives more detail on this paper than published including the possibility that hypotension was treated differently within the 5 centers. This study found more hypotension in the spinal group which was associated with more ephedrine use (median dose 6mg v 0mg). However the mean difference in the lowest BP was only 10mmHg with the hypotension being transient and easily treated – i.e. probably of little clinical significance. Fetal outcome (Apgar and cord gases) did not differ.

(494) *** Aya AGM, Vialles N, Tanoubi I et al. Spinal anesthesia-induced hypotension: a risk comparison between patients with severe preeclampsia and healthy women undergoing preterm cesarean delivery. Anesth Analg 2005; 101:869-75.

Previous study by this group which showed less hypotension in PET with spinals was criticized since the lower fetal wt of PET patients could have influenced the results due to less aortocaval compression. This prospective study compared mothers with severe PET with pre-term mothers with fetuses of similar wt. There was a reduced frequency of hypotension in the PET group (25% v 41% approx). The magnitude of the BP drop when it occurred was similar between groups, although PET patients needed less ephedrine to return to baseline values. Fetal data was similar. The authors conclude that PET factors may account of this reduced hypotension incidence rather than the smaller uterine mass.

(495) Ganzevoort W, Rep A, Bonsel GJ et al. A randomized trial of plasma volume expansion in hypertensive disorders of pregnancy: Influence on the pulsatility indices of the fetal umbilical artery and middle cerebral artery. Am J Obstet Gynecol 2005; 192:233-9.

Large randomized study using 250ml (twice daily) 6% HES to expand the plasma volume (PVE) in such patients compared to control. There was no difference in the pulsatility index of fetal umbilical and middle cerebral arteries between groups.

(496) Spaanderman ME, Willekes C, Hoeks AP et al. Maternal nonpregnant vascular function correlates with subsequent fetal growth. Am J Obstet Gynecol 2005; 192:504-12.

Evidence is accumulating that fetal growth is influenced by preexisting maternal disorder (s) hampering endothelial function. The authors tested the hypothesis that in nonpregnant normotensive, formerly preeclamptic women, vascular function predicts the development of fetal growth restriction. The study found that in such patients, arterial function (increased uterine artery PI – pulsatility index) was associated with subsequent reduced fetal growth.

(497) Beazley D, Ahokas R, Livingston J et al. Vitamin C and E supplementation in women at high risk for preeclampsia: a double-blind, placebo-controlled trial. Am J Obstet Gynecol 2005; 192:520-1.

The study was terminated after only 109 patients had been recruited. Analysis of this data showed no difference compared to placebo control.

(498) Yamamoto T, Suzuki Y, Kojima K, Suzumori K. Reduced flow-mediated vasodilation is not due to a decrease in production of nitric oxide in preeclampsia. Am J Obstet Gynecol 2005; 192:558-63.

Study of PIH women measuring reactive hyperemia using BP cuff inflation and ultrasound measurement of brachial artery size + platelet cGMP measurement.

(499) Wimalasundera RC, Thom SA, Regan L, Hughes AD. Effects of vasoactive agents on intracellular calcium and force in myometrial and subcutaneous resistance arteries isolated from preeclamptic, pregnant, and nonpregnant woman. Am J Obstet Gynecol 2005; 192:625-32.

Subcutaneous and myometrial resistance arteries from women who had preeclampsia, normal pregnancy, and nonpregnant women were obtained at the time of cesarean section or hysterectomy. Endothelial function was altered in preeclampsia, with loss of effect of acetylcholine, but not substance P. The authors conclude that vasoconstrictor reactivity was not increased in preeclampsia compared with uncomplicated normal pregnancy. Therefore this is not the reason for the increased peripheral vascular resistance in preeclamptics.

(500) Buhimschi CS, Norwitz ER, Funai E et al. Urinary angiogenic factors cluster hypertensive disorders and identify women with severe preeclampsia. Am J Obstet Gynecol 2005; 192:734-41.

Paper linked to the angiogenic basis of PET. Serum levels of soluble fms-like tyrosine kinase 1 (sFlt-1), vascular endothelial growth factor (VEGF), and placental growth factor (PlGF) are altered in women with clinical preeclampsia. Severe PET is associated with increased urinary output of the antiangiogenic factor sFlt-1 and a decreased output of PlGF at the time of clinical manifestation, providing a rapid non-invasive screening of hypertensive women based on a sFlt/PlGF ratio.

(501) *** Fontenot MT, Lewis DF, Frederick JB et al. A prospective randomized trial of magnesium sulfate in severe preeclampsia: use of diuresis as a clinical parameter to determine the duration of postpartum therapy. Am J Obstet Gynecol 2005; 192:1788-93.

Approximately 100 severe PET patients randomized to either have Mg + infusion for 24 hrs (control group) or a gp which had Mg stopped when urine output >or = 100ml for 2 consecutive hrs (treatment group). The treatment gp had a shorter duration of Mg therapy. No other differences were found between gps (no eclampsia or further need for Mg).

(502) *** Hammoud AO, Bujold E, Sorokin Y et al. Smoking in pregnancy revisited: findings from a large population-based study. Am J Obstet Gynecol 2005; 192:1856-62.

Retrospective German database review of over 170,000 singleton pregnancies. Smoking decreased the incidence of preeclampsia in a dose-effect manner (this effect diminished with greater gestational age) and was shown to increase the rate of intrauterine growth restriction and preterm delivery.

(503) *** Lindheimer MD. Unraveling the mysteries of preeclampsia. Am J Obstet Gynecol 2005; 193:3-4.

Editorial accompanying paper by Wolf et al. Up to date mini review regarding the etiology of PET and anti-angiogenic factors.

(504) *** Wolf M, Shah A, Lam C et al. Circulating levels of the antiangiogenic marker sFLT-1 are increased in first versus second pregnancies. Am J Obstet Gynecol 2005; 193:16-22.

The mRNA of soluble fms-like tyrosine kinase-1 is a protein that binds / inactivates the angiogenic proteins, vascular endothelial growth factor (VEGF) etc – these have been linked to an angiogenic basis of PET. Analysis of stored serum of women in the MOMS cohort study (1998 onwards) found the levels of sFlt-1 to be higher in 1st pregnancies compared to 2nd pregnancies.

(505) *** Levine RJ, Thadhani R, Qian C et al. Urinary placental growth factor and risk of preeclampsia. Jama 2005; 293:77-85.

This paper asks the question – can you predict the onset of preeclampsia from urinary PlGF? The hypothesis being that urinary PlGF (a proangiogenic protein) should be reduced in women with preeclampsia. Analysis was derived from women enrolled in the CPEP trial (Ca for Preeclampsia Prevention) which was set up to evaluate the effect of Ca v placebo on the development and severity of preeclampsia (1992-95). In the current study each preeclamptic woman was matched to normotensive controls (120 matched pairs). The urinary conc. of PlGF was significantly lower beginning at 25-28 weeks gestation among women who later had preeclampsia. Differences were more pronounced at 29-36 weeks. After the onset of preeclampsia, urinary PlGF was also significantly reduced.

(506) Magee LA, Miremadi S, Li J et al. Therapy with both magnesium sulfate and nifedipine does not increase the risk of serious magnesium-related maternal side effects in women with preeclampsia. Am J Obstet Gynecol 2005; 193:153-63.

Some case reports suggest that Mg + nifedipine cause increased neuromuscular blk and hypotension. This retrospective chart review of 377 patients in a Canadian hospital found that this combination did not increase Mg related side effects.

(507) Powers RW, Roberts JM, Cooper KM et al. Maternal serum soluble fms-like tyrosine kinase 1 concentrations are not increased in early pregnancy and decrease more slowly postpartum in women who develop preeclampsia. Am J Obstet Gynecol 2005; 193:185-91.

Increased soluble fms-like tyrosine kinase 1 is more likely to be present in women with severe preeclampsia, but it is not present in all women with preeclampsia. Soluble fms-like tyrosine kinase 1 concentrations decrease more slowly after delivery in women with preeclampsia.

(508) Yie SM, Taylor RN, Librach C. Low plasma HLA-G protein concentrations in early gestation indicate the development of preeclampsia later in pregnancy. Am J Obstet Gynecol 2005; 193:204-8.

Human leukocyte antigen G is expressed by extravillous trophoblast cells and may play a protective role in an immune response during PET. HLA-G levels in plasma from women who subsequently develop PE are lower than control patients, as early as the first trimester - circulating HLA-G protein concentration may be useful as an early predictor for the development of PET.

(509) Haggerty CL, Ferrell RE, Hubel CA et al. Association between allelic variants in cytokine genes and preeclampsia. Am J Obstet Gynecol 2005; 193:209-15.

Cytokine genotypes are associated with PET.

(510) Braekke K, Holthe MR, Harsem NK et al. Calprotectin, a marker of inflammation, is elevated in the maternal but not in the fetal circulation in preeclampsia. Am J Obstet Gynecol 2005; 193:227-33.

Calprotectin is a protein found in neutrophils. It was raised in mothers with PET but not in cord blood.

(511) Ajne G, Ahlborg G, Wolff K, Nisell H. Contribution of endogenous endothelin-1 to basal vascular tone during normal pregnancy and preeclampsia. Am J Obstet Gynecol 2005; 193:234-40.

The vascular sensitivity to endothelin-1 is not altered during normal pregnancy unlike in PET, where no effect of endothelin-1 was seen. Reduced endothelin dependence during pregnancy may partly explain the fall in peripheral vascular resistance.

(512) Yu CK, Smith GC, Papageorghiou AT et al. An integrated model for the prediction of preeclampsia using maternal factors and uterine artery Doppler velocimetry in unselected low-risk women. Am J Obstet Gynecol 2005;193:429-36.

The combination of UA Dopplers and maternal factors (high BMI, nulliparity, previous PET) provided the best estimate of risk.

(513) Resnik JL, Hong C, Resnik R et al. Evaluation of B-type natriuretic peptide (BNP) levels in normal and preeclamptic women. Am J Obstet Gynecol 2005; 193:450-4.

BNP is produced in the cardiac ventricles and is known to increase with hypertension / renal disease. In severe PET, BNP levels are significantly increased compared to mild PET and normal pregnancy.

(514) Zusterzeel PL, Te Morsche RH, Raijmakers MT et al. N-acetyl-transferase phenotype and risk for preeclampsia. Am J Obstet Gynecol 2005; 193:797-802.

The fast NAT acetylator status (metabolism of various toxic compounds) may be associated with PET.

(515) Vaughan JE, Walsh SW. Neutrophils from pregnant women produce thromboxane and tumor necrosis factor-alpha in response to linoleic acid and oxidative stress. Am J Obstet Gynecol 2005; 193:830-5.

Neutrophils from normal pregnant women produced thromboxane and tumor necrosis factor-alpha when exposed to conditions present in women with preeclampsia. This may cause vasoconstriction and inflammation.

(516) *** Kim YM, Romero R, Oh SY et al. Toll-like receptor 4: A potential link between "danger signals," the innate immune system, and preeclampsia? Am J Obstet Gynecol 2005; 193:921 e1-8.

Interesting paper about TLR expressed in interstitial trophoblasts comparing normal term pregnancies with PET and pre-term labor patients. TLRs are part of the innate immune system. The study found that TLRs may play a key role in developing PET.

(517) *** Norwitz ER, Tsen LC, Park JS et al. Discriminatory proteomic biomarker analysis identifies free hemoglobin in the cerebrospinal fluid of women with severe preeclampsia. Am J Obstet Gynecol 2005; 193:957-64.

Free Hb chains were identified in CSF of mothers with severe PET compared to mild PET and normotensive controls.

(518) Goodwin AA, Mercer BM. Does maternal race or ethnicity affect the expression of severe preeclampsia? Am J Obstet Gynecol 2005; 193:973-8.

Ten year chart review. African American women have more severe hypertension, while Caucasian women have more frequent HELLP.

(519) Ascarelli MH, Johnson V, McCreary H et al. Postpartum preeclampsia management with furosemide: a randomized clinical trial. Obstet Gynecol 2005; 105:29-33.

Patients with PET were given a 5-day course of 20mg oral furosemide. Only severe PET patients had lower postdischarge antihypertensive therapy requirements. There were no other benefits.

(520) Lin J, August P. Genetic thrombophilias and preeclampsia: a meta-analysis. Obstet Gynecol 2005; 105:182-92.

Suggests that Factor V Leiden may be associated with an increased risk of PET.

(521) Cunningham FG. Severe preeclampsia and eclampsia: systolic hypertension is also important. Obstet Gynecol 2005; 105:237-8.

Editorial accompanying paper by Martin et al.

(522) Martin JN, Jr., Thigpen BD, Moore RC et al. Stroke and severe preeclampsia and eclampsia: a paradigm shift focusing on systolic blood pressure. Obstet Gynecol 2005; 105:246-54.

Detailed examination of 28 case histories of patients who sustained a CVA associated with severe PET or eclampsia. Interestingly a systolic BP exceeding 155-160 mmHg (usually with diastolic BP < 105mmHg) preceded a CVA in most of these cases.

(523) Mignini LE, Latthe PM, Villar J et al. Mapping the theories of preeclampsia: the role of homocysteine. Obstet Gynecol 2005; 105:411-25.

Systematic review of 25 relevant studies. Homocysteine concentrations were slightly increased in normotensive pregnancies that later develop PET and are considerably increased once PET is established. However there does not appear to be a causal link.

(524) *** Sibai BM. Diagnosis, prevention, and management of eclampsia. Obstet Gynecol 2005; 105:402-10.

Excellent review article which includes some of the author's personal experience on the management of eclampsia.

(525) *** Blaauw J, Graaff R, van Pampus MG et al. Abnormal endothelium-dependent microvascular reactivity in recently preeclamptic women. Obstet Gynecol 2005; 105:626-32.

Skin reactivity 3-11 months postpartum assessed in early onset preeclampsia v controls using laser Doppler perfusion monitoring & iontophoresis of ACh and SNP (sodium nitroprusside). Abnormal endothelial function was indicated in preeclamptic women by increased ACh mediated vasodilation.

(526) Barrilleaux PS, Martin JN, Jr., Klauser CK et al. Postpartum intravenous dexamethasone for severely preeclamptic patients without hemolysis, elevated liver enzymes, low platelets (HELLP) syndrome: a randomized trial. Obstet Gynecol 2005; 105:843-8.

Double blind randomized trial giving dexamethasone or saline to severe preeclamptics. The disease severity or duration was not reduced.

(527) *** Caughey AB, Stotland NE, Washington AE, Escobar GJ. Maternal ethnicity, paternal ethnicity, and parental ethnic discordance: predictors of preeclampsia. Obstet Gynecol 2005; 106:156-61.

Retrospective cohort study. African Americans had the highest rate of preeclampsia. Asian paternity had the lowest rates. Having different maternal and paternal ethnicity was also associated with higher preeclampsia rates.

(528) Saftlas AF, Beydoun H, Triche E. Immunogenetic determinants of preeclampsia and related pregnancy disorders: a systematic review. Obstet Gynecol 2005; 106:162-72.

A systematic review of HLA associations with preeclampsia. The authors conclude that better powered studies are needed.

(529) Nabatian S, Quinn P, Brookfield L, Lakier J. Acute coronary syndrome and preeclampsia. Obstet Gynecol 2005;106:1204-6.

Two cases reported. Troponin I levels may be useful in the diagnosis.

(530) Cowley E, Thompson JP, Sharpe P et al. Effects of pre-eclampsia on maternal plasma, cerebrospinal fluid, and umbilical cord urotensin II concentrations: a pilot study. Br J Anaesth 2005; 95:495-9.

Urotensin II is a potent vasoconstrictor. Concentrations in preeclamptics were no different to controls.

(531) Oettle C, Hall D, Roux A, Grove D. Early onset severe pre-eclampsia: expectant management at a secondary hospital in close association with a tertiary institution. BJOG 2005; 112:84-8.

Prospective case series over 39 months. Maternal and perinatal outcomes were similar to the tertiary unit. Transfers to the tertiary unit were also optimized reducing workload and costs.

(532) Zhang WH, Alexander S, Bouvier-Colle MH, Macfarlane A. Incidence of severe pre-eclampsia, postpartum haemorrhage and sepsis as a surrogate marker for severe maternal morbidity in a European population-based study: the MOMS-B survey. BJOG 2005; 112:89-96.

A questionnaire based study in 11 regions within 9 European countries. A steering group agreed the definitions of the 3 conditions beforehand.¬¬ Hemorrhage was the most common of the 3 conditions reported followed by severe pre-eclampsia.

(533) Chan P, Brown M, Simpson JM, Davis G. Proteinuria in pre-eclampsia: how much matters? BJOG 2005;112:280-5.

Retrospective study - analysis of a regional database of mothers with hypertension. Increasing proteinuria was associated with adverse maternal and fetal outcomes.

(534) Arnadottir GA, Geirsson RT, Arngrimsson R et al. Cardiovascular death in women who had hypertension in pregnancy: a case-control study. BJOG 2005; 112:286-92.

Case control study. Long term follow-up of a cohort of 325 patients with hypertension during pregnancy. The study group had a higher incidence of ischemic heart disease and stroke.

(535) Waugh JJS, Bell SC, Kilby MD et al. Optimal bedside urinalysis for the detection of proteinuria in hypertensive pregnancy: a study of diagnostic accuracy. BJOG 2005;112:412-7.

Automated dipstick urinalysis is a better screening test for proteinuria than visual testing.

(536) *** Cotter AM, Martin CM, O'Leary JJ, Daly SF. Increased fetal RhD gene in the maternal circulation in early pregnancy is associated with an increased risk of pre-eclampsia. BJOG 2005; 112:584-7.

Interesting study which suggests that fetal DNA may provide an inflammatory response resulting in preeclampsia. Using blood samples taken in early pregnancy, fetal DNA analysis was later performed in women developing preeclampsia compared to controls. Increased fetal RhD gene was present in the maternal circulation in early pregnancy in women who subsequently develop pre-eclampsia; there also appears to be a graded response between the quantity of fetal DNA and severity of pre-eclampsia.

(537) Fraser WD, Audibert F, Bujold E et al. The vitamin E debate: implications for ongoing trials of pre-eclampsia prevention. BJOG 2005; 112:684-8.

Commentary on the use of Vitamin E for preeclampsia prevention following a metaanalysis in 2004 suggesting that high dose Vitamin E may cause increased mortality.

(538) Papageorghiou AT, Yu CKH, Erasmus IE et al. Assessment of risk for the development of pre-eclampsia by maternal characteristics and uterine artery Doppler. BJOG 2005; 112:703-9.

Large prospective observational study of over 17,000 women undergoing Doppler evaluation of the uterine arteries at 23 weeks gestation. This data was combined with maternal history variables to develop a model for risk assessment for developing preeclampsia.

(539) Tuffnell DJ, Jankowicz D, Lindow SW et al. Outcomes of severe pre-eclampsia/eclampsia in Yorkshire 1999/2003. BJOG 2005; 112:875-80.

Prospective 5 year study of 16 maternity units in a UK region looking at outcome after implementing a common guideline for the treatment of preeclampsia/eclampsia. The authors comment on the overall low incidence of serious complications.

(540) Hibbard JU, Korcarz CE, Girardet Nendaz G et al. The arterial system in pre-eclampsia and chronic hypertension with superimposed pre-eclampsia. BJOG 2005; 112:897-903.

Prospective study using echocardiography and Doppler to look at arterial compliance in 11 preeclamptics, 10 chronic hypertensives with superimposed preeclampsia versus 14 normotensive controls. All patients were receiving Mg, the controls receiving Mg for pre-term labor. A second lot of controls not receiving Mg but either with or without epidural analgesia were also included to account for confounding variables. Systemic vascular resistance was increased and arterial compliance reduced in the preeclamptic patients especially those with superimposed chronic hypertension. Epidural analgesia was not a confounding factor.

(541) Steegers EAP. Plasma volume expansion and delaying delivery in pre-eclampsia. BJOG 2005; 112:1337-8.

Editorial accompanying the paper by Ganzevoort et al.

(542) *** Ganzevoort W, Rep A, Bonsel GJ et al. A randomised controlled trial comparing two temporising management strategies, one with and one without plasma volume expansion, for severe and early onset pre-eclampsia. BJOG 2005; 112:1358-68.

The plasma volume expansion group received 250ml boluses of HES twice a day in addition to restricted volumes of saline whereas the control group was fluid restricted. There were no significant differences in maternal or perinatal outcome between the groups, although the authors' main outcome measure was a neurological score at term age.

(543) Spasojevic M, Smith SA, Morris JM, Gallery EDM. Peripheral arterial pulse wave analysis in women with pre-eclampsia and gestational hypertension. BJOG 2005; 112:1475-8.

A radial artery tonometer was used for waveform analysis to compare women with either preeclampsia or gestational hypertension with a control group. There were clear differences between these 3 groups. By 6 weeks postpartum all groups had values within the normal range.

(544) Emery SP, Levine RJ, Qian C et al. Twenty-four-hour urine insulin as a measure of hyperinsulinaemia/insulin resistance before onset of pre-eclampsia and gestational hypertension. BJOG 2005; 112:1479-85.

Insulin urine excretion in women with mild preeclampsia was increased compared to controls.

(545) Ay E, Kavak ZN, Elter K et al. Screening for pre-eclampsia by using maternal serum inhibin A, activin A, human chorionic gonadotropin, unconjugated estriol,

and alpha-fetoprotein levels and uterine artery Doppler in the second trimester of pregnancy. Aust N Z J Obstet Gynaecol 2005;45:283-8.

Hormonal markers only marginally improved predictive efficacy compared to Doppler alone.

(546) Osmanagaoglu MA, Dinc G, Osmanagaoglu S et al. Comparison of cerebral magnetic resonance and electroencephalogram findings in pre-eclamptic and eclamptic women. Aust N Z J Obstet Gynaecol 2005; 45:384-90.

Interesting report of findings in mild preeclamptics, severe preeclamptics and eclamptics undergoing MRI and EEG evaluations. MRI changes showed mainly ischemic changes.

(547) Atalay C, Erden G, Turhan T et al. The effect of magnesium sulfate treatment on serum cardiac troponin I levels in preeclamptic women. Acta Obstet Gynecol Scand 2005; 84:617-21.

Prospective study of preeclamptic patients and controls. A troponin I level is a sensitive way of assessing minor cardiac damage in preeclampsia and for assessing Mg treatment (Mg treatment lowered Troponin I levels in preeclamptics). The significance of these results is uncertain.

(548) Tranquilli AL, Giannubilo SR, Tedeschi E et al. Placental expression of nitric oxide synthase during HELLP syndrome: the correlation with maternal-fetal Doppler velocimetry. Acta Obstet Gynecol Scand 2005; 84:849-53.

Isoforms of nitric oxide synthase (NOS) were analyzed in placental samples of 10 patients with HELLP compared to 10 controls. Inducible NOS was lower in HELLP patients and may indicate extreme placental dysfunction.
(549) Kaur R, Jain V, Khuller M et al. Association of angiotensin-converting enzyme gene polymorphism with pregnancy-induced hypertension. Acta Obstet Gynecol Scand 2005; 84:929-33.

Serum ACE levels do not correlate with the ACE gene polymorphism or the development of PIH.

(550) Berends N, Teunkens A, Vandermeersch E, Van de Velde M. A randomized trial comparing low-dose combined spinal-epidural anesthesia and conventional epidural anesthesia for cesarean section in severe preeclampsia. Acta Anaesthesiol Belg 2005; 56:155-62.

Small study of 30 non-laboring women with severe preeclampsia undergoing elective Cesarean section randomized into 3 groups: epidural anesthesia with prophylactic fluid loading (10ml/kg crystalloid preload given 10 minutes before initiation of anesthesia), combined spinal epidural anesthesia with prophylactic fluid loading, or combined spinal epidural anesthesia with prophylactic ephedrine (30mg total dose). Hemodynamic data were similar between groups with a similar incidence and duration of hypotension. CSE appears to be a safe technique in severe preeclampsia even when prophylactic ephedrine is used.

(551) Okafor UV, Okezie O. Maternal and fetal outcome of anaesthesia for caesarean delivery in preeclampsia/eclampsia in Enugu, Nigeria: a retrospective observational study. Int J Obstet Anesth 2005; 14:108-13.

Retrospective survey providing a very interesting insight into the high maternal and fetal mortality rates in a Nigerian teaching hospital.

(552) Okafor UV, Efetie RE. Acute renal failure due to HELLP syndrome and acute renal failure in mid gestation. Int J Obstet Anesth 2005;14:265-8.

Case report of severe eclampsia / HELLP and acute renal failure at 22 weeks gestation. Intensive care with ventilation / dialysis eventually resulted in a good outcome for the mother.

(553) *** Parra M, Rodrigo R, Barja P et al. Screening test for preeclampsia through assessment of uteroplacental blood flow and biochemical markers of oxidative stress and endothelial dysfunction. Am J Obstet Gynecol 2005; 193:1486-91.

Uterine Doppler was performed on almost 1,500 asymptomatic pregnant women at 11-14 weeks and 22-25 weeks gestation. Various markers of oxidative stress, endothelial dysfunction and an antiangiogenic state were also analyzed in these two trimesters. Results of those women who developed preeclampsia were compared to controls. The UtA PI (uterine artery pulsatility index) was significantly different to those who eventually developed preeclampsia compared to controls in either trimester. Biochemical markers did not differ during the first trimester but did in the second trimester. UtA Doppler at 23 weeks gestation was the best test to predict preeclampsia.

(554) *** Sibai BM, Barton JR. Dexamethasone to improve maternal outcome in women with hemolysis, elevated liver enzymes, and low platelets syndrome. Am J Obstet Gynecol 2005; 193:1587-90.

Good editorial accompanying the paper by Fonseca et al which sets out the definition of HELLP and how previous trials have interpreted the inclusion of patients with this disease.

(555) *** Fonseca JE, Mendez F, Catano C, Arias F. Dexamethasone treatment does not improve the outcome of women with HELLP syndrome: A double-blind, placebo-controlled, randomized clinical trial. Am J Obstet Gynecol 2005; 193:1591-8.

The first such trial in which the treatment group of 132 women with HELLP received multiple doses of dexamethasone during the pregnancy and into the postpartum period. The use of dexamethasone for HELLP is not supported.

(556) van Runnard Heimel PJ, Franx A, Schobben AF et al. Corticosteroids, pregnancy, and HELLP syndrome: a review. Obstet Gynecol Surv 2005; 60:57-70.

A review on corticosteroids, their mechanism of action and changes in glucocorticoid metabolism during pregnancy. A detailed summary of papers using steroids to treat HELLP syndrome is also given.

(557) *** Aagaard-Tillery KM, Belfort MA. Eclampsia: morbidity, mortality, and management. Clin Obstet Gynecol 2005; 48:12-23.

Excellent review of the subject with brief summaries and comments on the major eclampsia trials including the MAGPIE and the Eclampsia Trial Collaborative Group study.

(558) *** Levine RJ, Karumanchi SA. Circulating angiogenic factors in preeclampsia. Clin Obstet Gynecol 2005; 48:372-86.

Excellent review of this topic with clear explanations of the role of sFlt-1 (soluble fms-like tyrosine kinase-1), VEGF (vascular endothelial growth factor) and PlGF (placental growth factor) in the anti-angiogenic (inhibition of factors promoting growth of vascular tissue) theory of preeclampsia.

(559) Belfort MA, Kennedy A, Rassner UA. Novel techniques for cerebral evaluation in preeclampsia and eclampsia. Clin Obstet Gynecol 2005; 48:387-405.

Detailed review on various techniques / associated physical principles used for cerebral imaging in preeclampsia including MRI, CT, PET (positron emission tomography) scanning and the potential uses of emerging techniques such as NIRS (near infrared spectroscopy) and MEG (Magnetoencephalography).

(560) Kupferminc MJ. Thrombophilia and preeclampsia: the evidence so far. Clin Obstet Gynecol 2005; 48:406-15.

(561) Spinnato JA, Livingston JC. Prevention of preeclampsia with antioxidants: evidence from randomized trials. Clin Obstet Gynecol 2005; 48:416-29.

Review on the use of antioxidants such as Lycopene, Zinc, Selenium, Magnesium, Melatonin, Vitamin E and Vitamin C for the prevention and treatment of preeclampsia.

(562) Haddad B, Sibai BM. Expectant management of severe preeclampsia: proper candidates and pregnancy outcome. Clin Obstet Gynecol 2005; 48:430-40.

A review of non-randomized and randomized trials of conservative management of severe preeclampsia with the aim of prolonging the pregnancy to improve fetal outcome. The authors conclude with their own protocol on expectant management balancing the risks between maternal and perinatal outcome.

(563) von Dadelszen P, Magee LA. Antihypertensive medications in management of gestational hypertension-preeclampsia. Clin Obstet Gynecol 2005; 48:441-59.

Review article on antihypertensive treatment of preeclampsia and non-proteinuric gestational hypertension. A substantial part of the review focuses on the use of hydralazine for the treatment of moderate to severe hypertension using data from their own metaanalysis.

(564) O'Brien JM, Barton JR. Controversies with the diagnosis and management of HELLP syndrome. Clin Obstet Gynecol 2005; 48:460-77.

Good review article on the subject looking particularly at management strategies including those of rare complications such as subcapsular hematoma.

(565) *** Sibai BM. Magnesium sulfate prophylaxis in preeclampsia: evidence from randomized trials. Clin Obstet Gynecol 2005; 48:478-88.

Excellent review on the evidence for the use of Mg for the prevention of fits in eclampsia, severe preeclampsia and mild eclampsia.

(566) van Pampus MG, Aarnoudse JG. Long-term outcomes after preeclampsia. Clin Obstet Gynecol 2005; 48:489-94.

Good review on long-term outcomes such as the risk of cardiovascular disease, renal disease, hepatic disease and brain lesions after preeclampsia.

(567) de Luca Brunori I, Battini L, Brunori E et al. Placental barrier breakage in preeclampsia: ultrastructural evidence. Eur J Obstet Gynecol Reprod Biol 2005; 118:182-9.

Placenta from 14 preeclamptic and 14 control patients were examined using electron microscopy. There was ultrastructural evidence of placental barrier breakage in the preeclamptic placentas.

(568) Kim YJ, Park HS, Park MH et al. Oxidative stress-related gene polymorphism and the risk of preeclampsia. Eur J Obstet Gynecol Reprod Biol 2005; 119:42-6.

Polymorphisms in the P450 cytochrome system (oxidative stress-related enzymes) were examined using PCR (polymerase chain reaction) in controls and preeclamptic patients. These polymorphisms do not appear to be related to preeclampsia.

(569) Atamer Y, Kocyigit Y, Yokus B et al. Lipid peroxidation, antioxidant defense, status of trace metals and leptin levels in preeclampsia. Eur J Obstet Gynecol Reprod Biol 2005; 119:60-6.

All these factors may play a role in preeclampsia according to this cross-sectional study of preeclamptic and pregnant patients as well as non-pregnant controls.

(570) Rumbold AR, Maats FH, Crowther CA. Dietary intake of vitamin C and vitamin E and the development of hypertensive disorders of pregnancy. Eur J Obstet Gynecol Reprod Biol 2005; 119:67-71.

A low Vitamin E intake was associated with an increased risk of developing hypertensive disorders of pregnancy.

(571) Balat O, Aksoy F, Kutlar I et al. Increased plasma levels of Urotensin-II in preeclampsia-eclampsia: a new mediator in pathogenesis? Eur J Obstet Gynecol Reprod Biol 2005; 120:33-8.

Levels of this vasoactive peptide was raised in preeclamptics compared to controls and also correlated with mean arterial pressure levels.

(572) Also-Rallo E, Lopez-Quesada E, Urreizti R et al. Polymorphisms of genes involved in homocysteine metabolism in preeclampsia and in uncomplicated pregnancies. Eur J Obstet Gynecol Reprod Biol 2005; 120:45-52.

An association with preeclampsia could not be shown.

(573) Ozkan S, Erel CT, Madazli R, Aydinli K. Serum leptin levels in hypertensive disorder of pregnancy. Eur J Obstet Gynecol Reprod Biol 2005; 120:158-63.

Levels were higher in the hypertensive group.

(574) Facchinetti F, Allais G, D'Amico R et al. The relationship between headache and preeclampsia: a case-control study. Eur J Obstet Gynecol Reprod Biol 2005; 121:143-8.

Mothers identified from retrospective data. Information from interviews conducted on mothers showed that migraine sufferers were more likely to develop preeclampsia.

(575) San-Frutos LM, Fernandez R, Almagro J et al. Measure of hemodynamic patterns by thoracic electrical bioimpedance in normal pregnancy and in preeclampsia. Eur J Obstet Gynecol Reprod Biol 2005; 121:149-53.

Eighteen preeclamptics compared with 15 controls. Preeclamptics showed a low cardiac output with a high systemic vascular resistance.

(576) Staff AC, Braekke K, Harsem NK et al. Circulating concentrations of sFlt1 (soluble fms-like tyrosine kinase 1) in fetal and maternal serum during pre-eclampsia. Eur J Obstet Gynecol Reprod Biol 2005; 122:33-9.

This is known to increase in maternal plasma in preeclamptics. This study showed that although the fetal concentration of sFlt1 was increased in the circulation in preeclampsia this was not large enough to contribute to the elevated maternal levels. Samples were taken from maternal blood as well as umbilical vein and amniotic fluid at (cesarean section) delivery.

(577) Sibai B, Dekker G, Kupferminc M. Pre-eclampsia. The Lancet 2005; 365:785-99.

Excellent detailed review on the subject.

(578) Roberts JM, Gammill H. Pre-eclampsia and cardiovascular disease in later life. Lancet 2005; 366:961-2.

Commentary on recent studies about the risk of developing cardiovascular disease following preeclampsia.

(579) Funai EF, Paltiel OB, Malaspina D et al. Risk factors for pre-eclampsia in nulliparous and parous women: the Jerusalem perinatal study. Paediatr Perinat Epidemiol 2005; 19:59-68.

Large cohort study which showed that the risk factors for preeclampsia did not differ between these groups.

(580) Martel MJ, Rey E, Beauchesne MF et al. Use of inhaled corticosteroids during pregnancy and risk of pregnancy induced hypertension: nested case-control study. BMJ 2005; 330:230-3.

Database study from Quebec which found no significant increase in pregnancy induced hypertension or preeclampsia among asthmatic women who used inhaled steroids during pregnancy.

(581) Greer IA. Pre-eclampsia matters. BMJ 2005; 330:549-50.

Editorial accompanying the systematic review by Duckitt & Harrington and the PRECOG preeclampsia community guidelines by Milne et al.

(582) Duckitt K, Harrington D. Risk factors for pre-eclampsia at antenatal booking: systematic review of controlled studies. BMJ 2005; 330:565.

A systematic review of controlled studies published between 1966 and 2002. The most significant risk factors for developing preeclampsia were a previous history of preeclampsia and the presence of antiphospholipid antibodies. Other factors included pre-existing diabetes, BMI>35 and maternal age > 40 yrs. Cigarette smoking reduces the risk!

(583) Milne F, Redman C, Walker J et al. The pre-eclampsia community guideline (PRECOG): how to screen for and detect onset of pre-eclampsia in the community. BMJ 2005; 330:576-80.

The guideline developed in the UK provides an evidence based risk assessment, with criteria for early referral, a 2-tiered schedule for monitoring women in the community after 20 weeks gestation, and referral criteria for step-up care. The authors claim that this guideline provides a framework by which pregnant women with preeclampsia are offered specialist care at the appropriate time for the best maternal / fetal outcome.

(584) Skjaerven R, Vatten LJ, Wilcox AJ et al. Recurrence of pre-eclampsia across generations: exploring fetal and maternal genetic components in a population based cohort. BMJ 2005; 331:877.

Interesting cohort database study from a Norwegian birth registry. Men and women born after preeclamptic pregnancies contribute to increased risk of preeclampsia in the next generation. The risk through affected mothers is higher than through affected fathers.

(585) Munjuluri N, Lipman M, Valentine A et al. Postpartum eclampsia of late onset. BMJ 2005; 331:1070-1.

Case report of eclampsia occurring on the 9th postpartum day.

(586) Coultas L, Chawengsaksophak K, Rossant J. Endothelial cells and VEGF in vascular development. Nature 2005; 438:937-45.

Review article on Vascular Endothelial Growth Factor which may play a role in the pathogenesis of preeclampsia.

(587) Carmeliet P. Angiogenesis in life, disease and medicine. Nature 2005; 438:932-6.

Review article on angiogenesis (growth of blood vessels).

(588) Matsuda H, Sakaguchi K, Shibasaki T et al. Cerebral edema on MRI in severe preeclamptic women developing eclampsia. J Perinat Med 2005; 33:199-205.

Can cerebral MRI aid us in the management of preeclampsia? Of the 41 patients with severe preeclampsia scanned, 11 had abnormal scans. Emergency cesarean section was performed on 5 while the remaining 6 had seizures despite being on magnesium. The authors suggest that cerebral MRI scans are

performed when delivery is delayed (e.g. to increase fetal maturation) in order to guide obstetric management.

(589) *** Innes KE, Weitzel L, Laudenslager M. Altered metabolic profiles among older mothers with a history of preeclampsia. Gynecol Obstet Invest 2005; 59:192-201.

Small case control study comparing 13 women who had experienced preeclampsia in their 1st pregnancy to 13 women who had no pregnancy related complications. All patients had no chronic illnesses. Preeclamptic women had a metabolic profile consistent with a higher risk of cardiovascular disease - higher levels of fasting serum triglycerides, insulin, and glucose, lower levels of fasting high-density lipoprotein, increased levels of insulin-like growth factor-binding protein-3 (IGFBP-3) and a higher ratio of IGFBP-3 to IGF-1 (insulin-like growth factor-1). These changes have been linked to an excess risk for cardiovascular morbidity and mortality and reduced risk for breast cancer later in life.

(590) Gupta S, Agarwal A, Sharma RK. The role of placental oxidative stress and lipid peroxidation in preeclampsia. Obstet Gynecol Surv 2005; 60:807-16.

Detailed review. Reduced placental perfusion as a result of abnormal placentation leads to ischemia reperfusion injury to the placenta. The result of this reperfusion injury results in placental oxidative stress, which is being increasingly reported to be involved in the pathogenesis of preeclampsia. This review article summarizes the mechanisms and the evidence for and against the role of placental oxidative stress in preeclampsia.

(591) Vanderlelie J, Venardos K, Clifton VL et al. Increased biological oxidation and reduced anti-oxidant enzyme activity in pre-eclamptic placentae. Placenta 2005; 26:53-8.

Placentas from normal and preeclamptic pregnancies were examined for tissue levels of anti-oxidant proteins (e.g. superoxide dismutase, thioredoxin reductase) and the amount of lipid and protein oxidation. The results showed a reduced level of anti-oxidant enzymes and evidence of increased oxidation in placental samples.

(592) Rumbold A, Duley L, Crowther C, Haslam R. Antioxidants for preventing pre-eclampsia. The Cochrane Database of Systematic Reviews 2005, Issue 4. Art. No.: CD004227.pub2.

Cochrane review - antioxidant supplementation seems to reduce the risk of pre-eclampsia. There may also be a reduction in the risk of having a small-for-gestational- age baby, although there is an increase in the risk of preterm birth. The authors suggest caution until we get the results of 7 large ongoing trials looking at antioxidants in pregnancy.

(593) Adeney KL, Williams MA, Miller RS et al. Risk of preeclampsia in relation to maternal history of migraine headaches. J Matern Fetal Neonatal Med 2005; 18:167-72.

Swedish study enrolling women over a 4 year period with preeclampsia and matching them to normotensive controls. An inpatient postpartum questionnaire was then used to ascertain a history of physician diagnosed migraine and other data such as lifestyle characteristics. A history of migraine was found to be associated with a 1.8 fold increased risk of preeclampsia.

(594) Bujold E, Romero R, Chaiworapongsa T et al. Evidence supporting that the excess of the sVEGFR-1 concentration in maternal plasma in preeclampsia has a uterine origin. J Matern Fetal Neonatal Med 2005; 18:9-16.

Small cross-sectional study of 9 preeclamptics and 9 normal patients undergoing cesarean section who had uterine vein and maternal antecubital vein blood samples taken at delivery for analysis of sVEGF-1 (soluble vascular endothelial growth factor receptor 1 – which binds and inhibits vascular growth factors) and PlGF (placental growth factor). The concentration of sVEGF-1 was higher in the uterine vein than antecubital vein blood in preeclamptics supporting a uterine source. There were no significant differences between uterine or antecubital concentrations of sVEGF-1 or PlGF in controls. PlGF also did not differ between controls and preeclamptics.

(595) Chaiworapongsa T, Romero R, Kim YM et al. Plasma soluble vascular endothelial growth factor receptor-1 concentration is elevated prior to the clinical diagnosis of pre-eclampsia. J Matern Fetal Neonatal Med 2005; 17:3-18.

Retrospective case control study using a clinical database and a bank of biological samples. sVEGFR-1 concentrations were higher in women who went on to develop preeclampsia compared to controls and this increase was apparent several weeks before the disease became clinically apparent.

(596) Ravid D, Massarwa LE, Biron-Shental T, Fejgin MD. Hyponatremia and preeclampsia. J Matern Fetal Neonatal Med 2005; 18:77-9.

Case report of a patient who developed this at 38 weeks gestation. The hyponatremia was corrected with a restricted volume normal saline infusion.

(597) Enquobahrie DA, Williams MA, Qiu C et al. Maternal plasma transforming growth factor-beta1 concentrations in preeclamptic and normotensive pregnant Zimbabwean women. J Matern Fetal Neonatal Med 2005; 17:343-8.

Case control study. TGF-beta1 is known to play a role in various physiological processes including placentation. Blood samples taken from preeclamptics after clinical diagnosis were analyzed for TGF-beta1 concentrations (and a tumor necrosis factor soluble receptor – sTNFp55; indicating systemic inflammation) and compared to normotensive controls. Patients with an elevated TGF-beta1 had a higher risk of preeclampsia. This risk was further increased if sTNFp55 was also elevated.

(598) Hatab MR, Zeeman GG, Twickler DM. The effect of magnesium sulfate on large cerebral artery blood flow in preeclampsia. J Matern Fetal Neonatal Med 2005; 17:187-92.

Twelve patients given 6 gm Mg intravenously by infusion followed by velocity-encoded phase-contrast magnetic resonance imaging to look at blood flow in the middle and posterior cerebral arteries before and after infusion. There were no differences in blood flow in these arteries, although the authors acknowledge that the technique could not rule out cerebral vasodilation in smaller arteries.

(596) Ravid D, Massarwa LE, Biron-Shental T, Fejgin MD. Hyponatremia and preeclampsia. J Matern Fetal Neonatal Med 2005; 18:77-9.

A case report of hyponatremia (without nephrotic syndrome) in a patient with preeclampsia.

(599) Salamalekis E, Vitoratos N, Makrakis E et al. No association between insulin resistance and preeclampsia. J Matern Fetal Neonatal Med 2005; 18:113-5.

Small study of preeclamptic (n=15) versus control (n=15) patients. Oral glucose tolerance tests as well as insulin resistance and insulin sensitivity indices showed no significant differences between the groups.

(600) Schipper EJ, Bolte AC, Schalkwijk CG et al. TNF-receptor levels in preeclampsia--results of a longitudinal study in high-risk women. J Matern Fetal Neonatal Med 2005; 18:283-7.

Almost 70 women with a high risk of developing preeclampsia were recruited into this study looking at levels of tumor necrosis factor receptor. The receptor is thought to mediate the actions of TNF-alpha and thought to be important in immune activation. Levels were higher in preeclamptics with intrauterine growth restriction.

(601) Tsao P-N, Wei S-C, Su Y-N et al. Excess soluble fms-like tyrosine kinase 1 and low platelet counts in premature neonates of preeclamptic mothers. Pediatrics 2005; 116:468-72.

Cord blood samples were taken from preterm neonates from mothers with / without preeclampsia and analyzed for sFlt-1 (an anti-angiogenic factor implicated in the pathogenesis of preeclampsia), placental growth factor (PlGF) and vascular endothelial growth factor (VEGF). Infants of mothers with preeclampsia had higher concentrations of sFlt-1 and lower concentrations of PlGF and VEGF (as expected). There was a negative correlation between neonatal platelet count and birth weight and sFlt-1 concentrations. – i.e. higher concentrations of sFlt-1 were found in neonates with thrombocytopenia in mothers with preeclampsia.

(602) Shames BD, Fernandez LA, Sollinger HW et al. Liver transplantation for HELLP syndrome. Liver Transpl 2005; 11:224-8.

Case report and literature review. Apparently there have been 8 cases (6 still alive) nationally (US) of liver transplantation after complications of HELLP syndrome between 1987 and 2003.

(603) Karaman S, Akercan F, Terek MC. Epidural versus spinal anesthesia for cesarean section in preeclamptic patients. Int J Gynaecol Obstet 2005; 90:68-9.

Retrospective review (really a letter!) of 41 patients given a spinal or epidural. There were no differences in blood pressure falls between the groups.

(604) *** Karumanchi SA, Maynard SE, Stillman IE et al. Preeclampsia: a renal perspective. Kidney Int 2005; 67:2101-13.

Superb review of preeclampsia with excellent explanatory diagrams. Although the review does have a renal focus there is an good summary about the anti-angiogenic etiology of the disease.

(605) Cipolla MJ, Vitullo L, Delance N, Hammer E. The cerebral endothelium during pregnancy: a potential role in the development of eclampsia. Endothelium 2005; 12:5-9.

In vitro rat study using an arterial model – late pregnant v controls. With increasing distending pressure, vascular permeability increased in pregnant rats compared to controls.

(606) Parisaei M, Derwig I, Yoon J et al. Posterior reversible leukoencephalopathy in a case of postpartum eclampsia. Am J Obstet Gynecol 2005; 193:885-6.

Atypical presentation of eclampsia 5 days postpartum with reversible MRI changes in the cerebellum.

(607) Morton A, Higgins S, Mullins B. HELLP, eclampsia and posterior reversible encephalopathy in a young woman with streak ovary syndrome. Aust N Z J Obstet Gynaecol 2005; 45:173-4.

Case report.

(608) Patel P, Desai P, Gajjar F. Labor epidural analgesia in pre-eclampsia: a prospective study. J Obstet Gynaecol Res 2005; 31:291-5.

Prospective study comparing nulliparous women with preeclampsia who had epidurals for labor analgesia (n=100) to those not receiving epidurals (n=100). There were no differences in obstetric or neonatal outcome between groups.

(609) Kuczkowski KM. Labor analgesia for the parturient with pregnancy-induced hypertension: what does an obstetrician need to know? Arch Gynecol Obstet 2005; 272:214-7.

Basic summary for obstetricians.

(610) Shaarawy M, Al-Sokkary F, Sheba M et al. Angiogenin and vascular endothelial growth factor in pregnancies complicated by preeclampsia. Int J Gynaecol Obstet 2005; 88:112-7.

Prospective study of 20 normotensive healthy pregnant women compared to 55 mild preeclamptics and 16 severe preeclamptics. Both VEGF and angiogenin were significant increased in preeclampsia – a 5 fold increase being seen in severe preeclampsia.

(611) O'Brien JM, Poynter L, Barton JR. Transfusion for hemolysis, elevated liver function tests, and low platelet count in pregnancy. Int J Gynaecol Obstet 2005; 89:291-2.

Short report of HELLP patients receiving blood products in their medical management compared to HELLP patients not receiving blood products. The authors concluded that patients who had steroid therapy were less likely to be transfused. However there is a lack of detail in this report to make any firm conclusions.

(612) *** Redman CW, Sargent IL. Latest advances in understanding preeclampsia. Science 2005; 308:1592-4.

Brief review on preeclampsia concentrating on the latest advances in our understanding of the disease.

Perineal Trauma/Lacerations

(613) Bahl R, Strachan B, Murphy DJ. Pelvic floor morbidity at 3 years after instrumental delivery and cesarean delivery in the second stage of labor and the impact of a subsequent delivery. Am J Obstet Gynecol 2005; 192:789-94.

Urinary incontinence is higher after instrumental delivery than cesarean section.

(614) Hudelist G, Gelle'n J, Singer C et al. Factors predicting severe perineal trauma during childbirth: role of forceps delivery routinely combined with mediolateral episiotomy. Am J Obstet Gynecol 2005; 192:875-81.

Retrospective review of over 5,000 deliveries. This combination led to more perineal damage.

(615) Hopkins LM, Caughey AB, Glidden DV, Laros RK, Jr. Racial/ethnic differences in perineal, vaginal and cervical lacerations. Am J Obstet Gynecol 2005; 193:455-9.

Retrospective study of nulliparous women who delivered vaginally – vertex presentation. Filipino and Chinese women were at greatest risk of 3rd and 4th degree perineal tears.

(616) Wu JM, Williams KS, Hundley AF et al. Occiput posterior fetal head position increases the risk of anal sphincter injury in vacuum-assisted deliveries. Am J Obstet Gynecol 2005; 193:525-8.

Retrospective study of almost 400 vacuum-assisted vaginal deliveries.

Preterm Labor

(617) Kalish RB, Nguyen DP, Vardhana S et al. A single nucleotide A>G polymorphism at position -670 in the Fas gene promoter: Relationship to preterm premature rupture of fetal membranes in multi-fetal pregnancies. Am J Obstet Gynecol 2005; 192:208-12.

A genetic variant in the Fas gene is associated with an increased rate of PPROM in multi-fetal pregnancies.

(618) Simhan HN, Caritis SN, Krohn MA, Hillier SL. The vaginal inflammatory milieu and the risk of early premature preterm rupture of membranes. Am J Obstet Gynecol 2005; 192:213-8.

Elevated vaginal pH and neutrophils are strongly associated with early 3rd trimester PPROM which reflects the importance of infection / inflammation in PPROM.

(619) *** Gomez R, Romero R, Medina L et al. Cervicovaginal fibronectin improves the prediction of preterm delivery based on sonographic cervical length in patients with preterm uterine contractions and intact membranes. Am J Obstet Gynecol 2005; 192:350-9.

Both tests independently have a high negative and a weak positive predictive value. Combining the tests improves the PPV.

(620) Cauci S, McGregor J, Thorsen P et al. Combination of vaginal pH with vaginal sialidase and prolidase activities for prediction of low birth weight and preterm birth. Am J Obstet Gynecol 2005; 192:489-96.

Danish study of vaginal fluid biomarkers. This combination was predictive for low birth wt and prematurity.

(621) Jarjoura K, Devine PC, Perez-Delboy A et al. Markers of periodontal infection and preterm birth. Am J Obstet Gynecol 2005; 192:513-9.

The severity of periodontitis is significantly associated with preterm birth and low birth wt.

(622) Hendler I, Goldenberg RL, Mercer BM et al. The Preterm Prediction Study: association between maternal body mass index and spontaneous and indicated preterm birth. Am J Obstet Gynecol 2005; 192:882-6.

Maternal obesity is associated with a lower risk of preterm delivery.

(623) Samol JM, Lambers DS. Magnesium sulfate tocolysis and pulmonary edema: the drug or the vehicle? Am J Obstet Gynecol 2005; 192:1430-2.

MgSO4 and intravenous fluid rates are both associated with the development of pulmonary edema. Once appropriately treated, MgSO4 tocolysis can be continued with little risk of recurrence.

(624) Farina A, LeShane ES, Romero R et al. High levels of fetal cell-free DNA in maternal serum: a risk factor for spontaneous preterm delivery. Am J Obstet Gynecol 2005; 193:421-5.

The authors found a relationship between high concentrations of fetal cell – free DNA and an increased risk of spontaneous preterm delivery.

(625) Steer P. The epidemiology of preterm labour. BJOG 2005; 112:1-3.

Editorial. Interestingly the major causes of preterm birth globally are infection – malaria and HIV.

(626) Hagberg H, Mallard C, Jacobsson B. Role of cytokines in preterm labour and brain injury. BJOG 2005;112:16-8.

Commentary about cytokines and infection in preterm labor.

(627) Varner MW, Esplin MS. Current understanding of genetic factors in preterm birth. BJOG 2005; 112:28-31.

Interesting commentary about genetic influences and preterm labor. A woman's obstetric family history, race and specific array of inflammatory cytokines all contribute to her relative risk.

(628) Simhan HN, Canavan TP. Preterm premature rupture of membranes: diagnosis, evaluation and management strategies. BJOG 2005; 112 Suppl 1:32-7.

Review. Antibiotics and corticosteroids are important in management.

(629) *** Goffinet F. Primary predictors of preterm labour. BJOG 2005; 112:38-47.

Review which also discusses new markers such as cervical ultrasound length and fetal fibronectin.

(630) Leitich H. Secondary predictors of preterm labour. BJOG 2005; 112:48-50.

Review linked to Goffinet's paper.

(631) Di Renzo GC, Rosati A, Mattei A et al. The changing role of progesterone in preterm labour. BJOG 2005; 112 Suppl 1:57-60.

Interesting review about the use of high dose progesterone for tocolysis.

(632) Leitich H. Controversies in diagnosis of preterm labour. BJOG 2005;112 Suppl 1:61-3.

(633) Lamont RF. Can antibiotics prevent preterm birth - the pro and con debate. BJOG 2005;112 Suppl 1:67-73.

Good clear review on the topic.

(634) Caritis S. Adverse effects of tocolytic therapy. BJOG 2005; 112:74-8.

A review of potential problems during tocolysis including pulmonary edema and myocardial ischemia.

(635) van Geijn HP, Lenglet JE, Bolte AC. Nifedipine trials: effectiveness and safety aspects. BJOG 2005;112 Suppl 1:79-83.

Interesting review delving into the metaanalyses underlying the use of nifedipine for tocolysis. Pulmonary edema and cardiac failure side effects are also discussed.

(636) Mittendorf R, Pryde PG. A review of the role for magnesium sulphate in preterm labour. BJOG 2005; 112:84-8.

Review. No evidence that Mg is effective for tocolysis, although small doses may have a fetal neuroprotective effect.

(637) Ingemarsson I. Combination therapy. BJOG 2005; 112:89-93.

Observational study based mainly on case reports of 25 women with threatened preterm labor. Combination therapy of broad spectrum antibiotics, sulindac (PG synthetase inhibitor), atosiban (oxytocin anatagonist) and terbutaline produced good results in most patients.

(638) Esplin MS, Varner MW. Genetic factors in preterm birth - the future. BJOG 2005; 112:97-102.

How genomics and proteomics may influence our knowledge of preterm birth.

(639) Thornton JG. Maintenance tocolysis. BJOG 2005; 112 Suppl 1:118-21.

Review of results of published systematic reviews. Routine use of maintenance tocolysis in preterm labor is not justified.

(640) Groom KM, Shennan AH, Jones BA et al. TOCOX--a randomised, double-blind, placebo-controlled trial of rofecoxib (a COX-2-specific prostaglandin inhibitor) for the prevention of preterm delivery in women at high risk. BJOG 2005; 112:725-30.

Rofecoxib did not reduce the incidence of early preterm delivery < 30 weeks.

(641) *** Karsdon J, Garfield RE, Shi S-Q et al. Electrical inhibition of preterm birth: Inhibition of uterine contractility in the rabbit and pup births in the rat. Am J Obstet Gynecol 2005;193:1986-93.

Interesting combination of an in vitro (rat) and in vivo (rabbit & rat) study. Electrical inhibition decreased myometrial tension in vitro and intrauterine pressure in vivo and increased birth intervals. Inhibition of uterine activity was also reversible. Could this have potential in humans in years to come?

(642) Ward K, Argyle V, Meade M, Nelson L. The heritability of preterm delivery. Obstet Gynecol 2005; 106:1235-9.

A study confirming the inherited nature of preterm delivery using a genealogy database and 28 families with a history of relatives with preterm delivery.

(643) Brocklehurst P, McGuire W. Evidence based care. BMJ 2005; 330:36-8.

From the "ABC of Preterm Birth" series. A discussion about the measurement of outcomes and examples of ongoing large perinatal trials.

(644) Hollier LM. Preventing preterm birth: what works, what doesn't. Obstet Gynecol Surv 2005; 60:124-31.

Good review article which concentrates on recent research into preventing preterm birth with both primary (cervical cerclage, detection & treatment of infections, use of progesterone) and secondary (antibiotics during pre-term labor, use of tocolytic drugs) interventions. Most interventions fail to demonstrate benefit in terms of prevention of pre-term birth and neonatal outcome, although the use of progesterone is promising.

(645) Dortbudak O, Eberhardt R, Ulm M, Persson GR. Periodontitis, a marker of risk in pregnancy for preterm birth. J Clin Periodontol 2005; 32:45-52.

Prospective study which evaluated the periodontal status of 36 women at 15-20 weeks gestation at risk of miscarriage or preterm birth. Amniotic fluid was tested for bacteria and cytokine levels. Periodontitis was diagnosed in 20% of normal and in 83% of preterm cases. Bacteria were not isolated in amniotic fluid. Amniotic levels of interleukin-6 and prostaglandin-E2 were higher in preterm cases. This and other papers now point to a link between periodontitis and preterm birth.

(646) King J, Flenady V, Cole S, Thornton S. Cyclo-oxygenase (COX) inhibitors for treating preterm labour. The Cochrane Database of Systematic Reviews 2005, Issue 2. Art. No.: CD001992.

Cochrane review – there is inconclusive evidence if COX-2 inhibitors inhibit preterm labor. There was insufficient data to comment on adverse fetal effects.

(647) Papatsonis D, Flenady V, Cole S, Liley H. Oxytocin receptor antagonists for inhibiting preterm labour. The Cochrane Database of Systematic Reviews 2005, Issue 3. Art. No.: CD004452.

Atosiban, an oxytocin receptor anatagonist, is no better than other drugs such as beta agonists in preventing preterm birth, but may have fewer side effects.

(648) Ables AZ, Romero AM, Chauhan SP. Use of calcium channel antagonists for preterm labor. Obstet Gynecol Clin North Am 2005; 32:519-25.

Short review summarizing the evidence for using calcium channel antagonists compared to other drugs for preterm labor.

(649) Haghighi L, Akbarian A. Isosorbide dinitrate for treatment of preterm labor. Int J Gynaecol Obstet 2005; 89:274-5.

A randomized double blind placebo controlled study. There were less preterm deliveries with ISD, but more headache, hypotension and tachycardia compared with control. Side effect incidence is similar to more established treatments such as Mg, beta-agonists and Ca channel blockers.

Pulmonary Embolism

(650) Dias-Junior CA, Souza-Costa DC, Zerbini T et al. The effect of sildenafil on pulmonary embolism-induced oxidative stress and pulmonary hypertension. Anesth Analg 2005; 101:115-20.

Combined dog & rat study. Sildenafil was found to reduce increases in MPAP (mean pulmonary artery pressure) and PVRI (pulmonary vascular resistance index) possibly through antioxidant mechanisms.

(651) James AH, Tapson VF, Goldhaber SZ. Thrombosis during pregnancy and the postpartum period. Am J Obstet Gynecol 2005; 193:216-9.

183 centers looked at all DVTs including 53 pregnant women with USS confirmed DVT. Most were left lower leg DVT usually beginning in the 1st trimester. When prophylaxis is indicated, it should be started early in gestation.

(652) *** Marty AT, Hilton FL, Spear RK, Greyson B. Postcesarean pulmonary embolism, sustained cardiopulmonary resuscitation, embolectomy, and near-death experience. Obstet Gynecol 2005; 106:1153-5.

Interesting case rpt of a mother who survived a PE and had several near death experiences.

(653) Trukhacheva E, Scharff M, Gardner M, Lakkis N. Massive pulmonary embolism in pregnancy treated with tissue plasminogen activator. Obstet Gynecol 2005; 106:1156-8.

Case rpt of the successful use of TPA. The mother went on to deliver her baby vaginally without complication at a later date.

(654) Bechtel JJ, Mountford MC, Ellinwood WE. Massive pulmonary embolism in pregnancy treated with catheter fragmentation and local thrombolysis. Obstet Gynecol 2005; 106:1158-60.

Case rpt in which several guidewires were used to break up the thrombus followed by local thrombolysis.

(655) Acharya G, Singh K, Hansen JB et al. Catheter-directed thrombolysis for the management of postpartum deep venous thrombosis. Acta Obstet Gynecol Scand 2005; 84:155-8.

Five cases of acute postpartum DVT treatment with catheter directed thrombolysis (with angioplasty / stenting in some cases) followed by long term warfarin anticoagulation.

(656) Stone SE, Morris TA. Pulmonary embolism during and after pregnancy. Crit Care Med 2005; 33:S294-300.

Good review about the diagnosis and treatment of DVT and PE.

(657) Clark SL, Blatter DD, Jackson GM. Placement of a temporary vena cava filter during labor. Am J Obstet Gynecol 2005; 193:1746-7.

Case report of a woman diagnosed to have a large DVT at 38 weeks gestation who underwent anticoagulation initially with LMWH. This was stopped when she went into labor. Due to the high perceived risk of a massive PE, a new removable IVC filter was placed during labor in the radiology department through the right internal jugular vein. Delivery (vaginal) and outcome were good.

(658) Robertson L, Greer I. Thromboembolism in pregnancy. Curr Opin Obstet Gynecol 2005; 17:113-6.

Short review on the subject and the effect of various inherited thrombophilias.

(659) *** Fiessinger JN, Huisman MV, Davidson BL et al. Ximelagatran vs low-molecular-weight heparin and warfarin for the treatment of deep vein thrombosis: a randomized trial. Jama 2005; 293:681-9.

Ximelagatran is a new fast acting direct thrombin inhibitor which can be given in a fixed oral dose without coagulation monitoring. Non-obstetric randomized double-blind international multicenter study (almost 2,500 patients). Patients received either Ximelagatran or enoxaparin followed by warfarin for 6 months after the diagnosis of acute DVT with/ without pulmonary embolus. Ximelagatran was as effective as enoxaparin / warfarin for DVT / PE with a similar low risk of bleeding. Increased liver enzymes (9.6%) and acute coronary events in Ximelagatran patients need further study.

(660) Gurewich V. Ximelagatran--promises and concerns. Jama 2005; 293:736-9.

Editorial accompanying the paper by Fiessinger et al.

(661) Roy PM, Colombet I, Durieux P et al. Systematic review and meta-analysis of strategies for the diagnosis of suspected pulmonary embolism. BMJ 2005; 331:259.

When the clinical probability is moderate or high, PE is confirmed by a high probability lung scan and a positive result on spiral CT or venous angiography. When clinical probability is low, these results require confirmation by pulmonary angiography.

(662) Perrier A, Roy PM, Sanchez O et al. Multidetector-row computed tomography in suspected pulmonary embolism. N Engl J Med 2005; 352:1760-8.

The authors evaluated a new CT scanner which has the sensitivity to detect sub-millimeter clot in sixth order pulmonary vessels. Imaging also included the legs and pelvis for clot. The proportion of patients with deep venous thrombosis (on ultrasonography) despite negative findings on multidetector-row CT scanning was $<$ 1 percent. Ruling out pulmonary embolism with the use of d-dimer measurement and multidetector CT could be a safe strategy in patients who are admitted to emergency centers for suspected pulmonary embolism.

(663) Di Nisio M, Middeldorp S, Buller HR. Direct thrombin inhibitors. N Engl J Med 2005; 353:1028-40.

Detailed review article (with excellent color illustrations) about the mechanism of actions of DTIs and the results of various trials on some of the DTIs for coronary syndromes and prevention / treatment of venous thromboembolism.

(664) Maslovitz S, Many A, Landsberg JA et al. The safety of low molecular weight heparin therapy during labor. J Matern Fetal Neonatal Med 2005; 17:39-43.

Retrospective study of 284 women receiving LMWH compared to over 16,000 women not receiving LMWH. The majority of women were receiving LMWH as a prophylactic dose.

Stopping LMWH more than 12 hours before delivery did not increase bleeding complications. Over 75% of patients (in both groups) received an epidural block (none developed spinal hematomas).

Retained Placenta

(665) Banks A, Levy DM. Retained placenta: Anaesthetic considerations. Update Anaesth 2005:39-40.

(666) Bullarbo M, Tjugum J, Ekerhovd E. Sublingual nitroglycerin for management of retained placenta. Int J Gynaecol Obstet 2005; 91:228-32.

Small (n=24) randomized placebo controlled study. Study patients were given 1mg sublingual GTN or placebo. All 12 patients given GTN had successful delivery of their placentas compared to only 1 in the control group. Blood loss was significantly higher in the control group (mean difference approx 260ml)

Uterine Rupture

(667) Kayani SI, Alfirevic Z. Uterine rupture after induction of labour in women with previous caesarean section. BJOG 2005; 112:451-5.

Five year retrospective review. Women who have had a previous cesarean section without any vaginal deliveries are at a high risk of uterine rupture.

(668) Ozdemir I, Yucel N, Yucel O. Rupture of the pregnant uterus: a 9-year review. Arch Gynecol Obstet 2005; 272:229-31.

Retrospective chart review. 17 cases recorded of uterine rupture in over 117,000 deliveries.

(669) Zeteroglu S, Ustun Y, Engin-Ustun Y et al. Eight years' experience of uterine rupture cases. J Obstet Gynaecol 2005; 25:458-61.

Twenty cases were reported within this period (0.4% incidence). There were 2 maternal deaths and 7 perinatal deaths in this series. The authors comment on the poor obstetric care and the low socioeconomic patient status of these cases.

Analgesia and management of labor and delivery

Techniques

Systemic (opioid)

(670) *** Nelson KE, Eisenach JC. Intravenous butorphanol, meperidine, and their combination relieve pain and distress in women in labor. Anesthesiology 2005; 102:1008-13.

This study was designed to counteract the argument that giving meperidine for labor analgesia was no better than placebo! 50 mg meperidine, 1mg butorphanol or their combination (half the dose of both) provided similar analgesia with greater reductions in affective magnitude than pain intensity. Only 29% of women overall had clinically meaningful pain relief. The drug combination did not improve their therapeutic benefit.

(671) *** Evron S, Glezerman M, Sadan O et al. Remifentanil: A novel systemic analgesic for labor pain. Anesth Analg 2005; 100:233-8.

Randomized single blinded controlled trial comparing remifentanil PCIA with meperidine infusion for labor analgesia. Patients receiving remifentanil started off with 20mcg boluses with a 3 min lockout. This bolus was increased by 5 mcg every 15 min if needed up to a maximum level. Meperidine patients had the drug as a continuous infusion. Remifentanil was more effective as an analgesic with less sedation and desaturation events. Less patients eventually received epidurals for analgesic failure (11% v 39%). There were also fewer FHR problems with remifentanil.

(672) Lacassie HJ, Olufolabi AJ. Remifentanil for labor pain: is the drug or the method the problem? Anesth Analg 2005; 101:1242-3; author reply 1243.

Letter in connection with Evron et al's study.

(673) Blair JM, Dobson GT, Hill DA et al. Patient controlled analgesia for labour: a comparison of remifentanil with pethidine. Anaesthesia 2005; 60:22-7.

Randomized double blind trial comparing IV PCA pethidine versus remifentanil. Pain scores were similar, although satisfaction scores were higher for remifentanil. There were no differences in Apgar scores or cord pH, but 30 min NACS (a largely discredited neonatal scoring system) was better with remifentanil.

(674) Anwari JS. Patient-controlled opioid analgesia for labour. Anaesthesia 2005; 60:1244.

Letter to Blair et al's paper.

(675) Volikas I, Butwick A, Wilkinson C et al. Maternal and neonatal side-effects of remifentanil patient-controlled analgesia in labour. Br J Anaesth 2005; 95:504-9.

A prospective observational study with PCA remifentanil – 0.5mcg / kg bolus and 2 min lockout. This regimen worked well with minimal maternal side effects. Small amounts of drug were found in cord samples but there were no detectable neonatal effects.

(676) Volmanen P, Akural E, Raudaskoski T et al. Comparison of remifentanil and nitrous oxide in labour analgesia. Acta Anaesthesiol Scand 2005; 49:453-8.

Randomized double blind cross over study of IV remifentanil PCA (0.4 mcg / Kg bolus; 1 min lockout and 1 min infusion time) versus 50% inhaled nitrous oxide. Cleverly designed study which showed remifentanil provided better analgesia, although with slightly higher sedation scores.

(677) van de Velde M. Remifentanil for obstetric analgesia and anesthesia: a review of the literature. Acta Anaesthesiol Belg 2005; 56:45-9.

Good review.

(678) Bruyere M, Mercier FJ. [Alternative techniques to labour epidural analgesia]. Ann Fr Anesth Reanim 2005; 24:1375-82.

A review concentrating mainly on (systemic techniques) intravenous opioids including the use of remifentanil PCA.

Regional

(679) Palomaki O, Huhtala H, Kirkinen P. A comparative study of the safety of 0.25% levobupivacaine and 0.25% racemic bupivacaine for paracervical block in the first stage of labor. Acta Obstet Gynecol Scand 2005; 84:956-61.

There were no differences in CTG variables between the groups. There was an analgesia failure rate of approximately 10% in both groups – this necessitated either spinal or epidural analgesia.

(680) Palomaki O, Huhtala H, Kirkinen P. What determines the analgesic effect of paracervical block? Acta Obstet Gynecol Scand 2005; 84:962-6.

Subanalysis of data from the previous study.

(681) Ahuja A. Mums need more bottle. The Times (London). July 9, 2005.

A mother writes that her birth plan consisted of one word, "EPIDURAL" and that modern mothers should not be made to feel guilty about seeking epidural analgesia for pain relief.

Alternative Techniques

(682) Cyna AM, Andrew MI, McAuliffe GL. Antenatal hypnosis for labour analgesia. Int J Obstet Anesth 2005; 14:365-6.

Letter.

(683) O'Sullivan G. Analgesia and anaesthesia in labour. Curr Obstet Gynaecol 2005; 15:9-17.

A good review on the subject which includes information on many alternative forms of labor analgesia (acupuncture, water therapy, aromatherapy, inhalational analgesia and patient controlled IV analgesia) as well as modern epidural techniques / regimens / complications. Anesthesia (regional and general) for common procedures such as cesarean section is also discussed.

(684) Althaus J, Wax J. Analgesia and anesthesia in labor. Obstet Gynecol Clin North Am 2005; 32:231-44.

A review written by obstetricians which includes the history of obstetric analgesia and non-pharmacological methods of pain relief (e.g. acupuncture, massage). Regional analgesia is discussed but not in detail. There are some minor errors in this article and surprisingly even though various opioids are mentioned for intravenous use, remifentanil is omitted.

(685) Anderson FWJ, Johnson CT. Complementary and alternative medicine in obstetrics. Int J Gynaecol Obstet 2005; 91:116-24.

A review of various complementary techniques using a Medline search.

(686) Claahsen-van der Grinten HL, Verbruggen I, van den Berg PP et al. Different pharmacokinetics of tramadol in mothers treated for labour pain and in their neonates. Eur J Clin Pharmacol 2005; 61:523-9.

Serial blood samples taken from mothers (given 100-250mg tramadol for labor analgesia) and their neonates at birth and at regular intervals until 12 hrs postpartum. There was a very high placental transfer of tramadol.

(687) Kwok Y, Ng KF, Li CC et al. A prospective, randomized, double-blind, placebo-controlled study of the platelet and global hemostatic effects of Ganoderma lucidum (Ling-Zhi) in healthy volunteers. Anesth Analg 2005; 101:423-6.

This Chinese herbal medicine, popular in cancer patients, is thought to impair hemostasis. Coagulation screen and TEG, PFA-100 parameters were unchanged after a 4 week period of ingestion of this drug.

(688) Marcus DM, Snodgrass WR. Do no harm: avoidance of herbal medicines during pregnancy. Obstet Gynecol 2005; 105:1119-22.

Commentary highlighting the lack of safety data on herbal medicines.

(689) Ong CO, Chan LY, Yung PB, Leung TN. Use of traditional Chinese herbal medicine during pregnancy: a prospective survey. Acta Obstet Gynecol Scand 2005; 84:699-700.

Postnatal questionnaire study of Hong Kong Chinese mothers. More than 50% had consumed these herbal medicines during pregnancy with a higher consumption in lower socioeconomic group patients especially from mainland China.

Support during labor

(690) Wang S-M, Gaal D, Maranets I et al. Acupressure and Preoperative Parental Anxiety: A Pilot Study. Anesth Analg 2005; 101:666-9.

Acupressure v sham study in parents of children in the preop holding area before surgery. Anxiety scores less in acupressure group. BP, HR and BIS scores did not differ. Could this be applied to our anxious fathers in the delivery room?

Regional analgesia

Anatomy

(691) Lirk P, Colvin J, Steger B et al. Incidence of lower thoracic ligamentum flavum midline gaps. Br J Anaesth 2005; 94:852-5.

Interesting cadaver study which demonstrates a high incidence of gaps (incomplete fusion of the ligamentum flavum) between T10 and T12. The implication is that you may not get a definite end point when using a LOR technique to identify the epidural space.

(692) Bernards CM. Sophistry in medicine: lessons from the epidural space. Reg Anesth Pain Med 2005; 30:56-66.

Review article challenging current beliefs on epidural space anatomy and how epidural/spinal drugs work.

(693) Eidelman A, Shulman MS, Novak GM. Fluoroscopic imaging for technically difficult spinal anesthesia. J Clin Anesth 2005; 17:69-71.

Non-obstetric case report in an obese patient who had a successful spinal placement under fluoroscopic imaging.

Pharmacology

(694) Roizen MF. What's wrong with this label? Anesthesiology 2005; 103:4-5.

Editorial accompanying paper by Chang et al.

(695) *** Chang NS, Simone AF, Schultheis LW. From the FDA: what's in a label? A guide for the anesthesia practitioner. Anesthesiology 2005; 103:179-85.

An interesting general article on the history of drug labeling and FDA requirements. Off label use of many drugs including those used for obstetric anesthesia are mentioned.

(696) Roelants F, Lavand'homme PM, Mercier-Fuzier V. Epidural administration of neostigmine and clonidine to induce labor analgesia: evaluation of efficacy and local anesthetic-sparing effect. Anesthesiology 2005; 102:1205-10.

Epidural neostigmine 750mcg + clonidine 75 mcg is effective for labor analgesia without side effects. However only 80% of parturients had VAS < 30mm with this regimen.

(697) *** Camorcia M, Capogna G, Columb MO. Minimum local analgesic doses of ropivacaine, levobupivacaine, and bupivacaine for intrathecal labor analgesia. Anesthesiology 2005; 102:646-50.

The MLAD was 3.64 for ropivacaine, 2.94 for levobupivacaine, and 2.37 for bupivacaine. The potency hierarchy is spinal bupivacaine > levobupivacaine > ropivacaine.

(698) *** Sia AT, Goy RW, Lim Y, Ocampo CE. A comparison of median effective doses of intrathecal levobupivacaine and ropivacaine for labor analgesia. Anesthesiology 2005; 102:651-6.

Traditional dose finding study – not sequential allocation. Median effective dose for levobupivacaine was 1.07 and 1.40 for ropivacaine. Levobupivacaine was 30% more potent, but only 20% more when based on a molar calculation. However when these drugs were used at clinically relevant doses (> 2.5mg) there were no differences between them.

(699) *** Drasner K. Chloroprocaine spinal anesthesia: back to the future? Anesth Analg 2005; 100:549-52.

Amid previous controversy regarding the use of chloroprocaine, Drasner briefly reviews the history of the drug's use, problems and comments on its new preservative free formulation – free of the antioxidant sodium metabisulphite. The editorial accompanies 4 clinical papers on the use of this new formulation of chloroprocaine.

(700) Balestrieri PJ. Epidural chloroprocaine-standard of care for postpartum bilateral tubal ligation. Anesth Analg 2005; 101:1241; Author reply.

Letter to Drasner's editorial.

(701) *** Yoos JR, Kopacz DJ. Spinal 2-chloroprocaine for surgery: an initial 10-month experience. Anesth Analg 2005; 100:553-8.

Retrospective study of 122 patients undergoing outpatient surgery with preservative free 2-CP. Good clinical profile with patients being fit for discharge after ambulatory surgery. No patient reported neurological problems / TNS postoperatively.

(702) *** Davis BR, Kopacz DJ. Spinal 2-chloroprocaine: the effect of added clonidine. Anesth Analg 2005; 100:559-65.

Double blind crossover study comparing 30mg spinal 2-CP with / without 15mcg clonidine in 8 volunteers. This dose of clonidine increased the duration and improved the quality of 2-CP without side effects, although it increased the duration of motor block and time to ambulate / void urine (99 min v 131 min).

(703) *** Yoos JR, Kopacz DJ. Spinal 2-chloroprocaine: a comparison with small-dose bupivacaine in volunteers. Anesth Analg 2005; 100:566-72.

Crossover study in 8 volunteers with both spinal injections (40mg 2-CP & 7.5mg bupivacaine) being separated by > 96 hrs. Although no significant differences in peak blk ht, 2-CP anesthesia consistently resulted in faster resolution of blk, time to ambulation and voiding under simulated conditions.

(704) *** Gonter AF, Kopacz DJ. Spinal 2-chloroprocaine: a comparison with procaine in volunteers. Anesth Analg 2005; 100:573-9.

Crossover study in 8 volunteers with both spinal injections (30mg 2-CP & 80mg procaine) being separated by > 48 hrs. Procaine provided similar conditions to 2-CP in terms of peak blk ht, time to 2-segmant regression, tourniquet time tolerance (a surrogate of anesthesia quality) and time to return of motor strength. However 2-CP had quicker ambulation and void times and therefore fulfilled discharge criteria more quickly.

(705) Lin SK. More on the dilemma of intrathecal midazolam. Anesth Analg 2005; 100:604.

Letter regarding multiple papers about spinal midazolam published in an issue of A&A in 2004.

(706) Walker L. Intrathecal midazolam: adverse effects and sources of bias. Anesth Analg 2005; 100:604-5.

Letter on spinal midazolam.

(707) McLeod GA, Munishankar B, Columb MO. Is the clinical efficacy of epidural diamorphine concentration-dependent when used as analgesia for labour? Br. J. Anaesth. 2005; 94:229-33.

Up down sequential allocation study to see if the mode of action of diamorphine is concentration dependent. 2 gps given 3 mg diamorphine in a high-volume, low conc. or a low-volume, high conc. solution. There was no difference in EC50 between the groups, illustrating that diamorphine provides labor analgesia by a conc. dependent effect.

(708) Fenger-Eriksen C, Anker-Moller E, Heslop J et al. Thrombelastographic whole blood clot formation after ex vivo addition of plasma substitutes: improvements of the induced coagulopathy with fibrinogen concentrate. Br. J. Anaesth. 2005; 94:324-9.

Non-obstetric in vitro TEG study on whole blood diluted with HES and Dextran 70 showing a coagulopathy induced by hemodilution. This was improved by adding fibrinogen concentrate but not washed platelets and Factor VII.

(709) Rosenberg PH, Schug SA. Levobupivacaine base and levobupivacaine hydrochloride. Br J Anaesth 2005; 94:544.

Letter clarifying how the wt / vol of levobupivacaine 0.5% solution is calculated on the base and not the hydrochloride salt unlike racemic bupivacaine.

(710) Bouaziz H, Iohom G, Estebe JP et al. Effects of levobupivacaine and ropivacaine on rat sciatic nerve blood flow. Br J Anaesth 2005; 95:696-700.

This study tried to look at the mechanism of peripheral nerve injury after regional blk, specifically if local anesthetics / and adjuvants caused local alterations in blood flow and histological damage. In this rat sciatic nerve study, all local anesthetic concentrations reduced peripheral nerve blood flow but this did not lead to any histopathological changes.

(711) Vercauteren MP. Less motor block with the left isomers: more questions than answers. Acta Anaesthesiol Scand 2005; 49:4-5.

Editorial accompanying paper by Trachez et al.

(712) Trachez MM, Zapata-Sudo G, Moreira OR et al. Motor nerve blockade potency and toxicity of non-racemic bupivacaine in rats. Acta Anaesthesiol Scand 2005; 49:66-71.

Rat study. The motor nerve blocking potency of bupivacaine isomers is reduced by 50% compared to racemic bupivacaine.

(713) Sah N, Vallejo MC, Ramanathan S, Golebiewski K. Bupivacaine versus L-bupivacaine for labor analgesia via combined spinal-epidural: a randomized, double-blinded study. J Clin Anesth 2005; 17:91-5.

Patients received 2.5mg of either local anesthetic + 25 mcg fentanyl intrathecally. There were no differences between groups.

(714) Sia AT, Kwek K, Yeo GS. The in vitro effects of clonidine and dexmedetomidine on human myometrium. Int J Obstet Anesth 2005; 14:104-7.

Laboratory study using human myometrium strips exposed to these drugs. Dexmedetomidine increased uterine contractility at simulated clinical plasma concentrations. Such effects were only seen with clonidine in much higher concentrations.

(715) *** Parpaglioni R, Frigo MG, Lemma A et al. Minimum Local Analgesic Dose: Effect of Different Volumes of Intrathecal Levobupivacaine in Early Labor. Anesthesiology 2005; 103:1233-7.

Challenges our preconceptions from spinal (anesthesia) studies during cesarean section that the dose of spinal drug is more important than the volume in which it is injected. In this study of labour analgesia, the authors randomized women to receive spinal injection volumes of 2.5ml, 5ml or 10ml which contained levobupivacaine at a dose varying according to up / down sequential allocation, the first patient in each group receiving 2mg. The ED50 (MLAD) was reduced as volume injected increased. A unit volume change increased the odds of an effective response by a factor of 1.8.

(716) *** Graf BM, Zausig Y, Zink W. Current status and clinical relevance of studies of minimum local-anaesthetic concentration (MLAC). Curr Opin Anaesthesiol 2005; 18:241–5.

Good review on the pros and cons of the MLAC model on local anesthetic potency.

Physiology

(717) Lindstrom TM, Bennett PR. The role of nuclear factor kappa B in human labour. Reproduction 2005; 130:569-81.

Review of the current understanding of the role of NF-kappa B (normally associated with inflammation) in human labor.

(718) Critchley LA, Peng ZY, Fok BS et al. Testing the reliability of a new ultrasonic cardiac output monitor, the USCOM, by using aortic flow probes in anesthetized dogs. Anesth Analg 2005;100:748-53.

The USCOM is a new suprasternal CO device. When compared to direct aortic flowprobe measurement in dogs the USCOM measurement was found to have high degree of correlation.

Insertion techniques and equipment

Epidural

(719) *** Carvalho B. Nitroglycerin to facilitate insertion of a labor epidural. Anesthesiology 2005; 102:872.

Letter re use of GTN spray to reduce uterine contractions and thereby ensure full maternal cooperation during attempted placement of an epidural. Prior epidural attempts had failed due to excessive maternal movement.

(720) *** Higuchi H, Adachi Y, Kazama T. Effects of epidural saline injection on cerebrospinal fluid volume and velocity waveform: a magnetic resonance imaging study. Anesthesiology 2005; 102:285-92.

Non-pregnant study with implications for CSE users. Epidural saline injection compressed the dural sac resulting in decreased CSF volume. This reduction was dependent on saline volume and lasted for at least 30min. Changes in CSF flow dynamics did not correlate with the degree of dural sac compression.

(721) *** Rapp HJ, Folger A, Grau T. Ultrasound-guided epidural catheter insertion in children. Anesth Analg 2005; 101:333-9.

More interesting work from Grau's team with good ultrasound images. Of 25 children studied only 23 of these had good quality images for evaluation. A rapidly emerging technology holding some promise in obstetric anesthesia one day.

(722) Browne IM, Birnbach DJ, Stein DJ et al. A comparison of Espocan and Tuohy needles for the combined spinal-epidural technique for labor analgesia. Anesth Analg 2005; 101:535-40.

Espocan CSE (with a back hole for the spinal needle) v. Tuohy + Gertie Marx spinal needle for CSE. More paresthesia in the Tuohy group (42% v. 14%). Also more frequent spinal punctures at first attempt with Espocan set.

(723) Tsui BCH, Emery D, Uwiera RRE, Finucane B. The use of electrical stimulation to monitor epidural needle advancement in a porcine model. Anesth Analg 2005; 100:1611-3.

Continuation of work by Tsui with his electrical epidural stimulation techniques this time in pigs. The study yielded a high false positive rate making it unreliable.

(724) Tamai H, Sawamura S, Atarashi H et al. The electrical properties of epidural atheters: what are the requirements for nerve stimulation guidance? Anesth Analg 2005; 100:1704-7.

Assessment of different types of epidural catheter which are used for nerve stimulation guided insertion.

(725) Yentis SM, Barnes PK. Snippet. (epidural anesthesia techniques). Anaesthesia 2005; 60:406.

Pictures of the Doughty epidural loss of resistance to saline technique and multiple letters in subsequent editions of Anaesthesia.

(726) Reynolds F. Hand positions and the "son-of-Doughty" technique. Anaesthesia 2005; 60:717-8.

(727) Wildsmith JA. "Doughty" technique. Anaesthesia 2005; 60:717.

(728) Doughty A. Paternity of the Doughty technique. Anaesthesia 2005; 60:1242-3.

Letter from Andrew Doughty himself putting the matter of the correct way to perform the Doughty technique to rest.

(729) Marhofer P, Greher M, Kapral S. Ultrasound guidance in regional anaesthesia. Br. J. Anaesth. 2005; 94:7-17.

Good review article on US techniques for regional blk which concentrates mainly on peripheral nerve blks although work on epidural guided US is briefly mentioned.

(730) Ames WA, Hayes JA, Petroz GC, Roy WL. Loss of resistance to normal saline is preferred to identify the epidural space: a survey of Canadian pediatric anesthesiologists. Can J Anesth 2005; 52:607-12.

Six question questionnaire survey distributed to academic pediatric anesthesiologists in Canada.

(731) McLeod A, Roche A, Fennelly M. Case series: Ultrasonography may assist epidural insertion in scoliosis patients. Can J Anaesth 2005; 52:717-20.

Non-obstetric case series of 11 patients with scoliosis. Ultrasound helped with the insertion of 8 epidurals at the level of least rotation. Two others were inserted at the next higher level.

(732) Leeda M, Stienstra R, Arbous MS et al. Lumbar epidural catheter insertion: the midline vs. the paramedian approach. Eur J Anaesthesiol 2005; 22:839-42.

Epidural catheter insertion was faster with the midline approach.

(733) Cartagena R, Gaiser RR. Advancing an epidural catheter 10 cm then retracting it 5 cm is no more effective than advancing it 5 cm. J Clin Anesth 2005;17:528-30.

Randomized study in 80 pregnant women. There is no clear benefit or disadvantage in advancing an epidural catheter 10cm and then withdrawing it 5cm.

(734) Cesur M, Alici HA, Erdem AF et al. Administration of local anesthetic through the epidural needle before catheter insertion improves the quality of anesthesia and reduces catheter-related complications. Anesth Analg 2005; 101:1501-5.

Randomized double blind study. Non-obstetric patients receiving 20ml 2% lidocaine with epinephrine via the epidural needle before catheter insertion or after catheter insertion. The through-needle group had a better block quality for surgery and fewer IV catheter insertions and paresthesia.

(735) Gabopoulou Z, Mavrommati P, Chatzieleftheriou A et al. Epidural catheter entrapment caused by a double knot after combined spinal-epidural anesthesia. Reg Anesth Pain Med 2005; 30:588-9.

Letter. A non-obstetric case in which an epidural catheter was knotted during insertion after the spinal injection during a CSE. Surgical exploration under spinal anesthesia (surgery had not proceeded at that point) revealed that the knotted area was just under the latissimus dorsi fascia.

CSE

(736) *** Chassard D, Allaouchiche B, Boselli E. Timing is everything: the pendulum swings on. Anesthesiology 2005; 103:454-6.

Editorial accompanying paper by Pan et al on the chronobiology of spinal fentanyl for labor analgesia.

(737) *** Pan PH, Lee S, Harris L. Chronobiology of subarachnoid fentanyl for labor analgesia. Anesthesiology 2005; 103:595-9.

Chronobiology is a field of biology that examines time-related phenomena in living organisms. Similar labor studies on spinal sufentanil and epidural ropivacaine previously published. The duration of spinal fentanyl was 91 min for the day gp (1200 to 1800 hrs) compared to 67 min for the night group (2000 to 0200 hrs) – a 27% difference in labor analgesic duration. VAPS scores (pre / post spinal fentanyl) and other characteristics were similar – i.e. the results cannot be explained by higher pain scores at night.

(738) Goy RW-L, Chee-Seng Y, Sia AT-H et al. The median effective dose of intrathecal hyperbaric bupivacaine is larger in the single-shot spinal as compared with the combined spinal-epidural technique. Anesth Analg 2005; 100:1499-502.

Interesting study in adult males which showed the MED in SSS was 11.37mg v. 9.18mg for CSE for cesarean section. There was an approx 20% reduction in spinal bupiv dose with CSE. However these are median doses and not ED95 doses and so these results should be interpreted with caution in the obstetric population.

(739) van den Berg AA, Sadek M, Swanson S, Ghatge S. Epidural injection of lidocaine reduces the response to dural puncture accompanying spinal needle insertion when performing combined spinal-epidural anesthesia. Anesth Analg 2005; 101:882-5.

Unusual study with patients receiving epidural saline or lidocaine before dural puncture with a spinal needle during CSE for cesarean section. 9% v 81% - response to dural puncture with the spinal needle. 81% in the saline group is rather high for the incidence of responses (movement, vocalization) during routine CSE. No indication regarding who performed these blocks.

(740) Cleary-Goldman J, Negron M, Scott J et al. Prophylactic ephedrine and combined spinal epidural: maternal blood pressure and fetal heart rate patterns. Obstet Gynecol 2005; 106:466-72.

Randomized double blind trial comparing im ephedrine v placebo given during a CSE for labor analgesia. There were less late decelerations, less hypotension but more fetal tachycardia in the study group.

(741) Gurbet A, Turker G, Kose DO, Uckunkaya N. Intrathecal epinephrine in combined spinal-epidural analgesia for labor: dose-response relationship for epinephrine added to a local anesthetic-opioid combination. Int J Obstet Anesth 2005; 14:121-5.

Randomized study of patients given intrathecal bupivacaine 2.5mg + fentanyl 25 mcg with varying doses of epinephrine (12.5 – 100 mcg). Compared to control all epinephrine groups had similar durations of prolonged analgesia – approximately another 15 min of analgesia. In my opinion probably not worth the extra few minutes of analgesia especially when you consider that many units start an epidural infusion / PCEA regimen immediately after the spinal part of a CSE technique for labor analgesia.

(742) *** Thomas JA, Pan PH, Harris LC et al. Dural puncture with a 27-Gauge Whitacre needle as part of a combined spinal-epidural technique does not improve labor epidural catheter function. Anesthesiology 2005; 103:1046-51.

Interesting study trying to tease out whether puncturing the dura (without drug injection) during a CSE has an influence on epidural catheter manipulation or replacement. This prospective double blind randomized study found no such differences between a CSE gp with dural puncture, but without drug injection compared to a group which had an epidural catheter only technique. Analgesia was provided, after a 2% lidocaine test dose, with a PCEA regimen using 0.11% bupivacaine + 2mcg/ml fentanyl with additional boluses of 0.25% bupivacaine if needed. A subgroup of patients, who had a dural puncture, but no CSF return through the spinal needle, had a higher epidural catheter replacement rate, but this did not reach statistical significance when compared to the 2 main groups.

(743) Rawal N. Combined spinal-epidural anaesthesia. Curr Opin Anaesthesiol 2005; 18:518–21.

Good review covering some of the controversies surrounding CSE analgesia for labor and cesarean section. The EVE (epidural volume extension) technique as part of a CSE for cesarean section, the success rates of epidural versus CSE, and the pros / cons of the commonly used NTN (single space needle through needle) CSE over the double space method are of particular interest in this review.

Spinal / CSA

(744) Cohen S, Stricker P, Sakr A. Cerebrospinal fluid leak after disconnection of an intrathecal catheter adapter placed after accidental dural puncture. Reg Anesth Pain Med 2005; 30:591.

Letter. Labor analgesia case in which an epidural catheter was placed intrathecally after an accidental dural puncture. Postpartum the spinal catheter was left in situ in the hope of reducing PDPH. Over 24 hrs later the patient complained of a wet bed and the catheter was found to be disconnected!

(745) *** Higuchi H, Adachi Y, Kazama T. The influence of lumbosacral cerebrospinal fluid volume on extent and duration of hyperbaric bupivacaine spinal anesthesia: a comparison between seated and lateral decubitus injection positions. Anesth Analg 2005; 101:555-60.

Non-obstetric study of MRI CSF volume measurement followed by spinal injection. The smaller the lumbosacral CSF volume, the greater the peak blk ht regardless of position. In the sitting position – the smaller the CSF vol, the longer the blk took to regress to L4 and the longer it took to reach maximum blk ht.

(746) Fassoulaki A, Melemeni A, Zotou M, Sarantopoulos C. Systemic Ondansetron Antagonizes the Sensory Block Produced by Intrathecal Lidocaine. Anesth Analg 2005; 100:1817-21.

Urology study in patients undergoing transurethral surgery pre-treated with ondansetron. Blk regressed faster in those receiving ondansetron compared with placebo.

(747) Ayoub CM, Rizk LB, Yaacoub CI et al. Music and ambient operating room noise in patients undergoing spinal anesthesia. Anesth Analg 2005; 100:1316-9.

Non-obstetric study in patients undergoing spinal anesthesia under propofol sedation. Intraop music reduced sedative requirements compared to white noise and OR noise!

(748) Ramachandran K, Ponnusamy N. Dry tap and spinal anesthesia. Can J Anaesth 2005; 52:1104-5.

Letter. Non-obstetric case of several "dry" taps with the patient refusing general anesthesia. Eventually a spinal injection was given despite the "dry" tap which was successful. The reason for this phenomenon is discussed.

Test Dose

(749) Mowafi HA. Digital skin blood flow as an indicator for intravascular injection of epinephrine-containing simulated epidural test dose in sevoflurane-anesthetized adults. Anesth Analg 2005; 101:584-8.

Non-obstetric study. A Doppler laser flowmeter was used to measure digital skin blood flow during a test dose. This was superior to HR and BP criteria.

(750) Gardner IC, Kinsella SM. Obstetric epidural test doses: a survey of UK practice. Int J Obstet Anesth 2005; 14:96-103.

OAA postal survey conducted in 1999-2000. There appears to be no consensus about test doses! With the advent of low dose solns for epidural labor analgesia, there was a trend to use these for test doses during labor. Most anesthetists do not use a test dose when topping up a labor epidural for emergency cesarean section.

(751) de Medicis E, Tetrault JP, Martin R et al. A prospective comparative study of two indirect methods for confirming the localization of an epidural catheter for postoperative analgesia. Anesth Analg 2005; 101:1830-3.

Non-obstetric study in 218 surgical patients using either the epidural stimulation test (EST – described frequently in Ban Tsui's work from Canada) or epidural pressure waveform analysis (EPWA). Both tests proved to be comparable for confirming catheter placement.

(752) Mowafi HA. The efficacy of plethysmographic pulse wave amplitude as an indicator for intravascular injection of epinephrine-containing epidural test dose in anesthetized adults. Anesth Analg 2005; 101:1506-11.

PPWA is a reliable way of detecting an intravascular injection of an epidural test dose.

Maintenance

Infusion / bolus doses

(753) Ueda K, Ueda W, Manabe M. A comparative study of sequential epidural bolus technique and continuous epidural infusion. Anesthesiology 2005; 103:126-9.

Study of postoperative analgesia in 6 patients undergoing lower abdominal gynecology surgery. Approximately 8 more segments blocked in SEB (1ml of 0.75% ropivacaine / 20 min) v. CEI gp (3ml of 0.75% ropivacaine / hr). Surprising results, but assessments only made at 15 hr postop.

(754) Salim R, Nachum Z, Moscovici R et al. Continuous compared with intermittent epidural infusion on progress of labor and patient satisfaction. Obstet Gynecol 2005; 106:301-6.

Infusions of 0.125% bupivacaine with fentanyl compared with boluses of 0.25% bupivacaine (!) and a control group not receiving regional block. Both epidural groups prolonged labor but there were no other differences in obstetric outcome.

(755) *** Lim Y, Sia AT, Ocampo C. Automated regular boluses for epidural analgesia: a comparison with continuous infusion. Int J Obstet Anesth 2005; 14:305-9.

Interesting study of 40 patients randomized after CSE with 25mcg intrathecal fentanyl to receive 0.1% levobupivacaine + 2mcg/ml fentanyl either as an epidural infusion @ 10ml / hr or 5ml boluses every 30 min via an automated pump. The bolus group had a lower incidence of breakthrough pain (10% v 37%) and better satisfaction scores for labor analgesia.

PCEA

(756) Paech M. Is shared control of patient-controlled epidural analgesia during labour a better option? Anaesth Intensive Care 2005; 33:439-41.

Editorial accompanying paper by Missant et al.

(757) Missant C, Teunkenst A, Vandermeersch E, Van de Velde M. Patient-controlled epidural analgesia following combined spinal-epidural analgesia in labour: the effects of adding a continuous epidural infusion. Anaesth Intensive Care 2005; 33:452-6.

Randomized study using epidural 0.15% ropivacaine / sufentanil 0.75 mcg / ml after CSE for labor. Patients given either PCEA alone (4ml bolus) or with a background infusion (2ml/hr). Less anesthetic workload was associated with the infusion group.

(758) Bremerich DH, Waibel HJ, Mierdl S et al. Comparison of continuous background infusion plus demand dose and demand-only parturient-controlled epidural analgesia (PCEA) using ropivacaine combined with sufentanil for labor and delivery. Int J Obstet Anesth 2005; 14:114-20.

Randomized study using a PCEA solution of ropivacaine 0.16% + sufentanil 0.5 mcg/ml. PCEA with a continuous background infusion (4ml/hr) provided better analgesia than a demand (4ml bolus) only PCEA. There were no significant differences in the total amount of ropivacaine / sufentanil consumed.

(759) Stratmann G, Gambling DR, Moeller-Bertram T et al. A randomized comparison of a five-minute versus fifteen-minute lockout interval for PCEA during labor. Int J Obstet Anesth 2005; 14:200-7.

Small study of 30 patients per group receiving an initial 15ml bolus + 6ml / hr background infusion of bupivacaine 0.125% + fentanyl 2mcg/ml combined with a PCEA bolus of 5ml. Patients were then randomized to receive either a 5min or 15min lockout time. There were no differences in VAS scores, side effects or anesthesiologist intervention. The 5 min group had a significantly better bolus / attempt ratio (0.88 v. 0.70).

(760) Carvalho B, Cohen SE, Giarrusso K et al. "Ultra-light" patient-controlled epidural analgesia during labor: effects of varying regimens on analgesia and physician workload. Int J Obstet Anesth 2005; 14:223-9.

120 patients randomized to one of four PCEA regimens of low dose bupivacaine / sufentanil with varying background infusion rates (10 or 15 ml / hr), bolus doses (6 or 12ml) and lockouts (8 or 16 min). These regimens were designed to give equal amounts of drug. There were no differences in physician workload (recall of anesthesiologist back to patient for a topup). Spontaneous vaginal delivery rate was 80%. There was a trend to improved analgesia and fewer physician interventions in the higher basal infusion / large bolus group, although there was slightly more bupivacaine consumption and more requests to stop the infusion for perceived motor block even though the motor block scores were similar between groups.

(761) Gogarten W. Patient-controlled epidural analgesia is the technique of choice for epidural analgesia in labour. Int J Obstet Anesth 2005; 14:328-9.

Proposer. OAA Controversies debate.

(762) Aveling W. Patient-controlled epidural analgesia is the technique of choice for epidural analgesia in labour. Int J Obstet Anesth 2005; 14:329-31.

Opposer OAA Controversies debate.

(763) *** Halpern S. Recent advances in patient-controlled epidural analgesia for labour. Curr Opin Anaesthesiol 2005; 18:247–51.

Good review article summarizing the evidence for use of PCEA and whether or not to use a background infusion (and at what rate) in addition to the normal bolus dose with lockout.

(764) Saito M, Okutomi T, Kanai Y et al. Patient-controlled epidural analgesia during labor using ropivacaine and fentanyl provides better maternal satisfaction with less local anesthetic requirement. J Anesth 2005; 19:208-12.

PCEA compared to a continuous infusion technique. PCEA provided better maternal satisfaction with lower local anesthetic requirements.

Ambulation

(765) Roberts CL, Algert CS, Cameron CA, Torvaldsen S. A meta-analysis of upright positions in the second stage to reduce instrumental deliveries in women with epidural analgesia. Acta Obstet Gynecol Scand 2005; 84:794-8.

Only 2 studies included! Insufficient data to show any benefit of adopting the upright position with epidural analgesia.

(766) Roberts CL, Algert CS, Olive E, Boulvin M. Ambulation during the first stage of labour with epidural analgesia has no effect on mode of delivery - Meta-analysis. Evid Based Obstet Gynecol 2005; 7:122-4.

Small number of good quality studies in this metaanalysis.

Indications, special circumstances

Induction and augmentation of labor

(767) Berkane N, Verstraete L, Uzan S et al. Use of mifepristone to ripen the cervix and induce labor in term pregnancies. Am J Obstet Gynecol 2005; 192:114-20.

Mifepristone failed to ripen the cervix and induce labor in term pregnancies with a live infant.

(768) Wing DA, Guberman C, Fassett M. A randomized comparison of oral mifepristone to intravenous oxytocin for labor induction in women with prelabor rupture of membranes beyond 36 weeks' gestation. Am J Obstet Gynecol 2005; 192:445-51.

Oral mifepristone did not improve labor stimulation in women with PROM near term. It was also associated with more adverse fetal outcomes compared to IV oxytocin.

(769) Colon I, Clawson K, Hunter K et al. Prospective randomized clinical trial of inpatient cervical ripening with stepwise oral misoprostol vs vaginal misoprostol. Am J Obstet Gynecol 2005; 192:747-52.

Oral misoprostol was just as effective vaginal misoprostol without increased side effects and had a lower cesarean section rate.

(770) Wolf SB, Sanchez-Ramos L, Kaunitz AM. Sublingual misoprostol for labor induction: a randomized clinical trial. Obstet Gynecol 2005; 105:365-71.

100 mcg is more effective than 50 mcg but with more hyperstimulation.

(771) McDonagh MS, Osterweil P, Guise J-M. The benefits and risks of inducing labour in patients with prior caesarean delivery: a systematic review. BJOG 2005; 112:1007-15.

Systematic review which included 14 trials of moderate quality. Induction of labor after a previous cesarean section results in a higher rate of cesarean delivery and a small risk of uterine rupture compared to women in spontaneous labor.

(772) Siozos C, Stanley KP. Prolonged pregnancy. Curr Obstet Gynaecol 2005; 15:73-9.

Review. A pregnancy that continues for more than 294 days is termed prolonged. Induction of labor is offered at >41 weeks which reduces perinatal mortality without effecting the cesarean section rate. Alternatives to the formal induction of labor are also discussed including membrane sweeping, nipple stimulation and fetal surveillance (e.g. Doppler studies of fetal / placental circulation, ultrasound estimation of amniotic fluid volume, biophysical profile, non-stress test).

(773) Vahratian A, Zhang J, Troendle JF et al. Labor progression and risk of cesarean delivery in electively induced nulliparas. Obstet Gynecol 2005; 105:698-704.

Retrospective review of electronic records – low risk elective inductions v. spontaneous labor. The authors concluded that an elective induction of labor with an unfavorable cervix carries a high risk of labor arrest and subsequent cesarean section – a cesarean section rate > 40%.

Breech and other abnormal presentation

(774) Impey L, Pandit M. Tocolysis for repeat external cephalic version in breech presentation at term: a randomised, double-blinded, placebo-controlled trial. BJOG 2005; 112:627-31.

The use of ritodrine for tocolysis for a 2nd attempt cephalic version resulted in an increased success rate compared to placebo.

(775) Herbst A. Term breech delivery in Sweden: mortality relative to fetal presentation and planned mode of delivery. Acta Obstet Gynecol Scand 2005; 84:593-601.

Cohort study showing a significant reduction of perinatal and infant mortality with planned CS in term breech pregnancy.

(776) Uotila J, Tuimala R, Kirkinen P. Good perinatal outcome in selective vaginal breech delivery at term. Acta Obstet Gynecol Scand 2005; 84:578-83.

Seven year cohort study looking at perinatal outcome after vaginal or operative breech delivery compared to controls. There were no significant differences in clinical outcome between the groups apart from lower Apgars in the planned vaginal breech group. The authors maintain that vaginal breech delivery can be safely carried out in selected centers with experience of the technique.

(777) Fok WY, Chan LW, Leung TY, Lau TK. Maternal experience of pain during external cephalic version at term. Acta Obstet Gynecol Scand 2005; 84:748-51.

Ninety eight cases of ECV performed (with no analgesia) with a 66% success rate. Some patients felt a moderate degree of pain which on the whole was well tolerated.

(778) Jeyabalan A, Larkin RW, Landers DV. Vaginal breech deliveries selected using computed tomographic pelvimetry may be associated with fewer adverse outcomes. J Matern Fetal Neonatal Med 2005; 17:381-5.

Retrospective cohort study. The authors suggest that vaginal breech deliveries are still safe in a selected group of parturients if selected using criteria which include CT pelvimetry.

(779) Doyle NM, Riggs JW, Ramin SM et al. Outcomes of term vaginal breech delivery. Am J Perinatol 2005; 22:325-8.

Retrospective review of all breech deliveries in a county hospital (delivered by cesarean section or vaginally). There were no differences in fetal outcome in mothers who chose to deliver their breech baby vaginally.

(780) Pradhan P, Mohajer M, Deshpande S. Outcome of term breech births: 10-year experience at a district general hospital. BJOG 2005; 112:218-22.

Retrospective study of 1433 breech births, either in labor undergoing vaginal delivery / cesarean section or prelabor cesarean section. Although more babies in the labor group had low 5 min APGAR scores and neonatal ICU admissions there were no differences in long term morbidity (labor v non-labor groups).

(781) Rietberg CC, Elferink-Stinkens PM, Visser GH. The effect of the Term Breech Trial on medical intervention behaviour and neonatal outcome in The Netherlands: an analysis of 35,453 term breech infants. BJOG 2005; 112:205-9.

Retrospective study using the Dutch perinatal database which showed that the effects of the Term Breech Trial resulted in a rapid change in obstetric management resulting in better perinatal outcomes.

(782) Nor Azlin MI, Haliza H, Mahdy ZA et al. Tocolysis in term breech external cephalic version. Int J Gynaecol Obstet 2005; 88:5-8.

Randomized placebo controlled double blind trial using ritodrine during ECV. Ritodrine increased the success rate of ECV (50% v 23%).

(783) *** Eide MG, Oyen N, Skjaerven R et al. Breech delivery and intelligence: a population-based study of 8,738 breech infants. Obstet Gynecol 2005; 105:4-11.

Interesting retrospective cohort study in which the authors linked the effect of presentation at birth and delivery mode to IQ at 18 years of age using the Norwegian national birth registry linked to data from the National Conscript Service. There was no effect of birth presentation on adult IQ regardless of the increased perinatal risk for infants delivered vaginally in breech presentation.

(784) Hofmeyr GJ, Kulier R. Hands and knees posture in late pregnancy or labour for fetal malposition (lateral or posterior). The Cochrane Database of Systematic Reviews 2005, Issue 2. Art. No.: CD001063.

Cochrane review – only 2 trials during pregnancy were included which found no difference in outcome.

(785) Founds SA. Maternal posture for cephalic version of breech presentation: a review of the evidence. Birth 2005; 32:137-44.

The authors could not make any firm conclusions in this attempted systematic review due to the poor quality of the retrieved studies.

Multiple pregnancy etc.

(786) Kontopoulos EV, Ananth CV, Smulian JC, Vintzileos AM. The influence of mode of delivery on twin neonatal mortality in the US: Variance by birth weight discordance. Am J Obstet Gynecol 2005; 192:252-6.

Database review over a 4 yr period to examine the effect of vaginal / vaginal and cesarean / cesarean modes of delivery on neonatal mortality in relation to birth wt discordance (disparity). In twins with a BWD of > 40%, cesarean / cesarean delivery conferred a lower risk of neonatal mortality.

(787) Oyelese Y, Ananth CV, Smulian JC, Vintzileos AM. Delayed interval delivery in twin pregnancies in the United States: Impact on perinatal mortality and morbidity. Am J Obstet Gynecol 2005;192:439-44.

Retrospective study in which the first twin was born vaginally at 22-28 weeks. Amazingly some centers report delaying the delivery of the 2nd twin for up to a week or more to improve fetal maturity! Delayed delivery of the 2nd twin was associated with improved outcomes when the 1st twin was delivered at 22-23 weeks and the delivery interval was under 3 weeks.

(788) Vintzileos AM, Ananth CV, Kontopoulos E, Smulian JC. Mode of delivery and risk of stillbirth and infant mortality in triplet gestations: United States, 1995 through 1998. Am J Obstet Gynecol 2005; 192:464-9.

Cesarean section is associated with the best perinatal outcomes among triplet births in the US.

(789) Luke B, Brown MB, Alexandre PK et al. The cost of twin pregnancy: maternal and neonatal factors. Am J Obstet Gynecol 2005; 192:909-15.

This study looking at factors affecting birth charges showed the substantial maternal and neonatal morbidity associated with twin pregnancies, and demonstrated that 37 to 38 weeks is the optimal gestation.

(790) Varner MW, Leindecker S, Spong CY et al. The Maternal-Fetal Medicine Unit cesarean registry: trial of labor with a twin gestation. Am J Obstet Gynecol 2005; 193:135-40.

4 yr prospective observational trial at 19 centers – 412 women with a previous cesarean section undergoing a twin birth. A trial of labor does not increase maternal morbidity or perinatal mortality if < or = 35 wks gestation.

Previous cesarean section (VBAC)

(791) Goodall PT, Ahn JT, Chapa JB, Hibbard JU. Obesity as a risk factor for failed trial of labor in patients with previous cesarean delivery. Am J Obstet Gynecol 2005; 192:1423-6.

Obesity is an independent risk factor for VBAC.

(792) Landon MB, Leindecker S, Spong CY et al. The MFMU Cesarean Registry: Factors affecting the success of trial of labor after previous cesarean delivery. Am J Obstet Gynecol 2005; 193:1016-23.

Multicenter study of over 14,000 women who underwent TOL. In women attempting VBAC, the most predictive factor for success is previous vaginal delivery.

(793) Cahill A, Stamilio DM, Pare E et al. Vaginal birth after cesarean (VBAC) attempt in twin pregnancies: Is it safe? Am J Obstet Gynecol 2005; 193:1050-5.

Multicenter 4 yr study. Patients with twin pregnancies who attempt vaginal birth after cesarean have rates of success and complications similar to patients with singleton pregnancies.

(794) Buhimschi CS, Buhimschi IA, Patel S et al. Rupture of the uterine scar during term labour: contractility or biochemistry? BJOG 2005; 112:38-42.

Small retrospective review investigating the site of uterine rupture in the presence of prostaglandins (PGs) compared to rupture in the absence of PGs. Women treated with PGs were more likely to rupture at the old scar site. However a large multicenter prospective study needs to be done to really answer this question.

(795) Bujold E, Hammoud A, Schild C et al. The role of maternal body mass index in outcomes of vaginal births after cesarean. Am J Obstet Gynecol 2005; 193:1517-21.

Analysis of a perinatal database between 1991-7 showing that an increased BMI correlates with a lower rate of successful vaginal birth after cesarean section, but not uterine scar rupture.

(796) Macones GA, Peipert J, Nelson DB et al. Maternal complications with vaginal birth after cesarean delivery: A multicenter study. Am J Obstet Gynecol 2005; 193:1656-62.

A case control study to look at the incidence of uterine rupture with VBAC. The overall incidence of uterine rupture during attempted VBAC was approximately 10%. Those who had a prior vaginal delivery had a lower risk of rupture, whereas the sequential use of prostaglandin and oxytocin was associated with an increased risk of rupture.

(797) Dunn EA, O'Herlihy C. Comparison of maternal satisfaction following vaginal delivery after caesarean section and caesarean section after previous vaginal delivery. Eur J Obstet Gynecol Reprod Biol 2005; 121:56-60.

Questionnaire study comparing VBAC with CSAVD. Vaginal delivery had a very high satisfaction rate with mothers preferring vaginal delivery for future pregnancies.

(798) Martel MJ, MacKinnon CJ. Guidelines for vaginal birth after previous Caesarean birth. J Obstet Gynaecol Can 2005; 27:164-88.

Good clear guidelines from the Society of Obstetricians and Gynaecologists of Canada.

(799) de Costa C. Vaginal birth after classical Caesarean section. Aust N Z J Obstet Gynaecol 2005; 45:182-6.

This is usually regarded as a contraindication. The review attempts to analyze the evidence for this practice.

(800) Rubin R. Battle lines drawn over C-sections; Legal vs. medical risks. USA Today, Aug 24, 2005.

Concern about falling VBAC rates nationally.

(801) Rubin R. C-section rate hits record high at 29%. USA Today, Nov 16, 2005.

(802) Garmisa SP. Expert gets to elaborate at trial. Chicago Daily Law Bulletin, October 14, 2005.

A cerebral palsy case. Obstetrician being sued because he failed to warn the parents of the risks of VBAC.

(803) Stein R. Hospitals won't risk labor after C-sections; but many women want regular birth. The Washington Post, November 25, 2005.

Some hospitals refuse VBAC.

Outcome

Progress of labor

(804) Schiessl B, Janni W, Jundt K et al. Obstetrical parameters influencing the duration of the second stage of labor. Eur J Obstet Gynecol Reprod Biol 2005; 118:17-20.

Prospective study. Multivariate analysis showed that nulliparity and epidural analgesia were associated with a longer second stage of labor. Unfortunately no details about the epidural regimen are given.

(805) Le Ray C, Carayol M, Jaquemin S et al. Is epidural analgesia a risk factor for occiput posterior or transverse positions during labour? Eur J Obstet Gynecol Reprod Biol 2005; 123:22-6.

Retrospective study showing that early epidural placement when the head is high causes a higher incidence of OP and OT positions. Epidural regimen used was initial boluses of 0.125% bupivacaine with sufentanil after a 60mg lidocaine test dose followed by a low dose bupivacaine / sufentanil infusion.

(806) El-Hamamy E, Arulkumaran S. Poor progress of labour. Curr Obstet Gynaecol 2005; 15:1-8.

Review on the causes of slow labor progress and medical (active) management of labor including amniotomy and low dose oxytocin infusion.

(807) Anim-Somuah M, Smyth R, Howell C. Epidural versus non-epidural or no analgesia in labour. The Cochrane Database of Systematic Reviews 2005, Issue 4. Art. No.: CD000331.

Cochrane review – epidurals for labor analgesia provide superior pain relief, but can cause more instrumental deliveries, a longer 2nd stage of labor, increased oxytocin use, urinary retention, hypotension and fever. On the other hand there is no difference in cesarean section rates, long-term backache and effects on the baby immediately after delivery.

(808) Zahalka N, Sadan O, Malinger G et al. Comparison of transvaginal sonography with digital examination and transabdominal sonography for the determination of fetal head position in the second stage of labor. Am J Obstet Gynecol 2005; 193:381-6.

TVS was the most successful and accurate to determine fetal head position in the 2nd stage.

(809) Oppenheimer LW, Labrecque M, Wells G et al. Prostaglandin E2 vaginal gel to treat dystocia in spontaneous labour: a multicentre randomised placebo-controlled trial. BJOG 2005; 112:612-8.

This study recruited mothers in spontaneous labor who had a low rate of cervical dilatation (<0.5cm/hr). They went on to receive either PGE2 gel or placebo. A single 1-mg dose of PgE2 vaginal gel was found to be more effective than placebo in resolving dystocia, without increasing uterine hyperstimulation. The proportion of patients whose dystocia resolved is similar to when ARM + oxytocin has been used in other trials.

(810) Sen R, Paterson-Brown S. Prioritisation on the delivery suite. Curr Obstet Gynaecol 2005; 15:228-36.

Good article with a mainly UK flavor since it uses many UK terms which may not be familiar in North America. However that withstanding, it is a practical article aimed at obstetricians and how they should manage and prioritize a busy delivery suite. The article gives a fictitious scenario of 16 women admitted to the delivery suite and discusses how best to manage them with the available resources. There is also an emphasis on multidisciplinary meetings, ward rounds, teaching and maintaining good relationships with all members involved in obstetric care.

(811) Scholefield H. Risk management in obstetrics. Curr Obstet Gynaecol 2005; 15:237-43.

Short review focused mainly on UK practice, but with general points about assessment of medical errors, guidelines and communications.

(812) Bailit JL, Dierker L, Blanchard MH, Mercer BM. Outcomes of women presenting in active versus latent phase of spontaneous labor. Obstet Gynecol 2005; 105:77-9.

Retrospective study which tried to determine if women presenting to the delivery suite in latent phase labor are different at admission from those women presenting in active phase labor. This study showed that latent phase labor admission is associated with increased cesarean section rates, obstetric intervention and chorioamnionitis. However the study suffers from an arbitrary definition of active / latent labor as ?4cm / <4cm.

(813) Windrim R. Vaginal delivery in birth centre after previous caesarean section. Lancet 2005; 365:106-7.

Commentary about VBAC in Birth Centers in association with an article published in 2004 by Lieberman et al.

(814) Hodnett ED, Downe S, Edwards N, Walsh D. Home-like versus conventional institutional settings for birth. The Cochrane Database of Systematic Reviews 2005, Issue 1. Art. No.: CD000012.pub2.

Home delivery provided small improvements in delivery outcomes, reduced medical interventions and increased maternal satisfaction. There was a trend towards higher perinatal mortality with home births.

(815) Marsh B. 'Increased risk' of baby deaths at midwife-run birth centres. Sunday Telegraph (London), October 16, 2005.

The National Institute for Clinical Excellence (UK) is shortly to report on morbidity / mortality in isolated birth centers which do not have a resident anesthesiologist, pediatrician or an obstetrician, but it is likely to be much higher than seen within a hospital setting.

(816) Levine S. Birth Center Survives Close Financial Call; Insurance Spike Nearly Closes Doors The Washington Post, February 3, 2005.

A 30% increase in malpractice claims were partly to blame.

(817) Gregory J. AMA chief may rue loose tongue. The Courier Mail (Queensland, Australia) May 30, 2005.

The head of the Australian Medical Association criticized for calling a nurse led birthing center the "killing fields"!

Instrumental or operative delivery

(818) *** Camann W. Pain relief during labor. N Engl J Med 2005; 352:718-20.

Editorial accompanying the paper by Wong et al.

(819) *** Wong CA, Scavone BM, Peaceman AM et al. The risk of cesarean delivery with neuraxial analgesia given early versus late in labor. N Engl J Med 2005; 352:655-65.

Excellent study which randomized 750 nulliparous women at term in spontaneous labor at < 4cm cervical dilatation to receive intrathecal fentanyl (25 mcg) via a CSE technique or systemic (IM / IV combination) hydromorphone at first analgesic request. At second analgesic request, the CSE group received an epidural bolus of low dose bupivacaine with / without fentanyl depending on whether the cervical dilatation was less than 4 cm (15ml bolus of 0.0625% bupiv + fentanyl 2mcg/ml) or greater than or equal to 4 cm (15ml bolus of 0.125% bupiv). PCEA with 0.0625% bupiv + fentanyl 2mcg/ml was started after the bolus epidural injection (basal infusion15ml/hr, 5ml patient bolus, 10min lockout). In the systemic analgesia group further systemic hydromorphone was given if the cervix was < 4cm dilated or epidural analgesia if > 4cm. There were no differences in the rate of cesarean section between groups. The CSE group had superior analgesia and

faster labor duration (a finding similar to Tsen et al, Anesthesiology 1999) and less nausea and vomiting. Although this is really a study of intrathecal / epidural analgesia in early labor compared to systemic analgesia, the conclusion is clear – patients should not be denied superior pain relief with regional analgesia purely on an arbitrary cervical dilatation.

(820) Benavides L, Wu JM, Hundley AF et al. The impact of occiput posterior fetal head position on the risk of anal sphincter injury in forceps-assisted vaginal deliveries. Am J Obstet Gynecol 2005; 192:1702-6.

Forceps-assisted vaginal deliveries have been associated with a greater risk for anal sphincter injury. An OP position further increases the risk of third- or fourth-degree lacerations when compared with an OA position.

(821) *** Lieberman E, Davidson K, Lee-Parritz A, Shearer E. Changes in fetal position during labor and their association with epidural analgesia. Obstet Gynecol 2005; 105:974-82.

Non- randomized prospective study. Women receiving epidural labor analgesia are 4 times more likely to have an OP position at delivery. This may explain the higher incidence of instrumental deliveries after epidurals. However 0.25% bupivacaine epidural bolus followed by 0.125% bupivacaine infusion was used which may explain this effect.

(822) Caughey AB, Sandberg PL, Zlatnik MG et al. Forceps compared with vacuum: rates of neonatal and maternal morbidity. Obstet Gynecol 2005; 106:908-12.

Retrospective cohort study. More shoulder dystocia and cephalohematoma, but less perineal lacerations with vacuum assisted deliveries than forceps.

(823) Mollberg M, Hagberg H, Bager B et al. Risk factors for obstetric brachial plexus palsy among neonates delivered by vacuum extraction. Obstet Gynecol 2005; 106:913-8.

Retrospective study. Shoulder dystocia with vacuum delivery increases this complication.

(824) Hayman R. Instrumental vaginal delivery. Curr Obstet Gynaecol 2005; 15:87-96.

Review of various surgical instruments used for assisted vaginal delivery (ventouse, forceps etc) and their associated complications.

Complications

(825) Jain N, Sternberg LB. Symphyseal separation. Obstet Gynecol 2005; 105:1229-32.

Case report of a 9.5 cm pubic symphysis separation following a spontaneous vaginal delivery.

(826) Soong B, Barnes M. Maternal position at midwife-attended birth and perineal trauma: is there an association? Birth 2005; 32:164-9.

Perineal trauma was associated with primiparous mothers, deflexed head position, epidural analgesia and birth wt > 3.5Kg.

Fetal Effects

(827) Gaiser RR, McHugh M, Cheek TG, Gutsche BB. Predicting prolonged fetal heart rate deceleration following intrathecal fentanyl/bupivacaine. Int J Obstet Anesth 2005; 14:208-11.

Retrospective study of CTG recordings before and after CSE with spinal bupivacaine and fentanyl for labor. A lack of fetal head pelvic engagement and presence of variable FHR decelerations (before CSE) increased the risk of prolonged FHR decelerations after the spinal injection. However there were no prolonged FHR decelerations > 10 min and no other differences in obstetric outcome.

(828) Bolukbasi D, Sener EB, Sarihasan B et al. Comparison of maternal and neonatal outcomes with epidural bupivacaine plus fentanyl and ropivacaine plus fentanyl for labor analgesia. Int J Obstet Anesth 2005; 14:288-93.

40 patients randomized to receive an infusion of ropivacaine or bupivacaine 0.0625% with fentanyl 2 mcg/ml after a loading dose of 8ml, 0.125% solution with 50mcg fentanyl. No difference in maternal or neonatal outcome (Apgars, umbilical cord gases or NACS).

(829) *** Van de Velde M. Neuraxial analgesia and fetal bradycardia. Curr Opin Anaesthesiol 2005; 18:253–6.

Good review on this subject which highlights high dose intrathecal opioids to be a common cause of FHR abnormalities. An important point mentioned in this review is that FHR monitoring is a very non-specific assessment of fetal well being and that other methods of fetal surveillance may be more appropriate.

Breastfeeding

(830) *** Halpern SH, Ioscovich A. Epidural analgesia and breast-feeding. Anesthesiology 2005; 103:1111-2.

Editorial accompanying Beilin et al's paper.

(831) *** Beilin Y, Bodian CA, Weiser J et al. Effect of labor epidural analgesia with and without fentanyl on infant breast-feeding: a prospective, randomized, double-blind study. Anesthesiology 2005; 103:1211-7.

Interesting study. Multiparous patients, who had previously breast fed for at least 6 weeks and receiving epidural analgesia during their current labor, were randomly assigned to 3 groups based on epidural fentanyl usage (no fentanyl, ≤ 150 mcg fentanyl or > 150 mcg fentanyl. There were no significant differences in beast feeding at 24 hours. At 6 weeks postpartum, patients in the > 150 mcg fentanyl group were more likely to have stopped breast feeding. The accompanying editorial by Halpern advises caution due to the nature of data collection and potential confounding factors at the 6 week telephone interview. In addition 11% of patients failed to respond at the 6 week interview, which could naturally alter these results. It is unclear if fentanyl would have such effects 6 weeks postpartum!

(832) Jordan S, Emery S, Bradshaw C et al. The impact of intrapartum analgesia on infant feeding. BJOG 2005; 112:927-34.

Retrospective case notes study suggesting that breast feeding rates may be improved if fentanyl was omitted from labor regional analgesia regimens! Caution in interpreting this non-randomized study is advised since the regional analgesia groups were not homogenous.

(833) Hansen WF, McAndrew S, Harris K, Zimmerman MB. Metoclopramide effect on breastfeeding the preterm infant: a randomized trial. Obstet Gynecol 2005; 105:383-9.

Randomized double blind placebo controlled trial of 69 women who delivered preterm. Metoclopramide 10mg or placebo was given three times a day for 10 days starting postpartum. There were no differences between the groups in terms of breast milk volume or the length of breastfeeding.

Maternal education and consent

(834) Lyng K, Syse A, Bordahl PE. Can cesarean section be performed without the woman's consent? Acta Obstet Gynecol Scand 2005; 84:39-42.

A Norwegian slant on this issue. In Norway, based on health legislation, during an emergency, the doctor has a right to perform a cesarean section without the woman's consent to save the unborn fetus from death or major injury. These authors present 4 cases of mothers who refused cesarean section (even when told about the risks to the fetus) and discuss the ethical and consent issues.

Feeding during labor

(835) Shennan A, Thallon A, Hart D, O'Sullivan G. Caesarean section and calorific intake in labour; the influence of carbohydrate solution intake during labour. BJOG 2005; 112:1454.

Letter commenting on a paper by Scheepers et al in 2004.

Anesthesia for cesarean delivery

Fetal/neonatal/maternal outcome

(836) Richardson BS, Czikk MJ, daSilva O, Natale R. The impact of labor at term on measures of neonatal outcome. Am J Obstet Gynecol 2005; 192:219-26.

Large retrospective study of over 33,000 infants delivered over a 10 yr period using an in-house perinatal / neonatal database. Information from this database included cord pH, base excess and all adverse outcomes. Elective cesarean section versus trial of labor (for previous cesarean section) at term balances the low risk of increased neonatal respiratory morbidity against the extremely low risk of labor related infant death or severe morbidity.

(837) Lin HC, Xirasagar S. Maternal age and the likelihood of a maternal request for cesarean delivery: a 5-year population-based study. Am J Obstet Gynecol 2005; 192:848-55.

Taiwanese population-based study confirms the expectancy that maternal request cesarean delivery incidence increases with maternal age.

(838) Macones GA, Cahill A, Pare E et al. Obstetric outcomes in women with two prior cesarean deliveries: is vaginal birth after cesarean delivery a viable option? Am J Obstet Gynecol 2005; 192:1223-8.

The risk of major complications is low.

(839) Fogelson NS, Menard MK, Hulsey T, Ebeling M. Neonatal impact of elective repeat cesarean delivery at term: a comment on patient choice cesarean delivery. Am J Obstet Gynecol 2005; 192:1433-6.

Comparison with mothers attempting vaginal delivery. More neonatal respiratory morbidity in the cesarean group.

(840) Kenton K, Brincat C, Mutone M, Brubaker L. Repeat cesarean section and primary elective cesarean section: recently trained obstetrician-gynecologist practice patterns and opinions. Am J Obstet Gynecol 2005; 192:1872-5.

A questionnaire study given to delegates at 2 courses. Two thirds were willing to perform an elective cesarean section to prevent pelvic floor injury. Most offer VBAC; however, under a third include risk of pelvic floor injury in their preop informed consent discussions.

(841) Katz V, Balderston K, DeFreest M. Perimortem cesarean delivery: were our assumptions correct? Am J Obstet Gynecol 2005; 192:1916-20.

The recommendation to perform a cesarean section within 4 min of cardiac arrest if resuscitation is ineffective stems from 1986. Search of Medline supports this arbitrary rule.

(842) Allen VM, O'Connell CM, Farrell SA, Baskett TF. Economic implications of method of delivery. Am J Obstet Gynecol 2005; 193:192-7.

18 yr population based study to examine the costs of various forms of delivery. Cesarean delivery occurs more frequently after labor induction and has the highest costs.

(843) McKinnie V, Swift SE, Wang W et al. The effect of pregnancy and mode of delivery on the prevalence of urinary and fecal incontinence. Am J Obstet Gynecol 2005; 193:512-7.

Pregnancy itself increases the risk of urinary / fecal incontinence. Surprisingly cesarean section does not reduce this risk compared to a vaginal delivery.

(844) Rouse DJ, Leindecker S, Landon M et al. The MFMU Cesarean Registry: Uterine atony after primary cesarean delivery. Am J Obstet Gynecol 2005; 193:1056-60.

Over 23,000 cases analyzed. Various previously know risk factors identified (multiple gestation, > 4 Kg birth wt, induced / augmented labor) but using these factors to predict uterine atony overestimates the risk.

(845) Gerten KA, Coonrod DV, Bay RC, Chambliss LR. Cesarean delivery and respiratory distress syndrome: Does labor make a difference? Am J Obstet Gynecol 2005; 193:1061-4.

Study compared nearly 5,000 cases of RDS to 5x as many controls. Cesarean delivery was associated with a higher risk of neonatal respiratory distress syndrome. Labor before cesarean delivery lowered that risk.

(846) Wu JM, Hundley AF, Visco AG. Elective primary cesarean delivery: attitudes of urogynecology and maternal-fetal medicine specialists. Obstet Gynecol 2005; 105:301-6.

A web based survey which showed that the majority of these specialists would agree to perform a primary elective cesarean delivery.

(847) Linton A, Peterson MR, Williams TV. Clinical case mix adjustment of cesarean delivery rates in U.S. military hospitals, 2002. Obstet Gynecol 2005; 105:598-606.

A study trying to assess if variations in cesarean section rates in military hospitals are due differences in clinical case mix. The authors found that clinical case mix has little impact.

(848) Black C, Kaye JA, Jick H. Cesarean delivery in the United Kingdom: time trends in the general practice research database. Obstet Gynecol 2005; 106:151-5.

A 10 yr cohort study (1990- 99) with the proportion of cesarean sections increasing by 5.8. The proportion of VBAC also decreased by 8 in the UK. This still compares favorably with US figures.

(849) Lyell DJ, Caughey AB, Hu E, Daniels K. Peritoneal closure at primary cesarean delivery and adhesions. Obstet Gynecol 2005; 106:275-80.

A cohort study of women undergoing repeat cesarean sections showing that parietal peritoneal closure during cesarean section appears to reduce adhesions. However this is an observational study with no randomization into groups with or without peritoneal closure. The results of a large multicenter study by the National Perinatal Epidemiology Unit in Oxford, UK on cesarean section delivery techniques (the CAESAR study) is awaited for the (hopefully) definitive answer.

(850) *** Bloom SL, Spong CY, Weiner SJ et al. Complications of anesthesia for cesarean delivery. Obstet Gynecol 2005; 106:281-7.

Excellent prospective observational study looking at the safety of anesthesia techniques for cesarean section. 37,000 patients undergoing cesarean section were studied in 13 US centers over a 2 year period. 93% had a regional block of which only 3% failed. Maternal morbidity was rare with regional anesthesia. Primary GAs were associated with lower Apgars and umbilical artery pH. This was similar to a GA given for a failed regional block – i.e. no worse than after a primary GA. Nearly 40% of all GAs were given when the decision – delivery time was < 15 min.

(851) Quinones JN, James DN, Stamilio DM et al. Thromboprophylaxis after cesarean delivery: a decision analysis. Obstet Gynecol 2005; 106:733-40.

A decision analysis study (using a hypothetical cohort of 1 million women) which estimates that universal thromboprophylaxis with pneumatic compression stockings after cesarean section results in the lowest number of postop thrombotic and bleeding episodes.

(852) Aburezq H, Chakrabarty KH, Zuker RM. Iatrogenic fetal injury. Obstet Gynecol 2005; 106:1172-4.

Case rpt of an amputation of a digit during cesarean section.

(853) *** Kim C-y, Ko S-K, Kim K-Y. Are league tables controlling epidemic of caesarean sections in South Korea? BJOG 2005; 112:607-11.

Interesting paper which shows that the trends in increasing cesarean section rates were reversed by the use of published league tables.

(854) Alves B, Sheikh A. Investigating the relationship between affluence and elective caesarean sections. BJOG 2005; 112:994-6.

UK Dept of Health data collected on 500,000 mothers delivering between 1996 and 2000. No surprises here, with more affluent populations in the UK choosing to deliver by cesarean section compared to their "deprived" counterparts.

(855) Kamal P, Dixon-Woods M, Kurinczuk JJ et al. Factors influencing repeat caesarean section: qualitative exploratory study of obstetricians' and midwives' accounts. BJOG 2005; 112:1054-60.

Interviews of 25 obstetricians and midwives in 2 maternity units in the UK. Professionals felt that sometimes strict protocols were of limited value, but the organisation for care played an important role in influencing repeat cesarean section rates.

(856) Bergstrom S. Who will do the caesareans when there is no doctor? Finding creative solutions to the human resource crisis. BJOG 2005; 112:1168-9.

This commentary highlights manpower problems especially in Africa. It sites Mozambique as a country which has introduced non-physician surgical assistants capable of performing operations such as cesarean section with good results.

(857) Tihtonen K, Koobi T, Yli-Hankala A, Uotila J. Maternal hemodynamics during cesarean delivery assessed by whole-body impedance cardiography. Acta Obstet Gynecol Scand 2005; 84:355-61.

Small study of 10 patients. Various parameters evaluated after spinal anesthesia using impedance cardiography. At delivery cardiac index increased by 50% and systemic vascular resistance decreased by 40%.

(858) Larsen R, Titlestad K, Lillevang ST et al. Cesarean section: is pretransfusion testing for red cell alloantibodies necessary? Acta Obstet Gynecol Scand 2005; 84:448-55.

Retrospective study which suggests that routine testing is unnecessary.

(859) Kwek K, Yeap ML, Tan KH et al. Crash caesarean section-decision-to-delivery interval. Acta Obstet Gynecol Scand 2005; 84:914-5.

Short report on a retrospective review of cases in a tertiary center in Singapore. A decision to delivery time of less than 30 minutes (20 minutes in 80% cases!) was achievable in all cases – mean approx 15 minutes.

(860) Wee MY, Brown H, Reynolds F. The National Institute of Clinical Excellence (NICE) guidelines for caesarean sections: implications for the anaesthetist. Int J Obstet Anesth 2005; 14:147-58.

This is a summary of UK national guidelines published in 2004 with an emphasis on the summary of recommendations affecting anesthesia practice.

(861) Berghella V, Baxter JK, Chauhan SP. Evidence-based surgery for cesarean delivery. Am J Obstet Gynecol 2005; 193:1607-17.

A paper on the surgical technical aspects of performing a cesarean section based on searches of multiple online databases including Medline and Cochrane.

(862) Uygur D, Gun O, Kelekci S et al. Multiple repeat caesarean section: is it safe? Eur J Obstet Gynecol Reprod Biol 2005; 119:171-5.

Case notes study of patients who had repeat cesarean section. Patients who had 2 or more previous cesarean sections had more adhesions compared to those who had only one previous cesarean section, but maternal and neonatal morbidity / mortality did not differ.

(863) Uygur D, Tapisiz OL, Mungan T. Multiple repeat cesarean sections: maternal and neonatal outcomes. Int J Gynaecol Obstet 2005; 89:284-5.

Retrospective case notes review comparing women who had a cesarean section because of two or more previous cesarean sections to those who delivered by cesarean due to one previous cesarean section. Maternal and fetal morbidity did not differ between the groups.

(864) Malhotra N, Khanna S, Pasrija S et al. Early oral hydration and its impact on bowel activity after elective caesarean section--our experience. Eur J Obstet Gynecol Reprod Biol 2005; 120:53-6.

Women undergoing cesarean section under general anesthesia were randomized postoperatively into an early rehydration group (oral fluids given after 6 hrs postop and then solids after return of bowel sounds) or a control group only given fluids after bowel sounds had reappeared. Early hydration proved superior in terms of return of bowel function. However there is no detail on analgesic requirements in the postop period.

(865) Sheiner E, Levy A, Katz M, Mazor M. Short stature--an independent risk factor for Cesarean delivery. Eur J Obstet Gynecol Reprod Biol 2005; 120:175-8.

A population based study in Israel comparing mothers with short stature to control (1988 – 2002). Height less than 155cm was an independent risk factor for cesarean section even after controlling for other potentially confounding variables.

(866) Declercq E, Menacker F, MacDorman M. Rise in "no indicated risk" primary caesareans in the United States, 1991-2001: cross sectional analysis. BMJ 2005; 330:71-2.

US national database analysis of 4 million births annually which found that between 1991 and 2001 the "no indicated risk" primary cesarean section (37 weeks, singleton, vertex presentation with no maternal medical risk factors) increased 67% from 3.3% (1991) to 5.5% (2001).

(867) Lavender T, Kingdon C, Hart A et al. Could a randomised trial answer the controversy relating to elective caesarean section? National survey of consultant obstetricians and heads of midwifery. BMJ 2005; 331:490-1.

This survey found that only a minority would support a randomized trial comparing planned cesarean section with planned vaginal delivery.

(868) Simm A, Ramoutar P. Caesarean section: Techniques and complications. Curr Obstet Gynaecol 2005; 15:80-6.

Review mainly about surgical techniques for a cesarean delivery and related complications.

(869) Kovavisarach E, Atthakorn M. Early versus delayed oral feeding after cesarean delivery. Int J Gynaecol Obstet 2005; 90:31-4.

Laboring women (n=151) randomized following the decision to perform a cesarean section (under GA or regional) into an early feeding (at 8 hrs) or delayed feeding (at 24 hrs). There was a reduced time to first bowel sounds in the early feeding group. There is already a 2004 Cochrane review on this subject and the UK NICE (National Institute for Clinical Excellence) guidelines suggest that there is no reason to delay feeding post cesarean section.

(870) McCullough M. More women turn to cesarean section The Philadelphia Inquirer, March 20, 2005.

More mothers are seeing vaginal delivery as dangerous compared to 10 years ago.

General Anesthesia

(871) John ER, Prichep LS. The anesthetic cascade: a theory of how anesthesia suppresses consciousness. Anesthesiology 2005; 102:447-71.

A detailed review of how general anesthetics produce loss of consciousness, immobility and amnesia. Information on depth of anesthesia monitors is also included.

(872) Naguib M, Samarkandi AH, Abdullah K et al. Succinylcholine dosage and apnea-induced hemoglobin desaturation in patients. Anesthesiology 2005; 102:35-40.

Reduction in succinylcholine dose from 1mg/Kg to 0.56mg/Kg reduced the incidence of oxygen desaturation (<90%) from 85% to 65%, but did not shorten time to spontaneous diaphragmatic movements. No information about intubating conditions with any dose is provided.

(873) Hart EM, Owen H. Errors and omissions in anesthesia: a pilot study using a pilot's checklist. Anesth Analg 2005; 101:246-50.

An electronic checklist with text / voice prompts was tested on 20 anesthesiologists using a hi-fidelity simulator for general anesthesia for cesarean section. This may improve patient safety.

(874) Van den Bosch JE, Moons KG, Bonsel GJ, Kalkman CJ. Does measurement of preoperative anxiety have added value for predicting postoperative nausea and vomiting? Anesth Analg 2005; 100:1525-32.

Non-obstetric study showing that the association of preop anxiety with PONV is weak. Routine measurement of anxiety is not warranted.

(875) Thorn K, Thorn S-E, Wattwil M. The effects of cricoid pressure, remifentanil, and propofol on esophageal motility and the lower esophageal sphincter. Anesth Analg 2005; 100:1200-3.

Cricoid pressure significantly reduced lower oesophageal sphincter pressure in awake volunteers; this could not be seen during remifentanil infusion with or without a propofol bolus.

(876) Rahman K, Jenkins JG. Failed tracheal intubation in obstetrics: no more frequent but still managed badly. Anaesthesia 2005; 60:168-71.

A database study in a region of the UK, during a 5-year period from 1999 to 2003; there were 20 failed tracheal intubations occurring in 4768 obstetric general anesthetics (incidence 1: 238 – similar to previous years). In half of the 16 cases there was a failure to follow a failed tracheal intubation protocol.

(877) Kinsella SM, Daley C. Warning of previous anaesthetic problems. Anaesthesia 2005; 60:821.

Letter to Rahman paper outlining a local e-mail alert system for high risk patients.

(878) Alexander R, Fardell S. Use of remifentanil for tracheal intubation for caesarean section in a patient with suxamethonium apnoea. Anaesthesia 2005; 60:1036-8.

Patient with a history of multiple spinal operations refusing a regional blk who was intubated using a thiopentone / remifentanil technique.

(879) Saravanakumar K, Cooper GM. Failed intubation in obstetrics: has the incidence changed recently? Br J Anaesth 2005; 94:690.

Letter with some audit data from a UK center regarding failed intubation in obstetrics.

(880) Richa F, Yazigi A, Nasser E et al. General anesthesia with remifentanil for Cesarean section in a patient with HELLP syndrome. Acta Anaesthesiol Scand 2005; 49:418-20.

A case report of a patient with HELLP in which remifentanil was used for general anesthesia.

(881) Lipman S, Carvalho B, Brock-Utne J. The demise of general anesthesia in obstetrics revisited: prescription for a cure. Int J Obstet Anesth 2005; 14:2-4.

Interesting editorial about reduction in general anesthesia exposure in obstetric anesthesia secondary to increasing regional anesthesia uptake in developed countries. The role of medical simulation is discussed in this context.

(882) Nafiu OO, Elegbe EO. The disappearing art of obstetric general anaesthesia in the UK: implications for overseas trainees. Int J Obstet Anesth 2005; 14:272-3.

Letter discussing training issues with general anesthesia in obstetrics.

(883) Lyons G, Akerman N. Problems with general anaesthesia for Caesarean section. Minerva Anestesiol 2005; 71:27-38.

Review.

(884) Snyder-Ramos SA, Seintsch H, Bottiger BW et al. Patient satisfaction and information gain after the preanesthetic visit: a comparison of face-to-face interview, brochure, and video. Anesth Analg 2005; 100:1753-8.

A documentary video + face to face interview was the best method of conducting the preop anesthesia visit in this non-obstetric study before GA.

Regional Anesthesia

(885) *** Smiley R. Fast Fourier transforms as prophecy: predicting hypotension during spinal anesthesia. Anesthesiology 2005; 102:1079-80.

Editorial accompanying paper by Hanss et al.

(886) *** Hanss R, Bein B, Ledowski T et al. Heart rate variability predicts severe hypotension after spinal anesthesia for elective cesarean delivery. Anesthesiology 2005; 102:1086-93.

Interesting paper using fast Fourier transformation of heart rate variability using ECG data. In an initial retrospective study, parturients who had a higher sympathetic drive pre-spinal had a greater degree of hypotension. Prospectively this model (n=19) accurately predicted that those with a higher sympathetic drive would develop more severe hypotension.

(887) Zaidi ASH, Russell IF. Is transcutaneous electrical stimulation a realistic surrogate for genuine surgical stimulation during spinal anesthesia for cesarean delivery? Anesth Analg 2005; 100:1477-81.

The blk level to a non-painful TES had no relationship to pain-free surgery, whereas the blk level to touch (using a Neurotip tester) did.

(888) *** Hallworth SP, Fernando R, Columb MO, Stocks GM. The effect of posture and baricity on the spread of intrathecal bupivacaine for elective cesarean delivery. Anesth Analg 2005; 100:1159-65.

Comparison of hyperbaric, hypobaric or isobaric bupivacaine in either the sitting or right lateral position. The lateral position had no effect on the sensory level spread for bupivacaine,

whereas in the sitting position there was a significant difference in spread with the hypobaric solution producing higher sensory levels and more hypotension compared to the hyperbaric solution.

(889) *** Carvalho B, Durbin M, Drover DR et al. The ED50 and ED95 of intrathecal isobaric bupivacaine with opioids for cesarean delivery. Anesthesiology 2005; 103:606-12.

Follow-up study from the gp that looked at the same values for spinal hyperbaric bupivacaine. Logistic regression model used with 48 parturients receiving varying doses of plain bupivacaine with fentanyl 10mcg + morphine 200 mcg. ED50 & ED95 for success of operation (T6 blk within 6 min + no intraop supplementation) was 7.25 and 13.0 mg respectively. These doses were similar to their hyperbaric study. This study supports the use of larger bupivacaine doses to ensure adequate anesthesia and patient comfort intraoperatively by using much stricter criteria to define successful anesthesia. Plain bupivacaine is actually hypobaric and not isobaric, a minor point.

(890) Moore M, O'Sullivan G. A response to 'Extending low-dose epidural analgesia for emergency Caesarean section using ropivacaine 0.75%'. Anaesthesia 2005; 60:299; author reply - 300.

Letter / comment on a previous studying 2004 re extending an epidural block in labor for cesarean section.

(891) Harten JM, Boyne I, Hannah P et al. Effects of a height and weight adjusted dose of local anaesthetic for spinal anaesthesia for elective Caesarean section. Anaesthesia 2005; 60:348-53.

12mg of hyperbaric bupivacaine compared with a wt / ht adjusted regimen, both with diamorphine 0.4mg. Both gps produced adequate anesthesia, but with higher blks and more hypotension in the fixed dose gp. Multiple letters to this paper.

(892) McNaught A, Hallworth S. Weight adjusted spinal anaesthesia for Caesarean section. Anaesthesia 2005; 60:818-9; author reply 20.

(893) Russell IF. Weight adjusted spinal anaesthesia for Caesarean section. Anaesthesia 2005; 60:819; author reply 20.

(894) Pryn A, Young S. Intrathecal diamorphine. Anaesthesia 2005; 60:820-1.

Letter re Harten et al paper.

(895) Lane S, Evans P, Arfeen Z, Misra U. A comparison of intrathecal fentanyl and diamorphine as adjuncts in spinal anaesthesia for Caesarean section. Anaesthesia 2005; 60:453-7.

Randomized double blind study comparing bupivacaine with either fentanyl or diamorphine alone or in combination. Diamorphine alone provided optimal conditions in terms of postop analgesia and side effects. There was no advantage adding fentanyl to diamorphine. The UK is probably still the only country in the world in which the medical use of diamorphine is permitted!

(896) Rucklidge MW, Paech MJ, Yentis SM. A comparison of the lateral, Oxford and sitting positions for performing combined spinal-epidural anaesthesia for elective Caesarean section. Anaesthesia 2005; 60:535-40.

Randomized study using CSE trying to see if the Oxford position, a modified lateral position for the induction of regional block, is of any benefit. The Oxford position is not widely practiced outside Oxford (a city in the UK). This position needed more epidural topups before surgery to achieve an adequate anesthesia level than the other 2 groups and is therefore not recommended.

(897) Clyburn P. Spinal anaesthesia for Caesarean section: time for re-appraisal? Anaesthesia 2005; 60:633-5.

Editorial accompanying paper by Reynolds and Seed.

(898) *** Reynolds F, Seed PT. Anaesthesia for Caesarean section and neonatal acid-base status: a meta-analysis. Anaesthesia 2005; 60:636-53.

Metaanalysis of 27 studies using different forms of anesthesia for cesarean section. pH / BE better with epidural or GA versus spinal although differences are small. Authors acknowledge that ephedrine use / hypotension with spinals may play a part. The impact of GA re risks / morbidity / mortality is underrepresented in the paper. The paper begs several questions: is it the spinal itself, the hypotension produced, the inadequate treatment of hypotension or an intrinsic effect of ephedrine causing the poorer cord gases.

(899) Cooper DW. Ephedrine, phenylephrine and fetal acidosis. Anaesthesia 2005; 60:1237-8.

Letter regarding the meta-analysis by Reynolds and Seed and the accompanied editorial from a clinician with much experience in the use of phenylephrine!

(900) Collis RE, Harris SE. Spinal anaesthesia for Caesarean section and fetal acidosis. Anaesthesia 2005; 60:1238-9; author reply 39-41.

Letter to above papers with an emphasis on preventing aortocaval compression during spinal anesthesia.

(901) Hartle AJ. What babies want. Anaesthesia 2005; 60:1241-2; author reply 42.

A rather more aggressive letter to Reynolds and Seed's paper!

(902) Akerman N, Saxena S, Wilson R et al. Effect of intrathecal diamorphine on block height during spinal anaesthesia for Caesarean section with bupivacaine. Br J Anaesth 2005; 94:843-7.

Up down sequential allocation study with 2 gps, one received bupivacaine alone and the other received bupivacaine with diamorphine. There were no differences in block ht between the 2 gps.

(903) *** Beale N, Evans B, Plaat F et al. Effect of epidural volume extension on dose requirement of intrathecal hyperbaric bupivacaine at Caesarean section. Br J Anaesth 2005; 95:500-3.

EVE is said to be effective in increasing block ht when using low doses of intrathecal bupivacaine. 7 ml of saline was injected through the epidural needle immediately after spinal injection during CSE in the EVE group compared to control. This up down sequential allocation study showed no differences in ED50 of intrathecal bupivacaine when EVE was used.

(904) Gogarten W, Struemper D, Gramke HF et al. Assessment of volume preload on uteroplacental blood flow during epidural anaesthesia for Caesarean section. Eur J Anaesthesiol 2005; 22:359-62.

Small study of 14 patients randomized to receive 500ml of HES or gelatine. There were no differences in maternal arterial pressure or pulsatility indices which did not change from baseline. Uterine blood flow did increase in both gps.

(905) Sanli S, Yegin A, Kayacan N et al. Effects of hyperbaric spinal ropivacaine for caesarean section: with or without fentanyl. Eur J Anaesthesiol 2005; 22:457-61.

Addition of fentanyl increased the duration of early postoperative analgesia. No surprise here!

(906) Sen S, Ozmert G, Aydin ON et al. The persisting analgesic effect of low-dose intravenous ketamine after spinal anaesthesia for caesarean section. Eur J Anaesthesiol 2005; 22:518-23.

Three gps given spinal bupivacaine with one gp receiving additional fentanyl. Some of these patients went on to receive either IV low dose ketamine or saline. Ketamine when combined spinal bupivacaine had longer postop analgesia.

(907) Stamer UM, Wiese R, Stuber F et al. Change in anaesthetic practice for Caesarean section in Germany. Acta Anaesthesiol Scand 2005; 49:170-6.

In 1996 general anesthesia was the preferred method for cesarean section. This study relates to a postal questionnaire to over 900 anesthesia departments in Germany during 2002. Despite a 41% response rate, there seems to have been an overall increase in regional anesthesia techniques for cesarean section with over 50% of elective cesareans being performed under spinal anesthesia.

(908) Bachmann-Mennenga B, Veit G, Biscoping J et al. Epidural ropivacaine 1% with and without sufentanil addition for Caesarean section. Acta Anaesthesiol Scand 2005; 49:525-31.

Ropivacaine 0.75% is commercially available for epidural use to provide anesthesia during cesarean section. This study compared 1% ropivacaine (12 ml = 120mg) alone to 120mg ropivacaine with either 10 mcg or 20 mcg of sufentanil. The addition of sufentanil did not significantly effect anesthetic block quality or onset time.

(909) Bachmann-Mennenga B, Veit G, Steinicke B et al. Efficacy of sufentanil addition to ropivacaine epidural anaesthesia for Caesarean section. Acta Anaesthesiol Scand 2005; 49:532-7.

Epidural anesthesia was provided with 90mg ropivacaine (0.75%) either alone or with 10 mcg or 20 mcg sufentanil. Faster onset times and better block quality was seen when sufentanil was added to plain ropivacaine.

(910) Vallejo MC, Phelps AL, Shepherd CJ et al. Nitrous oxide anxiolysis for elective cesarean section. J Clin Anesth 2005; 17:543-8.

40% nitrous oxide in oxygen provided effective anxiolysis compared to 100% oxygen via facemask.

(911) Husain F, Busby C, Shaw S, Dimpel L. Use of anaesthetic rooms in obstetric anaesthesia; a postal survey of obstetric anaesthetists and departments in the United Kingdom. Int J Obstet Anesth 2005; 14:14-21.

The majority of obstetric anesthesiologists have abandoned the use of an anesthesia induction room in the UK. However it is still commonly used to induce anesthesia for non-obstetric cases in the OR.

(912) Collier C. Is testing touch sensation really necessary before caesarean section? Int J Obstet Anesth 2005; 14:82; author reply -82-83.

Comment on Ian Russell's paper in IJOA in 2004 on assessment of touch levels before cesarean section.

(913) Christelis N, Harrad J, Howell PR. A comparison of epidural ropivacaine 0.75% and bupivacaine 0.5% with fentanyl for elective caesarean section. Int J Obstet Anesth 2005; 14:212-8.

Surprisingly ropivacaine produced more motor block with a longer duration of action than bupivacaine. There was a 11% failure rate overall for epidural anesthesia.

(914) Carvalho B, Cohen SE, Lipman SS et al. Patient preferences for anesthesia outcomes associated with cesarean delivery. Anesth Analg 2005; 101:1182-7.

Survey of 100 mothers attending antenatal parent education classes. Intra and postoperative pain were ranked as the patients' most important concern whereas pruritus and shivering caused only moderate concern.

(915) Karaman S, Akercan F, Akarsu T et al. Comparison of the maternal and neonatal effects of epidural block and of combined spinal-epidural block for Cesarean section. Eur J Obstet Gynecol Reprod Biol 2005; 121:18-23.

Unusual dosing regimen in the CSE group who were given 1.5-1.8ml heavy bupivacaine spinally followed by 10ml epidural 0.25% bupivacaine + 50mcg fentanyl. The epidural group was given 14-16ml 0.5% bupivacaine + 100mcg fentanyl epidurally. Not surprisingly the CSE group had a better quality of block with less shivering.

(916) Mordecai MM, Brull SJ. Spinal anesthesia. Curr Opin Anaesthesiol 2005; 18:527–33.

Basic general review on spinal anesthesia including the use of vasopressors, baricity of local anesthetic / patient positioning, CSE techniques, local anesthetic adjuvants and complications. There are also some good references for further reading.

Oxygenation

(917) Dixon BJ, Dixon JB, Carden JR et al. Preoxygenation is more effective in the 25 degrees head-up position than in the supine position in severely obese patients: a randomized controlled study. Anesthesiology 2005; 102:1110-5.

Pre-oxygenation in the 25 degree head-up position achieves better oxygen tensions, which increases the desaturation safety period. Although performed in obese non-pregnant patients, it is interesting to speculate whether a similar finding would occur in parturients undergoing general anesthesia.

(918) *** Petrov YY, Prough DS, Deyo DJ et al. Optoacoustic, non-invasive, real-time, continuous monitoring of cerebral blood oxygenation: an in vivo study in sheep. Anesthesiology 2005; 102:69-75.

Evaluation of a new laser based non-invasive method of monitoring oxygenation in the superior sagittal sinus of sheep. Clinical trials in humans are awaited.

(919) O'Connor CJ, Mansy H, Balk RA et al. Identification of endotracheal tube malpositions using computerized analysis of breath sounds via electronic stethoscopes. Anesth Analg 2005; 101:735-9.

Non-obstetric study after intubation during GA. This may be useful when an ETCO2 device is unavailable.

Vasopressors and i.v. Fluids

(920) Kansal A, Mohta M, Sethi AK et al. Randomised trial of intravenous infusion of ephedrine or mephentermine for management of hypotension during spinal anaesthesia for Caesarean section. Anaesthesia 2005; 60:28-34.

Mephentermine is a mixed sympathomimetic amine which acts both directly and indirectly at alpha and beta receptors. Blood pressure was maintained between "hypotension" (<20% baseline or < 100mmHg) and baseline SBP by titrating the infusion. There were no differences between the groups in terms of hemodynamic parameters or fetal data.

(921) Dahlgren G, Granath F, Pregner K et al. Colloid vs. crystalloid preloading to prevent maternal hypotension during spinal anesthesia for elective cesarean section. Acta Anaesthesiol Scand 2005; 49:1200-6.

Randomized double blind study. The authors stratified different levels of hypotension before analysis including clinical significant hypotension (hypotension associated with maternal symptoms; hypotension being defined as SBP < 100mmHg or > 20% fall from baseline SBP). Colloid preloading was associated with reduced severity of hypotension.

(922) Clark VA, Sharwood-Smith GH, Stewart AV. Ephedrine requirements are reduced during spinal anaesthesia for caesarean section in preeclampsia. Int J Obstet Anesth 2005; 14:9-13.

Study comparing ephedrine use between 20 severe preeclamptic (but hemodynamically stabilized) and 20 normotensive women undergoing cesarean section under spinal anesthesia. Less ephedrine was used in the preeclamptic group.

(923) Brown N, Bryden F. Slow and steady spinal anaesthesia. Int J Obstet Anesth 2005; 14:271; author reply -2.

Letters in relation to Clark et al's study.

(924) Berlac PA, Rasmussen YH. Per-operative cerebral near-infrared spectroscopy (NIRS) predicts maternal hypotension during elective caesarean delivery in spinal anaesthesia. Int J Obstet Anesth 2005; 14:26-31.

Cerebral oxygenation (ScO—2) decreased by ? 5% in 22 patients who subsequently developed hypotension (sensitivity 1.00; specificity 0.85).

(925) Loughrey JP, Yao N, Datta S et al. Hemodynamic effects of spinal anesthesia and simultaneous intravenous bolus of combined phenylephrine and ephedrine versus ephedrine for cesarean delivery. Int J Obstet Anesth 2005; 14:43-7.

Patients were randomized to receive an IV bolus at induction of spinal anesthesia of ephedrine 10mg ± phenylephrine 40 mcg followed by half that dose for any subsequent hypotension. There were no differences between the groups.

(926) Desalu I, Kushimo OT. Is ephedrine infusion more effective at preventing hypotension than traditional prehydration during spinal anaesthesia for caesarean section in African parturients? Int J Obstet Anesth 2005; 14:294-9.

60 patients randomized to receive 1L of N saline before the spinal block or ephedrine 30mg in 1L of N saline after the spinal block titrated to maternal systolic blood pressure. Hypotension occurred in 70% of the preload group compared with 40% of the ephedrine group. Only Apgar scores were recorded for neonatal outcome.

(927) *** Kee WD, Khaw KS, Ng FF. Prevention of hypotension during spinal anesthesia for cesarean delivery: an effective technique using combination phenylephrine infusion and crystalloid cohydration. Anesthesiology 2005; 103:744-50.

Good study adding more information to the ongoing work by these authors on preventing hypotension during cesarean section. Rapid crystalloid infusion (2L) at the time of spinal injection (as opposed to a preload) was compared to a minimal maintenance rate. A phenylephrine infusion was titrated to maintain baseline systolic BP in both groups. In the cohydration group fewer patients became hypotensive and required smaller doses of vasopressor to maintain systolic BP. Howewer it is unclear how rapidly the cohydration group received the fluids – no pressure infusion device was used. Also the study was unblinded.

(928) *** Okudaira S, Suzuki S. Influence of spinal hypotension on fetal oxidative status during elective cesarean section in uncomplicated pregnancies. Arch Gynecol Obstet 2005; 271:292-5.

Plasma xanthine, serum uric acid and plasma malondialdehyde levels in umbilical venous blood and blood gases in the umbilical artery were measured in patients receiving spinal anesthesia for elective cesarean section with (n=26) and without (n=26) spinal hypotension. The hypotension group was further subdivided into patients with greater or less than 2 min hypotension. Although the cord blood gases did not differ between the control and > 2min hypotension group, oxygen free radical markers were increased in the group with prolonged hypotension. All patients received ephedrine for treatment of hypotension. It would be interesting to modify this study by comparing ephedrine versus phenylephrine.

Anesthesia for non-obstetric surgery during pregnancy

(929) Schmeler KM, Mayo-Smith WW, Peipert JF et al. Adnexal masses in pregnancy: surgery compared with observation. Obstet Gynecol 2005; 105:1098-103.

Notes review. Surgery can be postponed until after delivery in some mothers with an adnexal mass during pregnancy.

(930) Korkontzelos I, Papanicolaou S, Tsimoyiannis I et al. Large carcinoid tumor of the appendix during pregnancy. Eur J Obstet Gynecol Reprod Biol 2005; 118:255-7.

Case report of an inflamed appendix removed during pregnancy which showed to be of carcinoid origin subsequently.

(931) Nair U. Acute abdomen and abdominal pain in pregnancy. Curr Obstet Gynaecol 2005; 15:359-67.

Good review about pregnancy related causes of abdominal pain (ectopic, pre-term labor, placental abruption, uterine rupture) and concomitant pathology (e.g. appendicitis, pancreatitis, cholecystitis). Of interest the author states that laparoscopic removal of an inflamed appendix is a good option in early pregnancy.

(932) Dickson E, Clark V. Anaesthesia for non-obstetric surgery during pregnancy. CPD Anaesth 2005; 7:9-14.

Review.

Cervical cerclage

(933) Rebarber A, Roman AS, Istwan N et al. Prophylactic cerclage in the management of triplet pregnancies. Am J Obstet Gynecol 2005; 193:1193-6.

Study in patients without a history of cervical incompetence which showed no improvements in pregnancy or neonatal outcomes.

(934) Baxter JK, Airoldi J, Berghella V. Short cervical length after history-indicated cerclage: Is a reinforcing cerclage beneficial? Am J Obstet Gynecol 2005; 193:1204-7.

This was associated with worse outcomes.

Tubal Ligation

(935) Habib AS, Muir HA, White WD et al. Intrathecal morphine for analgesia after postpartum bilateral tubal ligation. Anesth Analg 2005; 100:239-43.

Postoperative analgesia after PPBTL was better when patients had 50 mcg morphine added to the spinal mixture of 12.75mg hyperbaric bupivacaine with 20 mcg fentanyl.

(936) Balestrieri PJ. Intrathecal morphine for postpartum bilateral tubal ligation. Anesth Analg 2005; 101:609.

Letter re Habib et al's paper.

(937) Habib AS. Intrathecal morphine for postpartum bilateral tubal ligation. Anesth Analg 2005; 101:609-10.

Author reply.

(938) Marcus R-JL, Wong CA, Lehor A et al. Postoperative epidural morphine for postpartum tubal ligation analgesia. Anesth Analg 2005; 101:876-81.

Patients with epidurals in situ following a vaginal delivery were randomized to get postoperative analgesia with saline, 2mg, 3mg or 4 mg epidural morphine (+ ibuprofen / paracetamol : hydocodone tablets). The 2mg dose provided the best result in terms of analgesia with few side effects.

(939) Evans NR, Skowno JJ, Bennett PJ et al. A prospective observational study of the use of the Proseal laryngeal mask airway for postpartum tubal ligation. Int J Obstet Anesth 2005; 14:90-5.

Study of 90 fasted patients undergoing PTL under general anesthesia via a minilaparotomy at least 8 hrs after vaginal delivery. Gastric tubes were also placed to measure gastric volumes and pH. The paper suggests a low risk of regurgitation in this situation.

Termination of pregnancy

(940) Jacquemard F. Anaesthesia and analgesia for termination of pregnancy. J Pediatr Pueric 2005; 18:127-30.

(941) Sharma S, Refaey H, Stafford M et al. Oral versus vaginal misoprostol administered one hour before surgical termination of pregnancy: a randomised controlled trial. BJOG 2005; 112:456-60.

Randomized controlled trial with patients in 3 groups – oral / vaginal misoprostol or no cervical ripening agent. There were no cervical ripening effects seen in either misoprostol groups.

(942) Owolabi OT, Moodley J. A randomized trial of pain relief in termination of pregnancy in South Africa. Trop Doct 2005; 35:136-9.

Randomized trial. Local anaesthetic infiltration of the cervix in combination with diclofenac or together with diclofenac and paracervical block provides better pain relief during and after the manual vacuum evacuation.

(943) Hamoda H, Flett GM, Ashok PW, Templeton A. Surgical abortion using manual vacuum aspiration under local anaesthesia: a pilot study of feasibility and women's acceptability. J Fam Plann Reprod Health Care 2005; 31:185-8.

Observational UK study which found that this technique was acceptable to patients.

Complications of Anesthesia

Airway

(944) Peterson GN, Domino KB, Caplan RA et al. Management of the difficult airway: a closed claims analysis. Anesthesiology 2005; 103:33-9.

Death or brain damaged cases assessed between 1985-1999 including the influence of the 1993 Difficult Airway guidelines. Death / brain damage decreased from airway problems during induction of anaesthesia in 1993-1999 v. 1985-1992.

(945) Johnson DM, From AM, Smith RB et al. Endoscopic study of mechanisms of failure of endotracheal tube advancement into the trachea during awake fiberoptic orotracheal intubation. Anesthesiology 2005; 102:910-4.

Non-pregnant study (which includes some interesting color pictures) which showed that the right arytenoid cartilage is the most common site to inhibit endotracheal advancement. Bronchoscope position in the larynx and the endotracheal orientation are also important.

(946) Schaumann N, Lorenz V, Schellongowski P et al. Evaluation of Seldinger technique emergency cricothyroidotomy versus standard surgical cricothyroidotomy in 200 cadavers. Anesthesiology 2005; 102:7-11.

Study of 20 Viennese emergency physicians evaluating both techniques in cadavers. The Seldinger technique was performed faster with shorter first ventilation times and no injuries to peri-tracheal structures.

(947) Shiga T, Wajima Z, Inoue T, Sakamoto A. Predicting difficult intubation in apparently normal patients: a meta-analysis of bedside screening test performance. Anesthesiology 2005; 103:429-37.

A substantial piece of work which shows the poor predictive value of standard bedside tests in patients without known airway pathology. A combination of the Mallampati test & the thyromental distance may have the highest discriminative power.

(948) Eberhart LH, Arndt C, Cierpka T et al. The reliability and validity of the upper lip bite test compared with the Mallampati classification to predict difficult laryngoscopy: an external prospective evaluation. Anesth Analg 2005; 101:284-9.

Both tests were poor predictors.

(949) Wong DT, Lai K, Chung FF, Ho RY. Cannot Intubate-Cannot Ventilate and Difficult Intubation Strategies: Results of a Canadian National Survey. Anesth Analg 2005; 100:1439-46.

In a CICV scenario most anesthesiologists surveyed preferred to use an IV catheter (51%) for cricothyroidotomy and percutaneous cricothyroidotomy (28%). Only 57% of respondents had come across a CICV situation in their clinical practice!

(950) Subramani K, Paul A. Laryngospasm during subarachnoid block. Br J Anaesth 2005; 94:668-70.

Non-obstetric case of a patient who developed laryngospasm possibly due to increased vagal tone under spinal anesthesia.

(951) Murphy M, Hung O, Launcelott G et al. Predicting the difficult laryngoscopic intubation: are we on the right track? Can J Anaesth 2005; 52:231-5.

Editorial accompanying the paper by Merah et al. The authors advise that we should be focusing on a framework that reliably predicts our ability to provide oxygenation and ventilation for a specific patient rather than just thinking solely in terms of "intubatability".

(952) Merah NA, Wong DT, Ffoulkes-Crabbe DJ et al. Modified Mallampati test, thyromental distance and inter-incisor gap are the best predictors of difficult laryngoscopy in West Africans. Can J Anaesth 2005; 52:291-6.

Non-obstetric study. Other airway assessments which were studied included sternomental distance and horizontal length of the mandible.

(953) Crosby E. The unanticipated difficult airway--evolving strategies for successful salvage. Can J Anaesth 2005; 52:562-7.

Emphasizes the over reliance on direct laryngoscopy and the limitation of certain skills to cope with airway problems.

(954) Burkle CM, Walsh MT, Harrison BA et al. Airway management after failure to intubate by direct laryngoscopy: outcomes in a large teaching hospital. Can J Anaesth 2005; 52:634-40.

Database review of over 37,000 patients with a failed intubation incidence of 0.43% (n=161). The fiberoptic bronchoscope was the most commonly used device when this occurred. Morbidity/mortality were very low.

(955) Cook TM, Lee G, Nolan JP. The ProSeal laryngeal mask airway: a review of the literature. Can J Anaesth 2005; 52:739-60.

Detailed review of the PSLMA.

(956) Munnur U, de Boisblanc B, Suresh MS. Airway problems in pregnancy. Crit Care Med 2005; 33:S259-68.

Review of pregnancy related airway problems including the use of several airway devices used for difficult intubation situations.

(957) Degler SM, Dowling RD, Sucherman DR, Leighton BL. Awake intubation using an intubating laryngeal mask airway in a parturient with spina bifida. Int J Obstet Anesth 2005; 14:77-8.

Letter regarding a patient with a potential difficult intubation refusing regional block who had an awake insertion of an intubating laryngeal mask under topical anesthesia followed by endotracheal intubation via the laryngeal mask. General anesthesia was then administered.

Allergy

(958) Harboe T, Guttormsen AB, Irgens A et al. Anaphylaxis during anesthesia in Norway: a 6-year single-center follow-up study. Anesthesiology 2005; 102:897-903.

Norwegian study showing most cases of anaphylaxis due to NMB drugs – IgE mediated anaphylaxis was established in 71% of cases. Suxamethonium was the most frequent drug involved followed by rocuronium and vecuronium.

(959) Brown RH, Hamilton RG, Mintz M et al. Genetic predisposition to latex allergy: role of interleukin 13 and interleukin 18. Anesthesiology 2005; 102:496-502.

This study showed that latex allergy in healthcare workers exposed to natural rubber latex is associated with polymorphisms in IL 13 & IL 18.

(960) Sambuughin N, Holley H, Muldoon S et al. Screening of the entire ryanodine receptor type 1 coding region for sequence variants associated with malignant hyperthermia susceptibility in the North American population. Anesthesiology 2005; 102:515-21.

Mutations in the ryanodine-1 receptor are the major cause of MH susceptibility. RNA / DNA analysis from muscle tissue or blood lymphocytes detected 9 new RYR1 mutations.

(961) Levano S, Ginz H, Siegemund M et al. Genotyping the butyrylcholinesterase in patients with prolonged neuromuscular block after succinylcholine. Anesthesiology 2005; 102:531-5.

Succinylcholine is usually rapidly hydrolysed by butyrylcholinesterase (BCHE - plasma cholinesterase). Variations in the genetic sequence of BCHE are common in patients with a prolonged duration of action of succinylcholine.

(962) Gerbershagen MU, Fiege M, Weisshorn R et al. Cumulative and bolus in vitro contracture testing with 4-chloro-3-ethylphenol in malignant hyperthermia positive and negative human skeletal muscles. Anesth Analg 2005; 101:710-4.

CEP can induce Ca induced Ca release in muscles. In this in vitro study, CEP (using cumulative administration) seems to be acceptable for MH diagnosis.

(963) Cuciti C, Mayer DC, Arnette R, Spielman FJ. Anaphylactoid reaction to intravenous sodium ferric gluconate complex during pregnancy. Int J Obstet Anesth 2005; 14:362-4.

Case report of the treatment of a 38 week gestation mother with SFGC who developed an anaphylactoid reaction.

(964) Ban M, Hattori M. Delayed hypersensitivity due to epidural block with ropivacaine. BMJ 2005; 330:229.

Non-obstetric case of a purpuric rash on a patients arms, legs and trunk after a ropivacaine epidural infusion. An intradermal test and skin biopsy showed a delayed-type hypersensitivity reaction.

Aspiration and Prophylaxis

(965) Calthorpe N, Lewis M. Acid aspiration prophylaxis in labour: a survey of UK obstetric units. Int J Obstet Anesth 2005; 14:300-4.

OAA survey of 250 UK units which found that overall there was an increased use of prophylaxis.

Cardiac Arrest

(966) Kopp SL, Horlocker TT, Warner ME et al. Cardiac arrest during neuraxial anesthesia: frequency and predisposing factors associated with survival. Anesth Analg 2005; 100:855-65.

Study period between 1983–2002. Mainly non-obstetric cases that had a cardiac arrest during regional anesthesia (these were compared with similar GA arrests during the same period). After controlling for other factors a cardiac arrest during regional anesthesia was associated with an equal or better chance of survival than a cardiac arrest during GA.

(967) Mallampalli A, Guy E. Cardiac arrest in pregnancy and somatic support after brain death. Crit Care Med 2005; 33:S325-31.

A brief review of CPR in pregnancy and physiological changes after brain death.

(968) 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation 2005; 112: IV 1-203.

The most recent US guidelines published in 2005. The main change (in adults) is a 30:2 chest compression to ventilation ratio and a greater emphasis on effective uninterrupted chest compressions before ventilation. The full document incorporates guidelines on cardiac arrest associated with trauma, pregnancy, electric shock and lightning strikes, drowning, hypothermia, pediatric BLS / ALS and neonatal resuscitation.

(969) Nolan JP, Deakin CD, Soar J et al. European Resuscitation Council guidelines for resuscitation 2005. Section 4. Adult advanced life support. Resuscitation 2005; 67 Suppl 1:S39-86.

The latest European guidelines which are naturally similar to the US ones since they are based on international consensus through the International Liaison Committee on Resuscitation.

(970) Soar J, Deakin CD, Nolan JP et al. European Resuscitation Council guidelines for resuscitation 2005. Section 7. Cardiac arrest in special circumstances. Resuscitation 2005; 67 Suppl 1:S135-70.

Includes some guidelines for resuscitation during pregnancy.

(971) Deakin CD, Nolan JP. European Resuscitation Council guidelines for resuscitation 2005. Section 3. Electrical therapies: automated external defibrillators, defibrillation, cardioversion and pacing. Resuscitation 2005;67 Suppl 1:S25-37.

(972) Chamberlain D. New international consensus on cardiopulmonary resuscitation. BMJ 2005; 331:1281-2.

Editorial on the new 2005 resuscitation guidelines.

(973) Hupfl M, Duma A, Uray T et al. Over-the-head cardiopulmonary resuscitation improves efficacy in basic life support performed by professional medical personnel with a single rescuer: a simulation study. Anesth Analg 2005; 101:200-5.

A manikin study with a new over-the-head CPR single rescuer technique which proved superior to standard one-rescuer basic life support.

Drug Error

(974) Balestrieri PJ, Hamza MS, Ting PH et al. Inadvertent intrathecal injection of labetalol in a patient undergoing post-partum tubal ligation. Int J Obstet Anesth 2005; 14:340-2.

Accidental injection of labetolol through a spinal catheter inserted after an accidental dural puncture during labor. The patient did not develop any complications.

Equipment

(975) Sharma P, Singh B, Manocha A. Stylet stuck in the back: an unusual complication of spinal needle. Anesth Analg 2005; 101:296-7.

Letter. Stylet bending occurred during insertion of a single shot spinal in a male patient. Pictures included in this case report.

(976) Sethi S. Complication of combined spinal epidural needle. Can J Anaesth 2005; 52:887.

Letter. Non-obstetric case of a Espocan CSE set complication, where the centering sleeve of the spinal needle became dislodged during the procedure.

High Spinal

(977) Singh B, Papneja VD, Datt V. Reversal of an unintentional spinal anesthetic by cerebrospinal lavage. Anesth Analg 2005; 100:296.

Letter re paper by Tsui in A&A 2004. Comment re use of CSF lavage (CSF exchange with saline) after total spinal.

(978) Tsui BC, Malherbe S. Reversal of an unintentional spinal anesthetic by cerebrospinal lavage. Anesth Analg 2005; 100:296-7. Author reply.

(979) Liu H. Reversal of an unintentional spinal anesthetic by cerebrospinal lavage. Anesth Analg 2005; 100:1215.

Letter re paper by Tsui in A&A 2004. Comment re use of CSF lavage (CSF exchange with saline) after total spinal.

(980) Tsui BC, Malherbe S, Koller J, Aronyk K. Reversal of an unintentional spinal anesthetic by cerebrospinal lavage. Anesth Analg 2005; 100:1215. Author reply.

(981) Wilson MJ. When using spinal anaesthesia for caesarean section after the epidural has failed, the normal dose of spinal anaesthetic should be used Proposer. Int J Obstet Anesth 2005; 14:53-5.

(982) Stocks GM. When using spinal anaesthesia for caesarean section after the epidural has failed, the normal dose of spinal anaesthetic should be used - Opposer. Int J Obstet Anesth 2005; 14:55-7.

OAA Controversies in Obstetric Anesthesia debate with Wilson MJ.

Inadequate Anesthesia

(983) Lacassie HJ, Millar S, Leithe LG et al. Dural ectasia: a likely cause of inadequate spinal anaesthesia in two parturients with Marfan's syndrome. Br J Anaesth 2005; 94:500-4.

Dural ectasia is widening or ballooning of the lumbosacral dural sac (associated with an increased CSF volume) and can be found in up to 90% of patients with Marfan's syndrome. 2 case reports of patients with inadequate spinal anesthesia later proven on CT scan to have dural ectasia.

Infection

(984) Davies PW, Vallejo MC, Shannon KT et al. Oral herpes simplex reactivation after intrathecal morphine: a prospective randomized trial in an obstetric population. Anesth Analg 2005; 100:1472-6.

Patients randomized to receive spinal morphine + PCA IV morphine or PCA IV morphine only for postop analgesia for cesarean section. The spinal group had a higher incidence of HSL reactivation and pruritus.

(985) Bussink M, Gramke HF, Van Kleef M, Marcus M. Bacterial meningitis ten days after spinal anesthesia. Reg Anesth Pain Med 2005; 30:210-1.

Letter. Non-obstetric case described.

(986) Reynolds F. Infection as a complication of neuraxial blockade. Int J Obstet Anesth 2005; 14:183-8.

Good editorial review about the causes of abscess and meningitis and the role of spinals / CSEs. 4 such cases are published in the same edition of IJOA. A case for the routine use of mask / gloves etc is highlighted.

(987) Robins K, Wilson R, Watkins EJ et al. Chlorhexidine spray versus single use sachets for skin preparation before regional nerve blockade for elective caesarean section: an effectiveness, time and cost study. Int J Obstet Anesth 2005; 14:189-92.

Both preparations were in alcohol. Both methods effectively reduced bacterial counts, but the spray was quicker to apply and cheaper to use.

(988) Chiang HL, Chia YY, Chen YS et al. Epidural abscess in an obstetric patient with patient-controlled epidural analgesia--a case report. Int J Obstet Anesth 2005; 14:242-5.

Case report. Epidural catheter inserted first followed by a single shot spinal injection for anesthesia. PCEA was used postoperatively. Eventually severe backache prompted an MRI scan which revealed a L1-2 abscess. Antibiotic treatment alone was successful with no resultant neurological deficit in the patient.

(989) Collis RE, Harries SE. A subdural abscess and infected blood patch complicating regional analgesia for labour. Int J Obstet Anesth 2005; 14:246-51.

Two reports. First report was of a patient who developed a large spinal subdural abscess after a CSE which was eventually drained surgically. The second report was of an E Coli subcutaneous abscess over an epidural site which was later treated with antibiotics.

(990) Huang YY, Zuo Z, Yuan HB et al. A paraspinal abscess following spinal anaesthesia for caesarean section and patient-controlled epidural analgesia for postoperative pain. Int J Obstet Anesth 2005; 14:252-5.

Elective cesarean section performed under a single space, two needle puncture spinal / epidural technique followed by PCEA postoperatively. A paraspinal abscess was diagnosed 20 days after removal of the epidural catheter and eventually drained surgically. Of note in this case, neither a bacterial filter, gown or hand disinfection was used before the procedure!

Intravenous Toxicity

(991) Burmester MD, Schluter KD, Daut J, Hanley PJ. Enantioselective actions of bupivacaine and ropivacaine on coronary vascular resistance at cardiotoxic concentrations (R and S enantiomers of each drug were tested). Anesth Analg 2005; 100:707-12.

Guinea pig laboratory study assessing coronary vascular resistance to varying concentrations of bupivacaine and ropivacaine. S-ropivacaine, S-bupivacaine and R-ropivacaine all induce coronary vasoconstriction, while racemic and R-bupivacaine cause vasodilation.

(992) Tanaka K, Oda Y, Funao T et al. Dexmedetomidine decreases the convulsive potency of bupivacaine and levobupivacaine in rats: involvement of alpha-2-adrenoceptor for controlling convulsions. Anesth Analg 2005; 100:687-96.

Dexmedetomidine (in rats) reduced the convulsive potency of both local anesthetics, by increasing their convulsive dose and plasma / brain concentrations at the onset of convulsions. It appears that this effect may be mediated at the alpha-2 receptor, since it was antagonized by yohimbine, an alpha-2 antagonist.

(993) Royse CF, Royse AG. The myocardial and vascular effects of bupivacaine, levobupivacaine, and ropivacaine using pressure volume loops. Anesth Analg 2005; 101:679-87.

Rabbit study using doses encountered in clinical practice. Ropivacaine had the least depressant effect on the heart.

(994) Finucane BT. Ropivacaine cardiac toxicity--not as troublesome as bupivacaine. Can J Anaesth 2005; 52:449-53.

Editorial accompanying non-obstetric case report by Gielen et al, outlining the potential for a successful outcome after accidental IV injection of ropivacaine during a peripheral nerve block.

(995) Gielen M, Slappendel R, Jack N. Successful defibrillation immediately after the intravascular injection of ropivacaine. Can J Anaesth 2005; 52:490-2.

Case report in a young girl during a sciatic nerve block – VF and convulsions resulted following IV ropivacaine.

(996) Harney D, Moran CA, Whitty R et al. Influence of posture on the incidence of vein cannulation during epidural catheter placement. Eur J Anaesthesiol 2005; 22:103-6.

Randomized study in 209 pregnant women. Epidural venous cannulation was higher when patients were sitting compared to the lateral position.

(997) Iwama H. A case of normal ropivacaine concentration causing grand mal seizure after epidural injection. Eur J Anaesthesiol 2005; 22:322-3.

Letter. Non-obstetric case given 80mg ropivacaine who convulsed (1.5mg/L blood conc. soon after convulsion).

(998) Kindler CH, Yost CS. Two-pore domain potassium channels: new sites of local anesthetic action and toxicity. Reg Anesth Pain Med 2005; 30:260-74.

Review article introducing us to the K2P ion channel and more.

(999) Reynolds F. Maximum recommended doses of local anesthetics: a constant cause of confusion. Reg Anesth Pain Med 2005; 30:314-6.

In depth letter explaining why we should not altogether abandon maximum recommended doses.

(1000) *** Renehan EM, Enneking FK, Varshney M et al. Scavenging nanoparticles: an emerging treatment for local anesthetic toxicity. Reg Anesth Pain Med 2005; 30:380-4.

Very interesting review.

(1001) Mulroy MF. Local anesthetics: helpful science, but don't forget the basic clinical safety steps. Reg Anesth Pain Med 2005; 30:513-5.

Editorial accompanying paper by Mather et al on local anesthetic toxicity. The author warns us not to forget clinical aspects of safety such as a test dose, incremental dosing and vigilance for sings of toxicity.

(1002) Mather LE, Copeland SE, Ladd LA. Acute toxicity of local anesthetics: underlying pharmacokinetic and pharmacodynamic concepts. Reg Anesth Pain Med 2005; 30:553-66.

Review. The authors discuss various pharmodynamic and pharmacokinetic factors which are important when considering local anesthetic toxicity. Most of the information is from animal work and the profiles of the new local anesthetics, ropivacaine and levobupivacaine are discussed.

Nausea/Vomiting

(1003) Candiotti KA, Birnbach DJ, Lubarsky DA et al. The impact of pharmacogenomics on postoperative nausea and vomiting: do CYP2D6 allele copy number and polymorphisms affect the success or failure of ondansetron prophylaxis? Anesthesiology 2005; 102:543-9.

Patients with 3 copies of the CYP2D6 gene (codes for a hepatic cytochrome P450 enzyme), a genotype consistent with ultrarapid metabolism, have an increased incidence of ondansetron failure when used for PONV but not nausea (ondansetron has previously been shown to be a better antiemetic agent than antinausea agent).

(1004) Balki M, Carvalho JC. Intraoperative nausea and vomiting during cesarean section under regional anesthesia. Int J Obstet Anesth 2005; 14:230-41.

Review article. Emphasizes the need to reduce the incidence of hypotension, surgical stimuli (e.g. exteriorization), reduce visceral pain with spinal / epidural opioids etc. The authors

state that antiemetics should only be given when other factors have been treated and that there is no role for prophylactic antiemetics.

(1005) White PF, Hamza MA, Recart A et al. Optimal timing of acustimulation for antiemetic prophylaxis as an adjunct to ondansetron in patients undergoing plastic surgery. Anesth Analg 2005; 100:367-72.

Non-obstetric sham controlled study using the Reliefband® + ondansetron which showed that application of acustimulation was more effective when applied postoperatively.

(1006) Meyer TA, Roberson CR, Rajab MH et al. Dolasetron versus ondansetron for the treatment of postoperative nausea and vomiting. Anesth Analg 2005; 100:373-7.

Outpatient GA study which demonstrated that the dolasetron group needed less antiemetic rescue medication (40% v 70%). Dolasetron is also 40% cheaper than ondansetron!

(1007) Kocamanoglu IS, Baris S, Karakaya D et al. Effects of granisetron with droperidol or dexamethasone on prevention of postoperative nausea and vomiting after general anesthesia for cesarean section. Methods Find Exp Clin Pharmacol 2005; 27:489-93.

Multiple comparisons in this placebo controlled trial showed that granisetron either alone or with droperidol or dexamethasone was superior to placebo. There were no differences between the granisetron groups, although the study lacked statistical power to show any differences.

(1008) Chen HM, Chang FY, Hsu CT. Effect of acupressure on nausea, vomiting, anxiety and pain among post-cesarean section women in Taiwan. Kaohsiung J Med Sci 2005; 21:341-50.

The use of acupressure reduced the incidence of nausea and vomiting from 69.3% to 53.9%, compared with control group.

Neurologic Injury

(1009) Ain RJ, Vance MB. Epidural hematoma after epidural steroid injection in a patient withholding enoxaparin per guidelines. Anesthesiology 2005; 102:701-3.

Letter. An elderly patient on LMWH developed an epidural hematoma, despite it being withheld for > 24hr.

(1010) Sakura S, Kirihara Y, Muguruma T et al. The comparative neurotoxicity of intrathecal lidocaine and bupivacaine in rats. Anesth Analg 2005; 101:541-7.

Equipotent doses established in 1st experiment unlike previous studies. 2nd experiment - rats given lidocaine had longer tail flick latencies & more morphological damage than bupivacaine.

(1011) Kaneko S, Matsumoto M, Tsuruta S et al. The nerve root entry zone is highly vulnerable to intrathecal tetracaine in rabbits. Anesth Analg 2005; 101:107-14.

Saline control and 1, 2, or 4% tetracaine was administered to rabbits. The myelin sheaths at the nerve root entry zone into the spinal cord were highly vulnerable to large tetracaine concentrations.

(1012) Horlocker TT, Brown DR. Evidence based medicine: haute couture or the emperor's new clothes? Anesth Analg 2005; 100:1807-10.

Editorial accompanying the paper by Zaric et al, but expanding on evidence based medicine and the Cochrane Collaboration with Anesthesia & Analgesia.

(1013) Zaric D, Christiansen C, Pace NL, Punjasawadwong Y. Transient neurologic symptoms after spinal anesthesia with lidocaine versus other local anesthetics: a systematic review of randomized, controlled trials. Anesth Analg 2005; 100:1811-6.

TNS (a temporary painful condition of the buttocks & thighs) lasting 1-10 days is 7 times more likely after lidocaine spinal anesthesia compared to bupivacaine, prilocaine or procaine.

(1014) Rowlingson JC, Hanson PB. Neuraxial anesthesia and low-molecular-weight heparin prophylaxis in major orthopedic surgery in the wake of the latest American Society of Regional Anesthesia guidelines. Anesth Analg 2005; 100:1482-8.

Review of the 2003 ASRA guidelines with reference to the timing of regional anesthesia and LMWH administration.

(1015) Peters G, Hinds NP. Inherited neuropathy can cause postpartum foot drop. Anesth Analg 2005; 100:547-8.

A case report of a parturient undergoing an emergency cesarean section under (uncomplicated) epidural anesthesia who developed foot drop (possibly due to fetal head compression). This was eventually found to be due to a hereditary condition called Hereditary Neuropathy with Liability to Pressure Palsies (HNPP). This was also confirmed by genetic testing.

(1016) YaDeau JT, Liguori GA, Zayas VM. The incidence of transient neurologic symptoms after spinal anesthesia with mepivacaine. Anesth Analg 2005; 101:661-5.

A prospective study of 1210 ambulatory surgery patients having spinal anesthesia with plain mepivacaine. TNS occurred in 6.4% of patients.

(1017) Frenk V, Camann W, Shankar KB. Regional anesthesia in parturients with low platelet counts. Can J Anaesth 2005; 52:114.

Letter. Retrospective database analysis of parturients presenting for regional anesthesia.

(1018) Perlas A, Chan VW. Neuraxial anesthesia and multiple sclerosis. Can J Anaesth 2005; 52:454-8.

Interesting editorial accompanying a non-obstetric case report by Finucane and Terblanche. Updates on the identification of CSF oligopeptides known to partially block sodium channels and the potential for spinal / epidural local anesthetics to temporarily unmask silent demyelinated plaques in MS.

(1019) Finucane BT, Terblanche OC. Prolonged duration of anesthesia in a patient with multiple sclerosis following paravertebral block. Can J Anaesth 2005; 52:493-7.

Non-obstetric case in which a patient exhibited over 12 hrs of anesthesia after a paravertebral block. She was subsequently diagnosed to have MS.

(1020) Cramer BG, Stienstra R, Dahan A et al. Transient neurological symptoms with subarachnoid lidocaine: effect of early mobilization. Eur J Anaesthesiol 2005; 22:35-9.

Non-obstetric study. 2 gps randomized to ambulate or not after minor surgery following spinal lidocaine. No differences were found in postoperative TNS.

(1021) Takenami T, Yagishita S, Murase S et al. Neurotoxicity of intrathecally administered bupivacaine involves the posterior roots/posterior white matter and is milder than lidocaine in rats. Reg Anesth Pain Med 2005; 30:464-72.

A rat study. Different concentrations of bupivacaine and lidocaine were used in addition to 5% bupivacaine in 20% glucose to examine any influence of high osmolarity. Intrathecal neurotoxicity was found to be greater with lidocaine.

(1022) Viitanen H, Porthan L, Viitanen M et al. Postpartum neurologic symptoms following single-shot spinal block for labour analgesia. Acta Anaesthesiol Scand 2005; 49:1015-22.

Prospective study of 212 multiparous patients receiving a single shot spinal anesthetic (with a Quincke needle!) of low dose bupivacaine (2.5mg) and fentanyl (25mcg) in advanced labor. Postpartum questionnaires were sent to the mothers and some were followed up by telephone interview. 8.5% had PDPH and 4.2% experienced transient neurological symptoms. Why would anyone choose to use non-pencilpoint spinal needles in obstetrics today?

(1023) Viitanen H, Viitanen M, Heikkila M. Single-shot spinal block for labour analgesia in multiparous parturients. Acta Anaesthesiol Scand 2005; 49:1023-9.

Study from the same authors above most likely using the same cohort of patients. 26% had unsatisfactory analgesia, som e because analgesia ended before delivery. Very predictable results. The authors do not mention the PDPH rate with the Quincke needles used in the study!

(1024) Yildirim GB, Colakoglu S, Atakan TY, Buyukkirli H. Intracranial subdural hematoma after spinal anesthesia. Int J Obstet Anesth 2005; 14:159-62.

Case report of a mother developing a severe headache and seizures after a spinal anesthetic for cesarean section. Surgery was unsuccessful and the patient eventually died.

(1025) *** Doblar DD, Schumacher SD. Spontaneous acute thoracic epidural hematoma causing paraplegia in a patient with severe preeclampsia in early labor. Int J Obstet Anesth 2005; 14:256-60.

Frightening case report of a 30 yr old patient with severe preeclampsia and a spontaneous thoracic epidural hematoma causing paraplegia who was operated within 11 hrs of symptoms – cesarean section followed by a neurosurgical decompression. Interesting discussion about the conflicting demands of lowering BP for preeclampsia and maintaining perfusion to the spinal cord.

(1026) Zhang RV, Caton D. Epidural catheter-induced paresthesia accompanied by changes in skin color and temperature in an obstetric patient. Int J Obstet Anesth 2005; 14:343-6.

Case report. Probable nerve root irritation which caused paresthesia as well as a cold / pale foot.

(1027) Spiegel JE, Kang V, Kunze L, Hess P. Ondansetron-induced extrapyramidal symptoms during cesarean section. Int J Obstet Anesth 2005; 14:368-9.

Letter which highlights one of the rare problems encountered with ondansetron. Midazolam helped to resolve these symptoms.

(1028) Ugur B, Basaloglu K, Yurtseven T et al. Neurotoxicity with single dose intrathecal midazolam administration. Eur J Anaesthesiol 2005; 22:907-12.

Rabbit study showing significant neurotoxicity effects on the spinal cord.

(1029) Birnbach DJ, Hernandez M, van Zundert AAJ. Neurologic complications of neuraxial analgesia for labor. Curr Opin Anaesthesiol 2005; 18:513–7.

Brief review which covers obstetric nerve palsies, PDPH, space occupying lesions in the epidural / spinal space, anterior spinal artery syndrome, drug toxicity and direct injury from needles used during regional block.

(1030) Jenkins JG. Some immediate serious complications of obstetric epidural analgesia and anaesthesia: a prospective study of 145,550 epidurals. Int J Obstet Anesth 2005; 14:37-42.

Database review over a 17 year period from multiple units in a UK region. The incidence of accidental IV, intrathecal, subdural or a high / total spinal was calculated from the data. The incidence was similar to other prospective studies (obstetric and non-obstetric) and was unrelated to the number of deliveries or epidural rate in the relevant obstetric units.

Post dural puncture headache

(1031) Inagawa G, Miwa T, Hiroki K. Unanticipated dural tap in caudal anesthesia: a case of intrasacral meningocele. Anesth Analg 2005; 101:302.

Letter with picture. 2 year old child having a caudal blk under GA which resulted in spinal fluid dripping from the caudal needle. Intrasacral meningocele was later shown on MRI.

(1032) Yang C-P, Lee C-H, Borel CO et al. Postdural puncture headache with abdominal pain and diarrhea. Anesth Analg 2005; 100:879-81.

A 20 yr man undergoing spinal anesthesia developed a PDPH associated with severe abdominal pain and diarrhea. An epidural blood patch completely resolved all his symptoms.

(1033) Baraz R, Collis RE. The management of accidental dural puncture during labour epidural analgesia: a survey of UK practice. Anaesthesia 2005; 60:673-9. OAA survey.

In 47 units (28%), the epidural catheter is now routinely placed intrathecally following accidental dural puncture; in 69 units (41%) the catheter is re-sited and in the remaining 53 units (31%) either option is allowed. This is in contrast to the previous survey in 1993, which found that epidural catheters were re-sited in 99% of units.

(1034) Awsare AN, Patwardhan A, Wagle A. Intrathecal catheters after dural puncture--some unanswered questions. Anaesthesia 2005; 60:1243-4.

Letter to the Baraz and Collis paper pointing out some potential dangers of intrathecal catheters.

(1035) Levy DM. Two late-onset postdural puncture headaches. Anaesthesia 2005; 60:722-3.

The trainee anesthesiologist responsible for both cases was subsequently found to be inserting a 21G, 40mm cutting bevel needle for skin anesthesia to the hilt, indenting the skin and presumably also increasing the risk of breaching the dura with the infiltration needle.

(1036) Siau C, Ng HP, Tan GM et al. In vitro effects of local anaesthetics on the thromboelastographic profile of parturients. Br. J. Anaesth. 2005; 94:117-20.

Do local anesthetics at the site of an epidural blood patch affect its efficacy? In this study the TEG parameters of 4 local anesthetics were no different to saline controls or to each other.

(1037) Levy DM. Postpartum post-dural puncture headache. Br J Anaesth 2005; 94:542; author reply -3.

Multiple letters about a case report from 2004 of a parturient who developed an intracerebral hemorrhage shortly after an epidural blood patch.

(1038) Chandrasekar B, Harding SA. Postpartum post-dural puncture headache. Br J Anaesth 2005; 94:542; author reply -3.

(1039) Zeidan A, Nanleh N. Postpartum post-dural puncture headache. Br J Anaesth 2005; 94:542; author reply -3.

(1040) Gosch UW, Hueppe M, Hallschmid M et al. Post-dural puncture headache in young adults: comparison of two small-gauge spinal catheters with different needle design. Br J Anaesth 2005; 94:657-61.

Study in healthy volunteers who received one of two spinal catheter systems. The overall incidence of PDPH was a staggering 78%, although the authors claimed a shorter PDPH duration and headache intensity with the catheter over needle group (Spinocath – B Braun)!

(1041) Jagannathan N, Tetzlaff JE. Epidural blood patch in a Jehovah's Witness patient with post-dural puncture cephalgia. Can J Anaesth 2005; 52:113.

Letter. The use of a continuous tubing circuit to perform an EBP in a Jehovah's Witness.

(1042) Angle P, Tang SLT, Thompson D, Szalai JP. Expectant management of postdural puncture headache increases hospital length of stay and emergency room visits. Can J Anesth 2005; 52:397-402.

Retrospective study (1996-2001) examining the length of hospital stay and additional visits after PDPH compared to controls. The usual hospital practice was expectant management of PDPH. Not surprisingly PDPH led to more hospital visits mainly for epidural blood patch. It would be interesting to know if the authors still advocate this type of management.

(1043) Goldszmidt E, Kern R, Chaput A, Macarthur A. The incidence and etiology of postpartum headaches: a prospective cohort study. Can J Anesth 2005; 52:971-7.

Prospective study of headaches in the 1st postpartum week using a cohort of almost 1000 mothers delivering over a 3 month period. Primary headaches accounted for most of the 39% postpartum headaches with PDPH accounting for 4.7%.

(1044) Decramer I, Fuzier V, Franchitto N, Samii K. Is use of epidural fibrin glue patch in patients with metastatic cancer appropriate? Eur J Anaesthesiol 2005; 22:724-5.

Letter. Non-obstetric case report of fibrin glue used to treat a spinal headache following epidural catheterization.

(1045) *** Kongstad L, Grande PO. Effects on intracranial pressure of dural puncture in supine and head-elevated positions. A study on the cat. Acta Anaesthesiol Scand 2005; 49:614-8.

A significant reduction in ICP (measured by a transducer system with the tip in the cerebral cortex) may occur during head elevation following dural puncture. Most of this reduction can be explained by a negative hydrostatic force exerted from the spinal fluid column during head elevation rather than by loss of CSF volume. The authors postulate that the decrease in ICP increases transvascular pressure, which may in turn induce venous dilation causing an increase in intracranial venous blood volume. This may contribute to postural postspinal headache.

(1046) *** Grande PO. Mechanisms behind postspinal headache and brain stem compression following lumbar dural puncture--a physiological approach. Acta Anaesthesiol Scand 2005; 49:619-26.

A study complementing the paper by Kongstad above. The emphasis is that postspinal headaches can be explained not by CSF leakage, but by the fact that the normally closed dural sac is open to the atmosphere which in turn triggers hydrostatic effects during changes in posture.

(1047) Esmaoglu A, Akpinar H, Ugur F. Oral multidose caffeine-paracetamol combination is not effective for the prophylaxis of postdural puncture headache. J Clin Anesth 2005; 17:58-61.

Randomized prospective study. 3 groups. One hour before the spinal anesthesia, the first group (n = 70) received placebo, the second group (n = 70) received 500-mg paracetamol + 75-mg caffeine, and the third group (n = 70) received 500-mg paracetamol + 125-mg caffeine orally. There were no differences between the groups. Since 25G Quincke spinal needles were used the PDPH rate was approximately 15%!
(1048) Kuczkowski KM. Once a post-dural puncture headache patient--always post-dural puncture headache patient: an update. Acta Anaesthesiol Belg 2005; 56:23.

Letter about pregnant women who seem to get repeated PDPHs.

(1049) Sandesc D, Lupei MI, Sirbu C et al. Conventional treatment or epidural blood patch for the treatment of different etiologies of post dural puncture headache. Acta Anaesthesiol Belg 2005; 56:265-9.

Randomized double blind study of 32 patients (obstetric and non-obstetric) with PDPH (accidental wet tap, diagnostic lumbar puncture and spinal anesthesia) given either epidural blood patch or conservative treatment (fluids, NSAIDs & caffeine). Regardless of the etiology of PDPH, epidural blood patch was superior to conservative treatment which did not affect pain scores. 14 of the 16 patients in the conservative treatment group eventually needed a blood patch.

(1050) Buettner A, Popham P, Morgan D. Incidence of epidural blood patch following obstetric regional analgesia in private Australian anaesthetic practice. Int J Obstet Anesth 2005; 14:5-8.

Audit data retrieved from the Medicare insurance database. Information is given for the different Australian states. Overall the epidural rate was 30% with a blood patch rate of 0.35%.

(1051) Webster V, Alderson J. Three spinal anaesthetics for caesarean sections in one patient, two requiring blood patch. Int J Obstet Anesth 2005; 14:179.

Letter. Atraumatic needles (24 or 25G) were used for all 3 spinal injections.

(1052) Cesur M, Alici HA, Erdem AF, Yuksek MS. Epidural blood patch with allogeneic blood for post-dural puncture headache. Int J Obstet Anesth 2005; 14:261-2.

Interesting case report of an allogeneic epidural blood patch from a friend's cross matched blood given with good effect. An autologous blood patch was not considered because of a preexisting high temperature.

(1053) Pruszkowski O, Goncalves O, Lentschener C, Mignon A. Why does prophylactic epidural blood patch fail to demonstrate efficacy in preventing post-dural puncture headache in parturients after dural puncture? Anesthesiology 2005; 103:900; author reply.

Letter to Scavone et al's paper in 2004.

Prolonged Spinal Anesthesia

(1054) James ML, Panni MK. extremely prolonged unilateral block (20 hours) with spinal ropivacaine used for cervical cerclage placement. Anesth Analg 2005; 100:897-8.

Letter.

Pruritus

(1055) Waxler B, Dadabhoy ZP, Stojiljkovic L, Rabito SF. Primer of postoperative pruritus for anesthesiologists. Anesthesiology 2005; 103:168-78.

Review article on the treatment of postoperative pruritus. Mechanisms of itch detailed as well as a meta-analysis.

(1056) Jeon Y, Hwang J, Kang J et al. Effects of epidural naloxone on pruritus induced by epidural morphine: a randomized controlled trial. Int J Obstet Anesth 2005; 14:22-5.

Post cesarean section study with 58 women receiving an epidural bolus of 4mg morphine followed by an infusion of either epidural morphine alone (6mg / 24hr) or epidural morphine mixed with naloxone. The incidence of pruritus was reduced from 82% in the control group to 47% in the naloxone group.

Respiratory Depression

(1057) Romberg RR, Olofsen E, Bijl H et al. Polymorphism of mu-opioid receptor gene (OPRM1:c.118A>G) does not protect against opioid-induced respiratory depression despite reduced analgesic response. Anesthesiology 2005; 102:522-30.

Healthy volunteer study (n=16) using morphine-6-glucuronide (M6G) to look at both analgesia and respiratory depression. This polymorphism affected analgesia and respiratory depression differentially.

Seizures

(1058) Shih CJ, Doufas AG, Chang HC, Lin CM. Recurrent seizure activity after epidural morphine in a post-partum woman. Can J Anaesth 2005; 52:727-9.

Unusual case report in a mother with stable pre-existing epilepsy who developed seizures following epidural morphine for post-cesarean analgesia.

(1059) Okutomi T, Zhang Y, Cooper TB, Morishima HO. Magnesium and bupivacaine-induced convulsions in awake pregnant rats. Int J Obstet Anesth 2005; 14:32-6.

Twelve rats pre-treated with Mg or saline before being given bupivacaine infusions until the onset of convulsions. Mg increased the amount of bupivacaine that could be given before convulsions occurred.

(1060) Akerman N, Hall W. A case of late postpartum seizures after epidural analgesia. Int J Obstet Anesth 2005; 14:163-6.

Case report of a mother who had an epidural for a twin labor and eventually developed seizures 7 days postpartum. Various differential diagnoses are discussed. The epidural was thought to be a non-contributory factor in the seizure etiology.

(1061) Ray N, Camann W. Hyperventilation-induced tetany associated with epidural analgesia for labor. Int J Obstet Anesth 2005; 14:74-6.

Interesting case report of a mother hyperventilating in labor who had an epidural for pain relief. Subsequent bilateral carp-pedal spasm produced severe pain which was relieved with fentanyl 100 mcg.

Shivering/Hypothermia

(1062) Maglinger PE, Sessler DI, Lenhardt R. Cutaneous heat loss with three surgical drapes one impervious to moisture. Anesth Analg 2005; 100:738-42.

Whether the skin was wet or dry, heat loss was similar between 3 drapes including a new impervious surgical drape – Tiburon (the primary purpose of this drape is to prevent contamination of surgical personnel).

(1063) Eberhart LH, Doderlein F, Eisenhardt G et al. Independent risk factors for postoperative shivering. Anesth Analg 2005; 101:1849-57.

Non-obstetric observational study where potential risk factors were recorded for 1340 patients. A risk score was then formulated using a form of logistic regression analysis and the model subsequently tested in a validation group of 340 patients from the same cohort. Postoperative shivering can be predicted using this model with moderate discriminating power using 4 risk factors. Patient age had the most predictive power with younger patients at a higher risk. Other risk factors included low core temperature on admission to the recovery area, prolonged surgery and orthopedic surgery.

(1064) Hong JY, Lee IH. Comparison of the effects of intrathecal morphine and pethidine on shivering after Caesarean delivery under combined-spinal epidural anaesthesia. Anaesthesia 2005; 60:1168-72.

Randomized double blind study of 119 patients randomized to receive 8-10mg hyperbaric 0.5% bupivacaine alone, or with the addition of 0.1 mg morphine, 0.2 mg morphine or 10mg pethidine. Shivering was highest in the opioid free group and lowest with pethidine both in incidence and intensity. It would have been interesting to have considered a group with bupivacaine + fentanyl only or a fentanyl / morphine combination.

(1065) Hess PE, Snowman CE, Wang J. Hypothermia after cesarean delivery and its reversal with lorazepam. Int J Obstet Anesth 2005; 14:279-83.

Case series of 14 hypothermic (presumed due to morphine) cesarean section patients undergoing spinal anesthesia with bupivacaine / morphine / fentanyl followed by an observational study of 100 patients to determine the incidence of hypothermia. 6% of these patients became hypothermic and developed sweating and felt hot! Lorazepam IV was used to successfully treat 8 / 10 subjects. Only sublingual temperatures were taken in this study.

Postpartum Care

Critical Care

(1066) Soubra SH, Guntupalli KK. Critical illness in pregnancy: an overview. Crit Care Med 2005; 33:S248-55.

Excellent review.

(1067) Cole DE, Taylor TL, McCullough DM et al. Acute respiratory distress syndrome in pregnancy. Crit Care Med 2005; 33:S269-78.

Detailed review of the pathophysiology and management of ARDS during pregnancy.

(1068) Fernandez-Perez ER, Salman S, Pendem S, Farmer JC. Sepsis during pregnancy. Crit Care Med 2005; 33:S286-93.

A review of a relatively uncommon problem during pregnancy.

(1069) Fujitani S, Baldisseri MR. Hemodynamic assessment in a pregnant and peripartum patient. Crit Care Med 2005; 33:S354-61.

Brief review of hemodynamic assessment with the emphasis on the pulmonary flotation catheter.

(1070) Clarke J, Butt M. Maternal collapse. Curr Opin Obstet Gynecol 2005; 17:157-60.

Brief review on the causes of maternal collapse including, AFE, major hemorrhage, PE and cardiac arrest.

(1071) Selo-Ojeme DO, Omosaiye M, Battacharjee P, Kadir RA. Risk factors for obstetric admissions to the intensive care unit in a tertiary hospital: a case-control study. Arch Gynecol Obstet 2005; 272:207-10.

Case controlled study of ITU admissions over a 10 yr period. The 33 admissions to ITU (0.11% of deliveries) were mainly postpartum and were for complications of preeclampsia and hemorrhage.

(1072) Walker E, Moore P. Obstetric recovery practice: a survey of UK obstetric anaesthetists. Int J Obstet Anesth 2005; 14:193-9.

Survey carried out in 2003 showing shortfalls in recovery facilities, inadequate staffing levels and staff training. 39% of "recovery" staff had no training.

Pain Management

(1073) Peng PW, Tumber PS, Gourlay D. Review article: perioperative pain management of patients on methadone therapy. Can J Anaesth 2005; 52:513-23.

A good review on how to manage postoperative pain relief in patients receiving methadone.

(1074) Goodman SR, Drachenberg AM, Johnson SA et al. Decreased postpartum use of oral pain medication after a single dose of epidural morphine. Reg Anesth Pain Med 2005; 30:134-9.

Patients delivering vaginally were randomized to receive 1mg or 2mg epidural morphine compared to control. Fewer mothers needed oral medications if given morphine, which was no surprise!

(1075) Hedayati H, Parsons J, Crowther CA. Topically applied anaesthetics for treating perineal pain after childbirth. The Cochrane Database of Systematic Reviews 2005, Issue 2. Art. No.: CD004223.

Cochrane review – there is no evidence that topically applied local evidence makes any difference to postpartum perineal pain.

(1076) Ferber SG, Granot M, Zimmer EZ. Catastrophizing labor pain compromises later maternity adjustments. Am J Obstet Gynecol 2005; 192:826-31.

Catastrophizing labor pain is an "exaggerated negative orientation to painful stimuli". This predicted postpartum depression and other associated events.

(1077) *** Carvalho B, Riley E, Cohen SE et al. Single-dose, sustained-release epidural morphine in the management of postoperative pain after elective cesarean delivery: results of a multicentre randomized controlled study. Anesth Analg 2005; 100:1150-8.

Standard epidural morphine was compared with EREM (DepoDur®) 5, 10 and 15mg after cord clamping. 10 and 15mg EREM provided the best analgesia compared to standard morphine in terms of improved analgesia and functional activity at 24 to 48 hrs. Side effects were similar between gps, although there was a tendency (the study was not

powered for these outcome measures) for more nausea / vomiting and pruritus with the larger doses of EREM. Despite this, EREM has potential to improve postop analgesia for cesarean section.

(1078) Viscusi ER. Emerging techniques in the management of acute pain: epidural analgesia. Anesth Analg 2005; 101:S23-9.

Review article which discusses data on the perioperative use of opioids via epidural versus parenteral routes and outcome. The use of DepoDur (extended release epidural morphine) is briefly reviewed as well.

(1079) Gadsden J, Hart S, Santos AC. Post-cesarean delivery analgesia. Anesth Analg 2005; 101:S62-9.

Review article outlining the various methods currently available for postoperative analgesia after cesarean section. Data on epidural and intrathecal opioids is useful as well as information on some new drugs including DepoDur.

(1080) Elhakim M, Abd El-Megid W, Metry A et al. Analgesic and antacid properties of i.m. tramadol given before Caesarean section under general anaesthesia. Br J Anaesth 2005; 95:811-5.

Randomized double blind trial of 60 patients given intramuscular doses of either 100mg tramadol or famotidine 20mg one hour before surgery. Gastric fluid pH was similar between groups, but postoperative PCA IV nalbuphine consumption was less in the tramadol group. Unfortunately almost 50% of patients in both groups had mild-moderate nausea or severe nausea / mild vomiting. Also note that tramadol is not licensed for use during pregnancy in some countries.

(1081) Bourlert A. Diclofenac intramuscular single dose to decrease pain in post operative Caesarean section: a double blind randomized controlled trial. J Med Assoc Thai 2005; 88:15-9.

Diclofenac reduced the use of postoperative morphine.

Pharmacology

(1082) Rose JS, Neal JM, Kopacz DJ. Extended-duration analgesia: update on microspheres and liposomes. Reg Anesth Pain Med 2005; 30:275-85.

(1083) Viscusi ER, Witkowski TA. Iontophoresis: the process behind non-invasive drug delivery. Reg Anesth Pain Med 2005; 30:292-4.

A short information article.

(1084) Ho KM, Ismail H, Lee KC, Branch R. Use of intrathecal neostigmine as an adjunct to other spinal medications in perioperative and peripartum analgesia: a meta-analysis. Anaesth Intensive Care 2005; 33:41-53.

Intrathecal neostigmine increased nausea and vomiting, bradycardia, anxiety, restlessness, but only improved analgesia. The authors conclude that the side effects of neostigmine outweigh any analgesic advantages.

(1085) Kehlet H. Postoperative opioid sparing to hasten recovery: what are the issues? Anesthesiology 2005; 102:1083-5.

Editorial accompanying paper by Marret et al.

(1086) Marret E, Kurdi O, Zufferey P, Bonnet F. Effects of nonsteroidal anti-inflammatory drugs on patient-controlled analgesia morphine side effects: meta-analysis of randomized controlled trials. Anesthesiology 2005; 102:1249-60.

22 trials reviewed. Use of NSAIDs with morphine PCA reduces risk of PONV and sedation, but not pruritus, urinary retention and respiratory depression.

(1087) Joseph A, Montiague R, Effendi AR et al. Effect of bupivacaine and levobupivacaine on exocytotic norepinephrine release from rat atria. Anesthesiology 2005; 102:977-84.

Clinically relevant cardiotoxic concentrations of local anesthetics cause profound blockade of norepinephrine release from cardiac sympathetic nerve endings, contributing to cardiac depressant effects.

(1088) Viscusi ER, Martin G, Hartrick CT et al. Forty-eight hours of postoperative pain relief after total hip arthroplasty with a novel, extended-release epidural morphine formulation. Anesthesiology 2005; 102:1014-22.

A phase III trial comparing DepoDur, EREM v. placebo for hip surgery. Good prolonged pain relief with DepoDur, but with a higher incidence of pruritus & vomiting.

(1089) Roboubi B. Extended-release epidural morphine formulation data far from clear. Anesthesiology 2005; 103:1318.

Letter to Viscusi et al's paper.

(1090) Viscusi ER. Extended-release epidural morphine formulation data far from clear. Anesthesiology 2005; 103:1318-9.

Author reply.

(1091) Hanna MH, Elliott KM, Fung M. Randomized, double-blind study of the analgesic efficacy of morphine-6-glucuronide versus morphine sulfate for postoperative pain in major surgery. Anesthesiology 2005; 102:815-21.

M6G has a potent antinociceptive effect. Study in orthopedic patients. Intraop study drug bolus + study drug PCA. M6G had a similar analgesic effect over the first 24 hrs to MS but with a slower onset time.

(1092) Sinatra RS, Jahr JS, Reynolds LW et al. Efficacy and safety of single and repeated administration of 1 gram intravenous acetaminophen injection (paracetamol) for pain management after major orthopedic surgery. Anesthesiology 2005; 102:822-31.

A study in orthopedic patients using 1 gm IV paracetamol v. 2 gm IV propacetamol (a prodrug) showed that IV paracetamol was effective as its prodrug.

(1093) Nakamura M, Minami K, Uezono Y et al. The effects of the tramadol metabolite O-desmethyl tramadol on muscarinic receptor-induced responses in Xenopus oocytes expressing cloned M1 or M3 receptors. Anesth Analg 2005; 101:180-6.

Frog study into 0-desmethyl tramadol (a major tramadol metabolite) showing that it inhibits muscarinic M1 but not M3 receptors.

(1094) *** Gambling D, Hughes T, Martin G et al. A comparison of DepoDur®, a novel, single-dose extended-release epidural morphine, with standard epidural morphine for pain relief after lower abdominal surgery. Anesth Analg 2005; 100:1065-74.

Non-obstetric study of patients undergoing lower abdominal surgery. 5mg of standard epidural morphine was compared with a single dose of EREM 5, 10, 15, 20, 25mg. Good analgesia was provided for up to 48 hrs especially with the higher dose EREM gps. Side effect profile was acceptable, although close postop monitoring was needed.

(1095) Marcou TA, Marque S, Mazoit J-X, Benhamou D. The median effective dose of tramadol and morphine for postoperative patients: a study of interactions. Anesth Analg 2005; 100:469-74.

Non-obstetric study using up down sequential & isobolographic analysis. The tramadol: morphine ratio was 10:3 with the combination showing infra-additivity. The opioid sparing effect of tramadol appears to be very small and the mu-opioid combination (tramadol has weak mu effects) may cause more side effects.

(1096) Suzuki M, Kinoshita T, Kikutani T et al. Determining the plasma concentration of ketamine that enhances epidural bupivacaine-and-morphine-induced analgesia. Anesth Analg 2005; 101:777-84.

Non-obstetric placebo controlled double blind study showing that a 20 ng /ml ketamine blood conc. enhances epidural morphine analgesia.

(1097) Liu S-Y, Shieh J-P, Tzeng J-I et al. Novel depots of ketorolac esters have long-acting antinociceptive and anti-inflammatory effects. Anesth Analg 2005; 101:785-92.

Depot formulation of the prodrug gave good results compared to the traditional dosage form.

(1098) Yu J, Tokinaga Y, Kuriyama T et al. Involvement of Ca2+ sensitization in ropivacaine induced contraction of rat aortic smooth muscle. Anesthesiology 2005; 103:548-55.

Rat aorta in-vitro study. Ropivacaine induced vascular contraction involves protein kinase C, p44/42 mitogen - activated protein kinase and Rho kinase.

(1099) *** Viscusi ER. Liposomal drug delivery for postoperative pain management. Reg Anesth Pain Med 2005; 30:491-6.

Mini-review on the subject including information on DepoDur, extended release epidural morphine.

(1100) Hudson SJ, Jones MF, Nolan S et al. Stability of premixed syringes of diamorphine and hyperbaric bupivacaine. Int J Obstet Anesth 2005; 14:284-7.

There was no degradation of bupivacaine @40°C, 25°C or 7°C for 90 days. Diamorphine was degraded over time with 10% degradation after 26 days @ 7°C, which is long enough to allow preparation of syringes in advance by a hospital pharmacy aseptic unit.

(1101) Rowlingson JC. Postoperative pain: to diversify is to satisfy. Anesth Analg 2005; 101:S1-4.

Editorial in the Anesthesia & Analgesia November 2005 supplement on advances in postoperative pain management.

(1102) White PF. The changing role of non-opioid analgesic techniques in the management of postoperative pain. Anesth Analg 2005; 101:S5-22.

Review article of non-opioid techniques including ways of giving local anesthetics, NSAIDs, COX-2 inhibitors, NMDA antagonists and alpha-2 adrenergic agonists.

(1103) Rathmell JP, Lair TR, Nauman B. The role of intrathecal drugs in the treatment of acute pain. Anesth Analg 2005; 101:S30-43.

Excellent review on the pharmacology and use of commonly administered opioid drugs and their associated side effects.

(1104) Grass JA. Patient-controlled analgesia. Anesth Analg 2005; 101:S44-61.

A review article concentrating in detail about IV PCA use postoperatively, but with some discussion on epidural, peripheral catheter and transdermal PCA.

(1105) Aubrun F, Salvi N, Coriat P, Riou B. Sex- and age-related differences in morphine requirements for postoperative pain relief. Anesthesiology 2005; 103:156-60.

General article assessing sex differences in morphine consumption in over 4,000 patients. Women had more severe postop pain and needed more morphine (+11%) than men. This difference disappeared in elderly patients.

(1106) Delage N, Maaliki H, Beloeil H et al. Median effective dose (ED50) of nefopam and ketoprofen in postoperative patients: a study of interaction using sequential analysis and isobolographic analysis. Anesthesiology 2005; 102:1211-6.

Interesting non-obstetric study of postop analgesia using nefopam (centrally acting) and ketoprofen (NSAID) either alone or in combination using a sequential analysis and an isobolographic method. When used together the drugs showed marked synergy.

(1107) Kapfer B, Alfonsi P, Guignard B et al. Nefopam and ketamine comparably enhance postoperative analgesia. Anesth Analg 2005; 100:169-74.

Both drugs reduced morphine requirements by 40%, although ketamine was associated with sedation and nefopam induced tachycardia and sweating.

(1108) Modalen AO, Quiding H, Frey J et al. A novel molecule (frakefamide) with peripheral opioid properties: the effects on resting ventilation compared with morphine and placebo. Anesth Analg 2005; 100:713-7.

Frakefamide is a fluorinated tetrapeptide with mu-opioid receptor effects. This volunteer study showed that the drug did not impair resting ventilation unlike morphine. This supports a peripheral opioid effect for the drug.

(1109) Guntz E, Dumont H, Roussel C et al. Effects of remifentanil on N-methyl-D-aspartate receptor: an electrophysiologic study in rat spinal cord. Anesthesiology 2005; 102:1235-41.

An increase in pain sensitivity (sometimes related to acute opioid use) is called hyperalgesia and is said to be associated with NMDA receptor activation. Blocking NMDA receptors can reduce hyperalgesia. Ultiva® is remifentanil in a glycine vehicle and activates NMDA receptors in the spinal cord. By using both drugs independently, glycine was found to activate the NMDA receptor directly, whereas remifentanil alone potentiates its activity via pathways mediated by mu opioid receptor activation.

Physiology

(1110) Paris A, Ohlendorf C, Marquardt M et al. The effect of meperidine on thermoregulation in mice: involvement of alpha-2-adrenoceptors. Anesth Analg 2005; 100:102-6.

Meperidine decreased the threshold for non-shivering thermogenesis in mice. This effect was abolished by administration of the alpha-2-adrenoceptor antagonist atipamezole, suggesting a predominant role of alpha-2-adrenoceptors in the inhibition of thermoregulation by meperidine. This model of thermoregulation in mice may be useful to further elucidate general mechanisms of thermoregulation.

(1111) Chernyak GV, Sessler DI. Perioperative acupuncture and related techniques. Anesthesiology 2005; 102:1031-49.

A review article exploring the theory, mechanisms of action (includes color functional MR brain images during acupuncture) and use for PONV, postop analgesia, preop sedation.

(1112) Xie G-x, Palmer PP. RGS Proteins: New players in the field of opioid signaling and tolerance mechanisms. Anesth Analg 2005; 100:1034-42.

RGS refers to Regulator of G protein Signaling. These are proteins which are involved in opioid signaling mechanisms. RGS proteins are known to negatively regulate G protein-mediated opioid signaling. This comprehensive review also looks at these proteins as future targets for drug therapy for acute and chronic pain.

Miscellaneous

Economics and Staffing

(1113) *** Miller RD. Academic anesthesia faculty salaries: incentives, availability, and productivity. Anesth Analg 2005; 100:487-9.

An interesting editorial accompanying Abouleish et al's paper on incentives. Professor Miller shares his own substantial experience within his own institution which now runs on clinical productivity based incentives to supplement faculty salaries. This system rewards clinical productivity and penalizes availability that is not clinically productive. In essence "productivity measures reward faculty independent of their rank and may enhance individual power".

(1114) *** Lubarsky DA. Incentivize everything, incentivize nothing. Anesth Analg 2005; 100:490-2.

Another editorial about productivity in the same issue of A&A. A more balanced view about incentives which explores in addition how academic goals can be rewarded within a clinical setting.

(1115) *** Abouleish AE, Apfelbaum JL, Prough DS et al. The prevalence and characteristics of incentive plans for clinical productivity among academic anesthesiology programs. Anesth Analg 2005; 100:493-501.

A national survey which takes an in depth look at how financial incentive plans (if any) are currently accommodated within academic anesthesiology departments. Perhaps the way forward, as the authors suggest, is to determine the goals each department considers essential to success including non-clinical goals (e.g. number of published peer reviewed papers) and then tailor any financial incentive plans accordingly.

(1116) *** Miller RD, Cohen NH. The impact of productivity-based incentives on faculty salary-based compensation. Anesth Analg 2005; 101:195-9.

The author's dept provided incentive and bonus salary based systems based on clinical productivity. Findings included narrowing of payments between assistant and full professor ranks.

Education/Residency/Registrar Training

(1117) *** Metro DG, Talarico JF, Patel RM, Wetmore AL. The resident application process and its correlation to future performance as a resident. Anesth Analg 2005; 100:502-5.

How do we predict success within our own residency programmes? The authors reviewed the interview scores of residents (n=18) accepted into the programme and then tried to correlate their performance, based on multiple criteria, during their residency. There was no correlation – the authors conclude that their residency selection programme failed to predict which applicants would eventually excel within the programme.

(1118) Anderson ER, Black R, Brocklehurst P. Acute obstetric emergency drill in England and Wales: a survey of practice. BJOG 2005; 112:372-5.

Telephone questionnaire survey of UK obstetric units. Almost 50% had such drills with many more developing them.

(1119) Baumgarten RK. Two-stage combined spinal epidural analgesia: a new paradigm for teaching obstetric anesthesia. Int J Obstet Anesth 2005; 14:367-8.

Letter about the advantages of the senior / staff anesthesiologist performing the spinal (for labor analgesia) first before allowing the resident to perform an epidural under optimum conditions for training purposes.

Ethics and Medicolegal Issues

(1120) Chervenak FA, McCullough LB. An ethical critique of boutique fetal imaging: A case for the medicalization of fetal imaging. Am J Obstet Gynecol 2005; 192:31-3.

Non-diagnostic use of USS to make fetal images is termed boutique fetal imaging. Apparently some centers can be found in shopping malls or even in a hospital setting to increase revenue streams! This article argues about the ethical issues when such images are presented to mothers without adequate physician input, especially when undiagnosed fetal abnormality may be present.

(1121) Cyna AM, Andrew MI, McAuliffe GL. The importance of patient autonomy at birth. Int J Obstet Anesth 2005; 14:365; author reply.

Letter about antenatal birth plans and associated ethical issues.

(1122) Tannsjo T. Negotiating ethics in anaethesia. Eur J Anaesthesiol 2005; 22:737-40.

Editorial exploring moral issues when faced with difficult issues with consent.

(1123) Bevan JC. Guidelines on the ethics of clinical research in anaesthesia. Curr Opin Anaesthesiol 2005; 18:189-94.

Review including information about clinical trial registration and consent for publication of case reports.

(1124) McCullough LB, Coverdale JH, Chervenak FA. A comprehensive ethical framework for responsibly designing and conducting pharmacologic research that involves pregnant women. Am J Obstet Gynecol 2005; 193:901-7.

An interesting discussion on the subject with an emphasis on how the pregnant patient should take into account her obligations to the fetus when consenting for this type of research.

(1125) *** Lupton M. Informed consent: can a patient ever be fully informed? Curr Opin Obstet Gynecol 2005; 17:601-4.

Excellent review about consent issues with recent major medicolegal cases concerning consent in the UK being discussed.

(1126) Dass M. Consent and caesarean section. Curr Obstet Gynaecol 2005; 15:60-4.

Case presentations and discussion about various consent issues in obstetrics as applied to the UK.

(1127) Mavroforou A, Koumantakis E, Michalodimitrakis E. Physicians' liability in obstetric and gynecology practice. Med Law 2005; 24:1-9.

The most common causes of medical litigation in obstetrics relate to fetal distress, uterine rupture after VBAC and shoulder dystocia.

Genetics

(1128) Allen PD. Anesthesia and the human genome project: the quest for accurate prediction of drug responses. Anesthesiology 2005; 102:494-5.

Editorial accompanying multiple papers (presented at the ASA 2004 journal symposium) in a special Anesthesiology edition on genetic work in anesthesia.

(1129) Kharasch ED. Special issue on pharmacogenomics and anesthesia: work presented at the 2004 journal symposium. Anesthesiology 2005; 102:493-4.

2nd editorial re genetic work.

(1130) Liem EB, Joiner TV, Tsueda K, Sessler DI. Increased sensitivity to thermal pain and reduced subcutaneous lidocaine efficacy in redheads. Anesthesiology 2005; 102:509-14.

Following a study showing that redheads are resistant to volatile agents, this showed that they were more sensitive to thermal pain and resistant to the analgesic effects of sc lidocaine. Mutations of the melanocortin-1 receptor may be implicated.

(1131) *** Palmer SN, Giesecke NM, Body SC et al. Pharmacogenetics of anesthetic and analgesic agents. Anesthesiology 2005; 102:663-71.

A review article which helps to clarify many of the terms and concepts in this rapidly expanding field of medicine.

(1132) Zaugg M, Schaub MC. Genetic modulation of adrenergic activity in the heart and vasculature: implications for perioperative medicine. Anesthesiology 2005; 102:429-46.

Detailed review on new genetic technologies, with an emphasis on genetic modulation of adrenergic activity, which have the potential for genotyping individuals to help individualize therapeutic approaches.

(1133) Samer CF, Piguet V, Dayer P, Desmeules JA. Genetic polymorphism and drug interactions: their importance in the treatment of pain. Can J Anesth 2005; 52:806-21.

Systematic review mainly focusing on metabolism of analgesic drugs.

(1134) *** Landau R. Pharmacogenetics: implications for obstetric anesthesia. Int J Obstet Anesth 2005; 14:316-23.

Good review article on the subject.

(1135) Landau R, Morales MA, Antonarakis SE et al. Arg16 homozygosity of the beta-2 adrenergic receptor improves the outcome after beta-2 agonist tocolysis for preterm labor. Clin Pharmacol Ther 2005; 78:656-63.

Study examining the pharmacogenetics of beta-2 AR agonist therapy for preterm labor. 60 women in preterm labor being treated with hexoprenaline were compared to 116 controls not in preterm labor. Being homozygous for Arg16 appears to improve the response to beat-2 agonist therapy.

(1136) Brandom BW. The genetics of malignant hyperthermia. Anesthesiol Clin North America 2005; 23:615-9.

Brief review of the genetic evaluation of RYR1 (ryanodine type 1 receptor) gene which is located on chromosome 19 for the diagnosis of MH. The author concludes that the test is unlikely to become a screening test, but may be useful in securing a diagnosis when there is a strong positive family history or well documented clinical events.

History

(1137) *** Modell JH. Assessing the past and shaping the future of anesthesiology: the 43rd Rovenstine Lecture. Anesthesiology 2005; 102:1050-7.

Good review of the specialty over many years with many political issues important to US anesthesiologists discussed.

(1138) Finster M, Wood M. The Apgar score has survived the test of time. Anesthesiology 2005; 102:855-7.

Historical perspective on Virginia Apgar's classic paper.

(1139) Chestnut DH. Efficacy and safety of epidural opioids for postoperative analgesia. Anesthesiology 2005; 102:221-3.

Historical commentary on a classic paper from 1980 by Dr Phillip Bromage – Dr Chestnut being an author on that paper himself.

(1140) Weinstein L. Syndrome of hemolysis, elevated liver enzymes, and low platelet count: A severe consequence of hypertension in pregnancy. Am J Obstet Gynecol 2005; 193:859 63.

A historical perspective about HELLP by the obstetrician who first described it in 1982.

(1141) *** Grant GJ, Grant AH, Lockwood CJ. Simpson, Semmelweis, and transformational change. Obstet Gynecol 2005; 106:384-7.

Excellent commentary about resistance to transformational change – how individuals resist change even when confronted with incontrovertible facts. This is illustrated by 2 changes which occurred in 1847; pain relief for childbirth (Simpson & Chloroform) and handwashing to reduce puerperal sepsis (Semmelweis).

(1142) Aldrete JA, Auad OA, Gutierrez VP, Wright AJ. Alberto Gutierrez and the hanging drop. Reg Anesth Pain Med 2005; 30:397-404.

Historical article about Gutierrez and his development of the hanging drop technique to identify the epidural space.

(1143) Barnett R. A horse named 'Twilight Sleep': the language of obstetric anaesthesia in 20th century Britain. Int J Obstet Anesth 2005; 14:310-5.

A historical article exploring the use of terms related to regional nerve block techniques in 2 papers from 1990 to 1999.

Research

(1144) Greenfield MLVH, Rosenberg AL, O'Reilly M et al. The quality of randomized controlled trials in major anesthesiology journals. Anesth Analg 2005; 100:1759-64.

Randomization methods and blinding of investigators collecting data need to be improved as well as adopting the CONSORT guidelines.

(1145) Avidan A, Weissman C, Sprung CL. An internet website as a data collection platform for multicenter research. Anesth Analg 2005; 100:506-11.

The authors set up a web site for data entry for a large multicentre trial (37 centers recruiting over 4,000 patients). The system proved to be highly effective.

(1146) Grimes DA, Schulz KF. Clinical research in obstetrics and gynecology: more tips for busy clinicians. Obstet Gynecol Surv 2005; 60:S53-69.

Topics discussed in this review (distilled from 5 Lancet articles in 2005) include sample size / power calculations, multiplicity issues in randomized controlled trials and likelihood ratios.

Websites/Books/Leaflets/Journal Announcements/Special articles

(1147) Tsen LC. Gerard W. Ostheimer "What's New in Obstetric Anesthesia" Lecture. Anesthesiology 2005; 102:672-9.

The paper is based on the 2004 SOAP lecture and concentrates in depth on 4 topics: preeclampsia, peripartum hemorrhage, the functional aspects of maternal pain and labor analgesia & ethics and consent issues around the delivery of care.

(1148) Tsen LC. What's new and novel in obstetric anesthesia? Contributions from the 2003 scientific literature. Int J Obstet Anesth 2005; 14:126-46.

A more detailed account of the Ostheimer 2004 SOAP lecture.

(1149) Waters JH, Ford P. What's old in obstetric anesthesia? Anesthesiology 2005; 103:907-8; author reply 8-9.

Letter in response to Lawrence Tsen's article.

(1150) *** Bucklin BA, Hawkins JL, Anderson JR, Ullrich FA. Obstetric anesthesia workforce survey: twenty-year update. Anesthesiology 2005; 103:645-53.

A national US survey carried out in 2001 with comparisons to similar national surveys in 1981 and 1992. Low response rate in common with similar surveys. Since 1992, the overall number of hospitals providing obstetric care has decreased but with more Stratum I hospitals (? 1,500 births). There was an increase in regional analgesia for labor despite a contracting anesthesia provider force (previous work has suggested a 75% fall in the number of US anesthesia graduates from 1,511 in 1994 to 400 in 2000). CSEs and ambulatory labor epidurals are uncommon techniques. Incredibly (from my personal perspective) obstetricians and independently practicing CRNA (certified registered nurse anesthetists) still provide regional analgesia for labor, although this was less common in the larger tertiary referral Stratum I hospitals.

(1151) Abstracts of the Society for Obstetric Anesthesia and Perinatology 37th Annual Meeting. May 4th-7th 2005. Palm Desert, California. Anesthesiology 2005; 102:B1.

(1152) Abstracts of the Obstetric Anaesthetists' Association Annual Meeting. 12-13 May 2005. Barbican Center, London, UK. Int J Obstet Anesth 2005;14 supplement:S1-S38.

(1153) Abstracts of the 24th Annual ESRA Congress. 14-17 September 2005. Berlin, Germany. Reg Anesth Pain Med 2005;30 - Supplement 1:1-53.

(1154) Abstracts of the Annual Meeting of the European Society of Anaesthesiology. 28-31 May 2005. Vienna, Austria. Eur J Anaesthesiol 2005; 22: Supplement. A1- A775.

(1155) Abstracts of the American Society of Regional Anesthesia and Pain Medicine Annual Spring Meeting & Workshops April 21–24, 2004 Toronto, Ontario, Canada. Reg Anesth Pain Med 2005;30:497-504.

(1156) Halpern SH, Douglas MJ. Evidence Based Obstetric Anesthesia Massachusetts, USA: Blackwells Publishing Ltd, 2005.

(1157) Obstetric Anesthesiology. ASA Newsletter 2005; 69:5-11.

Part of January 2005's issue devoted to OB topics including the SOAP International Outreach project, the new SOAP adverse complication tracking project, an update from the SOAP education committee and an update from David Birnbach on the ASA Committee on Obstetrical Anesthesia.

(1158) Horlocker TT. New Guidelines for antithrombotic therapy: making blood thinner than water. ASA Newsletter 2005; 69:5-7.

(1159) Percy L. Physician supervision of nurse anesthetists upheld by North Carolina appellate court. ASA Newsletter 2005; 69:30-1.

Poster Review #2

Moderator: Edward Riley, MD

Saturday, April 29, 2006
9:45 – 10:45 a.m.

Learner Objective: To discuss and review updates and advances in the practice of obstetric anesthesia.

SOAP A-55 **Oxytocin Requirements at Cesarean Section: An Opinion-Based Survey of Obstetricians**
V. Campitelli, A. J. Butwick, B. Carvalho, E. T. Riley, S. E. Cohen;
Stanford University Medical Center, Stanford, CA

SOAP A-56 **Comparison of Ropivacaine, Bupivacaine and Levobupivacaine Infusions for Labor Analgesia**
N. Sah, M. Vallejo, G. Mandell;
Magee Womens Hospital, Pittsburgh, PA

SOAP A-57 **Peripheral Venous Cannulation in Parturients Using Ultrasound Guidance**
D. B. Auyong, A. S. Habib, J. R. Schultz;
Duke University Medical Center, Durham, NC

SOAP A-58 **The Effect of Formal Patient Education on Patient-Controlled Epidural Analgesia During Labor**
B. Carvalho, S. Sarna, S. E. Cohen;
Stanford University School of Medicine, Stanford, CA

SOAP A-59 **What is the Best Skin Preparation Solution for Labour Epidural Analgesia? A Randomized Prospective Trial Comparing Chloraprep™, Duraprep™, and Chlorhexidine 0.5% in 70% Alcohol**
L. Crowley, R. Preston;
BC Women's Hospital, Vancouver, BC, Canada

SOAP A-60 **Maternal Serum Interleukin-6 Changes with Continuous vs. Intermittent Labor Epidural Analgesia**
V. R. Mantha, V. Ramesh, A. Daftary, M. Vallejo, S. Ramanathan;
Magee-Womens Hospital, Pittsburgh, PA

SOAP A-61 **Scrubs or Dress-Up in the Preoperative Clinic: Does it Matter?**
K. E. Nelson, P. Pan;
Wake Forest University, Winston-Salem, NC

SOAP A-62 **Minimum Local Analgesic Dose (MLAD) of 5 ml of Intrathecal Levobupivacaine and Ropivacaine, in Spontaneous Labouring Women**
R. Parpaglioni, M. Frigo, A. Lemma, G. Barbati, D. Celleno;
Fatebenefratelli General Hospital, Rome, Italy

Poster Review #2 (continued)

SOAP A-63 **Epidural Analgesia and the Incidence of Episiotomy**
S. K. Taylor, P. Weiss, S. R. Kimmel, C. A. Koller, A. Keller;
Lehigh Valley Hospital, Allentown, PA

SOAP A-64 **Fetal pH After Phenylephrine or Ephedrine Infusion Titrated to Maintain Systolic Blood Pressure at Cesarean Section Under Spinal Anesthesia**
K. J. Ashpole[1], R. Fernando[1], P. Tamilselvan[1], M. Columb[2];
[1]Royal Free Hospital, London, United Kingdom, [2]South Manchester University Hospital NHS Trust, Manchester, United Kingdom

SOAP A-65 **Peripartum Anesthetic Management of Patients with Aortic Stenosis**
A. Ioscovich[1], E. Goldszmidt[2], A. Fadeev[3], S. Halpern[1];
[1]SWCH, Toronto, ON, Canada, [2]MS, Toronto, ON, Canada, [3]SZMC, Jerusalem, Israel

SOAP A-66 **Safe Regional Anesthesia in ITP in Pregnancy – A Retrospective Study**
R. S. Agaram[1], M. J. Douglas[2], S. Fan[2];
[1]Glasgow Royal Infirmary, Glasgow, United Kingdom, [2]B C Women's Hospital, Vancouver, BC, Canada

SOAP A-67 **A Combination of Phenylephrine and Ephedrine Infusion Maintains Systemic Vascular Resistance and Prevents Post-spinal Hypotension in Cesarean Delivery**
L. Reed, R. Garrison, S. Sharma;
University of Texas southwestern medical center, Dallas, TX

SOAP A-68 **Epidural Catheter Insertion Depth and Labor Analgesia: A Retrospective Analysis**
W. L. Corbett, A. S. Habib;
Duke University Medical Center, Durham, NC

SOAP A-69 **A Randomized Double-blind Comparison of a 5 Unit Intravenous Oxytocin Bolus versus Placebo as a Strategy to Prevent Uterine Atony at Cesarean Section in Women who are at Increased Risk of Post-Partum Hemorrhage**
K. J. King, J. Douglas, W. Unger, A. B. Wong;
British Columbia Women's Hospital, Vancouver, BC, Canada

SOAP A-70 **Immediate Postoperative Complications: Elective versus Non-elective C-section**
M. M. Cardoso, A. R. Amaro, E. Lorenz, M. R. Rosa;
Hospital e Maternidade Santa Joana, Sao Paulo, Brazil

SOAP A-71 **Twenty Four-Hour Labor Epidural Analgesia Service Does Not Significantly Increase Workload at Midnight**
M. Namba, K. Terui, K. Yokota, N. Kariya, M. Tamura, H. Tsujihara;
Saitama Medical Center, Kawagoe, Japan

Poster Review #2 (continued)

SOAP A-72 **Ventilatory Support of Pregnant Patients with Respiratory Distress Syndrome**
A. Ioscovich, S. Grisaru-Granovsky, M. Hersch, M. Schimmel, A. Samueloff;
SZMC, Jerusalem, Israel

SOAP A-73 **Revisiting Epidural Demerol for Labor Analgesia**
J. M. Davies, B. K. Ross;
University of Washington Medical Center, Seattle, WA

SOAP A-74 **Anesthetic Interventions During Vaginal Twin Deliveries**
B. Carvalho, A. Saxena, A. Butwick, A. Macario;
Stanford University School of Medicine, Stanford, CA

SOAP A-75 **More Than Dural Puncture?**
An Analysis of Cranial Subdural Hematomas in Obstetrical Patients after Epidural Placement
M. J. Danic, D. J. Applefield, M. Brown;
Henry Ford Hospital, Detroit, MI

SOAP A-76 **Caffeine Significantly Decreases the Need for Epidural Blood Patch after Accidental Dural Puncture**
S. R. Desikan, R. G. Stacey;
Kingston Hospital, Kingston upon Thames, United Kingdom

SOAP A-77 **Management of a Pregnant Patient with Status Asthmaticus and Heroin Abuse**
M. C. DeAngelis, M. Vallejo;
University of Pittsburgh, Pittsburgh, PA

SOAP A-78 **Two Cases of Intracranial Venous Thrombosis Detected after Post-partum Epidural Blood Patch**
E. M. Lockhart, C. L. Baysinger, J. K. Boyle;
Vanderbilt University Medical Center, Nashville, TN

SOAP A-79 **A Typical Presentation of an Epidural Abscess in a Parturient**
T. L. Palumbo, S. D. Dumas;
University Hospitals of Cleveland, Case Western Reserve University, Cleveland, OH

SOAP A-80 **Epidural Labor Analgesia in a Patient with Unclassified von Willebrand's Disease**
A. J. Haas, B. Lewis;
University Hospitals of Cleveland, Case Western Reserve University, Cleveland, OH

SOAP A-81 **Where's the Catheter? Epidural Labor Analgesia in a Chronic Pain Patient with a Pump Implanted for Intrathecal Hydromorphone Therapy**
R. M. Truong, N. M. Scaccia, T. A. Davis, B. L. Leighton;
Washington University School of Medicine, Saint Louis, MO

Poster Review #2 (continued)

SOAP A-82 **Life-threatening Acute Peripartum Aortic Dissection in a Patient with Marfan Syndrome**
M. Harnett, B. S. Kodali, W. Camann;
Brigham and Women's Hospital, Boston, MA

SOAP A-83 **Case Report: Cesarean Section in a patient with Beckwith Wiedemann Syndrome**
E. A. Abou-Hassan, J. B. Schuitemaker R, L. A. López, I. J. Font A, P. Tejada;
Hospital Universitario de Caracas, Caracas, Venezuela

SOAP A-84 **Use of Norepinephrine in Pregnancy After Cardiopulmonary Bypass**
L. Cooper, M. Gabay, M. Barron, C. Gallagher;
University of Miami Miller School of Medicine, Miami, FL

SOAP A-85 **Anesthetic Management of a Partrient with Neurofibromatosis Type I vs. Type II**
W. T. Lennox, C. A. DeSimone;
Albany Medical College, Albany, NY

SOAP A-86 **Evaluation of Labor Epidural Information on the Internet**
E. Wayne, M. V. Greenfield, N. Naughton, L. S. Polley;
The University of Michigan Health System, Ann Arbor, MI

SOAP A-87 **Evaluation of Hand Hygiene Compliance Among Anesthesiology Residents on Labor and Delivery. Can Old Habits be Changed?**
M. A. Soens, L. Garcia, J. S. Ranasinghe, D. J. Birnbach;
University of Miami, Miami, FL

SOAP A-88 **Anesthesia for Cesarean Section in a Patient with Holt-Oram Syndrome**
A. Ioscovich, S. Halpern;
SWCH, Toronto, ON, Canada

Fred Hehre Lecture:

Lessons Learned from Obstetric Anesthesia

Introduction: William R. Camann, MD
Presenter: David Chestnut, MD

Saturday, April 29, 2006
10:45 – 11:45 a.m.

Learner Objective: Unavailable at the time of printing.

Frederick W. Hehre, MD

Best Paper Presentations

Moderator: Gordon Lyons, MD

Judges: William R. Camann, MD; Prof. Warwick Ngan Kee; Kiki Palacios, MD; Richard Smiley, MD, PhD

Saturday, April 29, 2006
1:00 – 2:30 p.m.

Learner Objective: To discuss and review updates and advances in the practice of obstetric anesthesia.

SOAP A-20 **Maternal Pneumoperitoneum with Carbon Dioxide Does Not Depress Near-Term Fetal Sheep Cerebral Oxygenation**
M. B. Moeller[1], K. Shimazutsu[1], D. J. McClaine[1], M. C. Jones[1], S. Eubanks[2], J. S. Stamler[1], J. D. Reynolds[1];
[1]Duke, Durham, NC, [2]University of Missouri, Columbia, MO

SOAP A-21 **3 Holes are Not Better than 1: A Randomized, Prospective Comparison of 2 Wire-reinforced Epidural Catheters for Labor Analgesia**
J. E. Spiegel, M. Chahal, A. Vasudevan, Y. Li, P. Hess;
Beth Israel Deaconess Medical Center, Boston, MA

SOAP A-22 **Neuropathic Injury To The Levator Ani Occurs In 1 In 4 Primiparous Women**
A. C. Weidner, V. Branham, M. M. South, K. L. McKiernan-Borawski, M. G. Jamison, H. A. Muir;
Duke University Medical Center, Durham, NC

SOAP A-23 **Tocolytic Desensitization: Plasmalemmal Sodium Calcium Exchanger (NCX) Activity and Function in Myometrial Cytosolic Free Calcium Concentration ([Ca2+]cyt) Oscillations and Relaxation**
M. K. Slodzinski;
Johns Hopkins University, Baltimore, MD

SOAP A-24 **MRI Following Neuraxial Analgesia. Can A Radiologist Determine What Is Pathologic?**
E. M. Davidson, L. Garcia, E. M. Sklar, R. G. Bhatia, I. M. Hernandez, J. Frohock, D. J. Birnbach;
Miller School of Medicine, University of Miami, Miami, FL

SOAP A-25 **Thromboembolism Risk Assessment: Guidelines Alone will not Change Practice!**
R. Ledger, R. Sashidharan;
The Royal London Hospital, London, United Kingdom

Panel: Obstetric Anesthesia and Coexisting Diseases

Moderator: Richard Wissler, MD, PhD

Panelists: Brendan Carvalho, MB, BCh;
Manuel Vallejo, DMD, MD;
Richard Wissler, MD, PhD

Saturday, April 29, 2006
2:30 – 4:00 p.m.

Learner Objective: The learner will be able to formulate an anesthetic plan based upon the pertinent pathophysiology of the pregnant patient with thrombocytopenia or other coagulation disorders, cardiac disease, and morbid obesity.

Cardiac Disease in the Pregnant Patient

Brendan Carvalho MBBCh, FRCA
Stanford University School of Medicine

An estimated 0.2-3% of pregnant patients have cardiac disease. Improved surgical techniques and advances in medical management have allowed more women with corrected congenital heart disease to survive to reproductive age. Cardiac disease is a leading cause of maternal mortality and is encountered with increasing frequency in pregnancy due to increases in maternal age and medical comorbidity. The inability to meet the additional demands imposed by the physiologic changes of pregnancy and parturition increase the risk of morbidity and mortality.

Lecture outline and objectives:

1. Physiology of pregnancy and parturition: To gain an understanding of normal hemodynamic changes during pregnancy, delivery, and the postpartum period as well as the impact these physiologic changes and additional cardiovascular stresses may have on a pregnant woman with heart disease.

2. Symptoms and signs of normal pregnancy compared with heart disease: To understand how symptoms of normal pregnancy can mimic cardiac disease and how to differentiate these normal changes of pregnancy from cardiac disease and cardiopulmonary decompensation.

3. General management principals of pregnant woman with heart disease:
   - Preconceptual counseling, early screening and regular follow-up of patients during pregnancy.
   - Multidisciplinary team approach in medical centers capable of managing high risk patients.
   - Anti-coagulation and antibiotic prophylaxis for infective endocarditis during pregnancy and parturition in the high risk parturient.
   - Peripartum monitoring: Monitoring should be appropriate to the patient's condition and underlying cardiac lesion. The potential benefits of invasive monitoring should be weighed against the risks associated with invasive line insertion.
   - Vaginal versus cesarean delivery in parturients with cardiac disease: The delivery plan should be individualized. Various potential options and contingency plans should be discussed early during pregnancy, preferably in a multidisciplinary team meeting. Vaginal delivery may be preferable if obstetrically indicated, however, limits to the duration should be discussed and preparations for a potential cesarean delivery considered. Assisted delivery is recommended to avoid prolonged pushing, a rapid expulsive phase, and Valsalva maneuvers.
   - Anesthetic technique: The advantages and disadvantages of various techniques will be discussed. Management options and anesthetic techniques must be individualized and based on the prevailing hemodynamic conditions and obstetric needs.
   - Uterotonic agents: Careful selection and administration of uterotonic agents is important to minimize potential cardiovascular effects from these agents.
   - The critical postpartum period: The immediate postpartum period is critical, especially if pulmonary hypertension is present. Most fatalities occur in the first week after delivery, but others occur as late as 3-4 weeks postpartum. Invasive monitoring should not be discontinued immediately after delivery and full therapeutic and monitoring support in a critical care setting should be provided. Postoperative pain management (e.g. epidural analgesia) is useful in reducing the cardiovascular stress response following cesarean delivery.
   - Managing and treating arrhythmias: Arrhythmias during pregnancy can lead to maternal hypotension and cardiac decompensation as well as fetal hypoperfusion and bradycardia. Electrical cardioversion and intravenous antiarrythmic agents should be used if the parturient is hemodynamically unstable. Anti-arrhythmic agents with a safety record in pregnant patients should be the first-line agents. However, maternal benefit from the anti-arrhythmic agents usually overrides the potential fetal risk in the acute setting. Electrophysiological catheter ablation procedures, implantable cardio-defibrillators and pacemakers are other options worth considering.
   - Cardiopulmonary resuscitation in a pregnant patient: Resuscitators must remember to relieve aortocaval compression; use the same emergency medication, dosages and defibrillator settings as for the non-pregnant patient; and perform a cesarean delivery

within minutes if initial resuscitation is unsuccessful to improve maternal as well as fetal outcome.

4. Discussion of important specific cardiac lesions focusing on general management principals and anesthetic options:
   - Peripartum cardiomyopathy
   - Peripartum ischemic heart disease and myocardial infarction
   - Aortic root dilation and dissection
   - Stenotic and regurgitant valve lesions
   - Congenital heart disease with pulmonary hypertension ± Eisenmenger's syndrome.

5. Recommended reading:
   Due to the rarity and complexity of many cardiac diseases presenting in pregnancy, there are no randomized controlled studies to guide our practice. For many of these cardiac lesions, case reports and reviews are the best evidence-based medicine available. However, management options and anesthetic techniques must be individualized and based on the prevailing hemodynamic condition and obstetric needs.

- Yeomans ER, Gilstrap LC. Physiologic changes in pregnancy and their impact on critical care. Crit Care Med 2005;33:S256-8
- Fujitani S, Baldisseri MR. Hemodynamic assessment in a pregnant and peripartum patient. Crit Care Med 2005;33:S354-61
- Ray P, Murphy GJ, Shutt LE. Recognition and management of maternal cardiac disease in pregnancy. Br J Anaesth 2004;93:428-39
- Klein LL, Galan HL. Cardiac disease in pregnancy. Obstet Gynecol Clin North Am 2004;31:429-59
- Tidswell M. Peripartum cardiomyopathy. Crit Care Clin 2004;20(4):777-88
- Murali S, Baldisseri MR. Peripartum cardiomyopathy. Crit Care Med 2005;33:S340-6
- Roth A, Elkayam U. Acute myocardial infarction associated with pregnancy. Ann Intern Med 1996;125(9):751-62
- Ladner HE, Danielsen B, Gilbert WM. Acute myocardial infarction in pregnancy and the puerperium: a population-based study. Obstet Gynecol 2005;105:480-4
- Immer FF, et al. Aortic dissection in pregnancy: analysis of risk factors and outcome. Ann Thorac Surg 2003;76(1):309-14
- Bonnin M, et al. Severe pulmonary hypertension during pregnancy. Anesthesiology 2005;102:1133-7
- Warnes CA. Pregnancy and pulmonary hypertension. Int J Cardiol 2004;97 Suppl 1:11-3
- Martin JT, Tautz TJ, Antognini JF. Safety of regional anesthesia in Eisenmenger's syndrome. Reg Anesth Pain Med 2002;27(5):509-13

Practice Guidelines:

- ASRA: Regional anesthesia in the anticoagulated patient: defining the risks. Reg Anesth Pain Med 2003;28:172-97
- ACC and AMA Practice Guidelines: Circulation 1998;98(18):1949-84
- European Society of Cardiology: Expert consensus document on management of cardiovascular diseases during pregnancy. Eur Heart J 2003;24:761-81
- European Society of Cardiology: Management of grown up congenital heart disease. Eur Heart J 2003;24:1035-84

Books:

- Datta S. Anesthetic and Obstetric Management of High-Risk Pregnancy, 3rd edn. Springer-Verlag, 2004.
- Gambling DR, Douglas MJ, Day L. Obstetric Anesthesia and Uncommon Disorders, 1st edn, Elsevier Health Sciences, 1997 (2nd edn in press).
- Hughes SC, Levinson G, Rosen MA. Shnider and Levinson's Anesthesia for Obstetrics, 4th edn. Lippincott Williams & Wilkins, 2001.
- Why Mothers Die. Report on Confidential Enquiries into Maternal Deaths in the United Kingdom 2002-2004.London: RCOG Press, 2004.

Online Resources: Online resources are often readily available, current and generally underutilized. Useful online sites include UpToDate, SKOLAR, and MD Consult.

Thrombocytopenia and Other Disturbances of Coagulation

Manny Vallejo, M.D.
Associate Professor, University of Pittsburgh
Director, Obstetric Anesthesia
Magee-Womens Hospital

Hemostasis

- **Hemostasis involves 3 processes:**
  - 1) **Primary hemostasis** - initial platelet aggregation
  - 2) **Coagulation** - coagulation factors form fibrin mesh at the site of injury; platelets vital to formation of fibrin clot
  - 3) **Fibrinolysis** – the conversion of plasminogen to plasmin ⇒ degrades fibrin clots

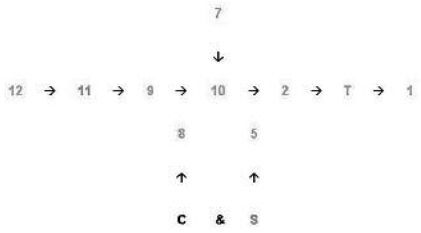
Coagulation Process

- Platelet adhesion involves interaction of von Willebrand's factor (VWF) and collagen with glycoprotein receptor 1b
- Stimulated platelets release factors that augment aggregation
- **Thrombin** - potent aggregator of platelets
- **Platelet Factor 3** - converts prothrombin to thrombin
- Cross-linking of fibrinogen + fibrin + platelets ⇒ hemostatic plug; requires activation of glycoprotein IIb/IIIa receptors

Hemostatic Changes in Normal Pregnancy

- Pregnancy is a **hypercoagulable** state - most marked around term and immediately post partum
- All blood coagulation factors except **XI** (60%) and **XIII** (50%) increase in pregnancy
- DVT's, thromboembolism, pulmonary embolism

Coagulation System



Fibrinolysis

- Release of tissue plasminogen activator (tPA) from the endothelial cells
- tPA - driven by fibrinogen and thrombin formation
- Plasma fibrinolytic activity ↓ during pregnancy (↑ plasminogen activator-1, ↓ plasminogen activator inhibitor-2)

Pregnancy Associated Thrombocytopenia (PAT)

- 5-10% incidence in pregnancy
- Normal = 150-400K; platelet counts ↓ ~ 20% during normal pregnancy
- PAT < 150K
  - Mild = 100-150K
  - Moderate = 50-100K
  - Severe < 50K
- ↑ platelet destruction or ↓ platelet production

Platelet Disorders

- **Quantitative**
- Bone marrow damage (XRT, Chemotherapy)
- Sequestered (spleen)
- Consumed (vasculitis, DIC)
- Diluted (massive transfusion)
- Destroyed (immune mechanisms)

- **Qualitative**
- VWds
- Renal disease
- Alcohol abuse
- ASA use/abuse
- DIC
- Fibrinolytic therapy
- Severe liver disease

Causes of Pregnancy Associated Thrombocytopenia (PAT)

- **Incidental or Gestational Thrombocytopenia**
- **Pseudothrombocytopenia (laboratory artifact with EDTA anticoagulant)**
- **Disorders with increased platelet consumption**
- **Immune Thrombocytopenic Purpura (ITP)**
- **Pregnancy induced hypertension/HELLP syndrome**
- **Thrombotic Thrombocytopenic Purpura (TTP)**
- **Hemolytic Uremic Syndrome (HUS)**
- **Infection-associated (HIV, malaria)**
- **Drug-induced (heparin, sulphonamides, penicillin, rifampicin, quinine)**
- **Systemic Lupus Erythematosus (SLE)**
- **Antiphospholipid Syndrome**
- **Disseminated Intravascular Coagulation (DIC)**
- **Amniotic Fluid Embolism**
- **Disorders with reduced platelet production**
- **Congenital Thrombocytopenia**
- **Aplastic anaemia, Leukaemia, Myelodysplasia**

Major Causes of Thrombocytopenia During Pregnancy†

Spurious, due to EDTA-induced platelet aggregation
Gestational thrombocytopenia
Preeclampsia-eclampsia, including HELLP syndrome
Autoimmune thrombocytopenia (idiopathic or related to drugs, systemic lupus erythematosus, antiphospholipid antibodies, or HIV)
Disseminated intravascular coagulation
Thrombotic thrombocytopenic purpura-Hemolytic uremic syndrome
Congenital platelet disorders
Bone marrow disease
Hypersplenism

† Adapted from Guidelines for the investigation and Management of Idiopathic Thrombocytopenic Purpura in Adults, Children and in Pregnancy. Br J Haematol 2003; 120:574.

Gestational or Incidental Thrombocytopenia

- Most common cause, accounts for 75% of all PAT
- 5-8% incidence, < 70K, occurs in late 2nd or 3rd trimester
- Returns to normal within 12 wks post delivery
- Diagnosis of exclusion – no specific diagnostic test available
- Not at ↑ risk for maternal or fetal hemorrhage

Immune Thrombocytopenic Purpura (ITP)

- 1:1000 incidence, 5% of PAT
- Hx of easy bruising, petechiae, epistaxis, and gingival bleeding
- Immune mediated platelet destruction with ↑ in circulating megathrombocytes
- IgG antiplatelet antibodies (80%) that recognize platelet membrane glycoproteins
- 1st trimester
- Diagnosis of exclusion with 4 prominent features:
  - 1) platelet count < 100K, 2) normal or ↑ megakaryocytes, 3) absence of splenomegaly, 4) exclusion of systemic disease or drugs known to cause thrombocytopenia

ITP Treatment

- > 50K is adequate
- Platelet transfusion for platelets < 20K
- Steroid therapy – prednisone, betamethasone, dexamethasone
- Intravenous immunoglobulin (IVIG)
- Splenectomy – most effective treatment for severe symptomatic ITP
- Consequences – maternal hemorrhage and neonatal (intracranial) hemorrhage

Preeclampsia

- 7-10% incidence, 21% of all PAT, 15% develop thrombocytopenia
- 10-25% of preeclamptic patients with a **normal** platelet count have an abnormal bleeding time
- Platelet life span is ↓ to 3-5 days
- Altered platelet membrane accelerates aggregation and destruction
- Frequency + severity of thrombocytopenia ↑ with severity of preeclampsia, HELLP syndrome, and eclampsia

Platelet Count in Preeclampsia

- > 150K - usually no problem
- < 150K - coagulation effects occur
- 50-100K - coagulation disorders detected
- If platelet count < 150K before admission, **50%** chance platelet count will < 100K during admission
- **50%** of preeclamptic patients have thrombocytopenia which can precede other manifestations of the disease

Thrombotic Thrombocytopenic Purpura (TTP)

- Characterized by:
  - 1) microangiopathic hemolytic anemia
  - 2) thrombocytopenia
  - 3) central neurological abnormalities
  - 4) fever
  - 5) renal dysfunction
- Pregnancy is a predisposing factor
- 2nd trimester, 1:25,000 incidence
- Neurological abnormalities are more pronounced
- No improvement post delivery

Hemolytic Uremic Syndrome (HUS)

- 1:25,000 incidence
- Clinical manifestations similar to TTP
- Renal dysfunction is more severe
- 90% of HUS occur post partum
- No improvement post delivery
- Plasma exchange is successful 75% of the time
- Chronic renal failure and HTN are long-term complications

Table 2 Clinical and laboratory features of HELLP, TTP, HUS.

Feature	HELLP	TTP	HUS
Time of presentation	>37 weeks	mid-trimester	postpartum
CNS signs	variable	severe	rare
Renal failure	variable	mild	severe
Hepatic dysfunction	definite	nil	nil
Fever	nil	present	nil usually
Purpura	nil	severe	nil usually
Decreased platelets	mild–moderate	severe	moderate
Creatinine increase	mild	mild	large
AST/ALT increase	increase	no change	no change
LDH increase	mild	marked	marked
Hyaline thrombi	+ –	+ +	+ +
Post-partum improvement	yes	nil	nil

HELLP = 'Haemolysis, Elevated Liver enzymes, Low Platelets'. TTP = thrombotic thrombocytopenic purpura. HUS = haemolytic uraemic syndrome. AST = aspartate aminotransferase. ALT = alanine aminotransferase.

Acute Fatty Liver of Pregnancy (AFLP)

- Mild microangiopathic hemolysis and thrombocytopenia
- 1:5,000-10,000 pregnancies, Primes
- S/S: malaise, nausea, epigastric and right upper quadrant pain, dyspnea, cholestatic liver abnormalities, hypoglycemia, ↓ levels of fibrinogen and antithrombin
- 75% of cases have laboratory evidence of DIC
- Treatment – supportive with emphasis on correction of hypoglycemia, coagulopathy, and electrolyte imbalances

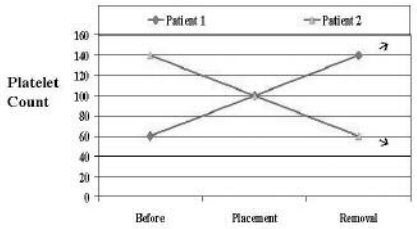
Other Causes of PAT

- **DIC** – associated with placental abruption, AFE, uterine rupture, IUFD, and thrombocytopenia
- **SLE** – 14-25% of patients develop thrombocytopenia
- **Antiphospholipid Syndrome** - 28-42% of SLE patients have antiphospholipid syndrome or lupus anticoagulant
- **Drug induced** – Quinidine and Sulphonamides
- **Type IIb von Willebrand disease**
- **HIV infection**
- **Pseudo-thrombocytopenia** – in vitro platelet clumping due to EDTA anticoagulant

A platelet count of 75-80K is the cut-off for placement of an epidural catheter

- Cousins and Bromage (1988)
  - bleeding time is **prolonged** < 100K
- Considerations
  - **Static vs Dynamic**
  - **Platelet function (normal vs abnormal)**
  - ITP, gestational thrombocytopenia, preeclampsia
- Platelet Tests
  - Bleeding time – **unreliable** risk at other sites, wide observer variation
  - TEG – **no "clinical"** evidence that a normal TEG **= safe epidural** (does not measure initial platelet adhesion to exposed collagen in the damaged vessel)
  - Aggregometry (platelet function analyzer – closure time)
  - Flow Cytometry ⇒ requires a basic science laboratory

Platelet Count + Epidural Placement



Normal TEG

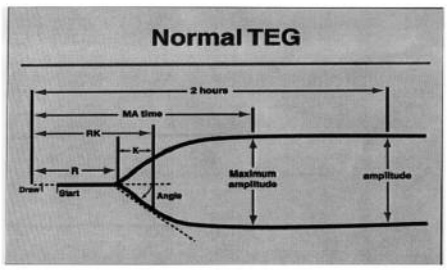


Fig. 1. Thromboelastogram (TEG): R, time until the onset of clotting; K, time until the tracing amplitude reaches 20 mm; Angle, the angle between the tangent line drawn from the curve to the split point and the tracing's horizontal line, in degrees; MA, measures the maximum amplitude, a measure of clotting strength.

Thrombocytopenia

- **Beilin et al** - reviewed 80 charts who had an epidural with platelet counts between **69-100K** ⇒ **No** neurological complications
- **UK and USA Survey** – most anesthesiologist would place an epidural between **80K-100K**
- **20K** ≤ Spontaneous bleeding
- **50K** ≥ Surgical Hemostasis
- **50K** ⇒ ITP and gestational thrombocytopenia
- **75-100K** ⇒ preeclampsia

Beilin Y. Anesth Analg 1997; 85: 385-8
Beilin Y. Anesth Analg 1996; 83: 735-41

Spinal or Epidural Hematoma

- Incidence of 1:150,000 - 1:200,000
- **61** cases of **anesthesia related** spinal hematoma
  - **68%** had a coagulopathy
  - **75%** had epidural anesthesia
  - **50%** developed hematoma **after** epidural removal

Vandermeulen EP. Anesth Analg 1994; 79: 1165-77.

Physical Exam

- **Platelet vascular disorders** - present with bruises, petechiae, or with superficial bleeding and mucosal bleeding
- **Factor deficiency** - deep tissue bleeding; time dependent
- **Surgical history** – a patient who has had major surgery without a blood transfusion is unlikely to have significant hereditary disease

ASA & NSAID's

- **Inhibits synthesis of thromboxane-A_2 for life of the platelet**
- **Effectiveness is dose related - higher doses do not improve efficacy**
- **Low risk for bleeding complications**
- **Bleeding time not recommended**
- **Interactions with other anticoagulants is a more serious matter**
- **Not a contra-indication**
- **NSAID's**
- **Inhibits cycoloxgenase temporarily (16-24 hr)**
- **Can prolong bleeding time**

Subcutaneous Heparin

- Usually not a clinical issue
- 5000-U, peak effect in 1 hr, 4-6 hr duration of action, aPTT
- Regional anesthesia not contraindicated
- Administer SQ heparin 1 hr post catheter insertion

Heparin-Induced Thrombocytopenia

- HIT
- 15% incidence in exposed patients
- Manifested by low or falling platelet count
- Exhibit heparin resistance
- Thrombosis of distal arteries (digits, toes)
- Tx - remove offending agent, consider alternative anticoagulants, avoid platelet transfusion
- Hirudins - extract of leech saliva, for heparin allergy

LMWH

- More bioavailability (90%) than regular heparin
- ASRA recommendations
  - Concomitant anticoagulants or antiplatelet agents potentiate bleeding
  - Single shot spinal may be the **safest** choice
  - Preoperative LMWH, neuraxial anesthesia should occur at least **10 to 12** hours **after** the last LMWH dose. Patients who receive higher doses of LMWH (enoxaparin 1 mg/kg twice a day), require waiting **24 hours**.
  - Remove epidural catheter ≥ **10-12 hr** after administration of last dose of LMWH
  - First dose ≥ **24 hr** after neuraxial anesthesia
  - First dose ≥ **2 hr** after removing epidural catheter
  - If blood is seen during needle or catheter placement, the first dose of LMWH should be delayed for **24** hours
  - Monitoring anti-Xa levels not recommended

Herbal Medications

- Ginseng, Garlic, and Gingko
- In and of themselves is not an absolute contraindication
- May have clinical effects especially in combination with other anticoagulants

Ticlopidine (Ticlid®)

- Inhibits platelet aggregation (Interferes with interaction of VWF and fibrinogen on platelet surface
- No effect on platelet cyclooxygenase system
- Prolongs bleeding time
- Extremely effective, irreversible, and dose-time dependent
- Associated with epidural hematoma
- Antiplatelet action may last up to **2 weeks**
- Discontinue **5 to 10 days** before epidural insertion

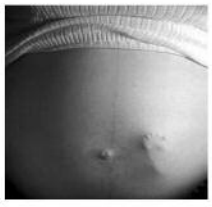
Clopidogrel (Plavix®)

- Inhibits platelet aggregation
- Extremely effective, irreversible, and dose-time dependent
- Associated with epidural hematoma
- Antiplatelet action may last up to **2 weeks**
- Discontinue **5 to 10 days** before epidural insertion

Fondaparinux Heparin

- Most effective portion of heparin
- Highly effective anti-Xa drug
- No regional anesthesia in presence of this drug

Thank You!



Open Forum: Proposed Revisions to the ASA Practice Guidelines on Obstetric Anesthesia

Saturday, April 29, 2006
4:00 – 5:00 p.m.

Scientific Program

SUNDAY, APRIL 30, 2006

7:00 - 7:30 am	**Continental Breakfast**
7:30 - 8:30 am	**Panel: Tort Reform** Moderator: Donald Penning, MD, MSC, FRCPC Panelists: Patricia Dailey, MD; Andrew Harris, MD, MHS; A. Terry Walman, MD, JD
8:30 - 9:30 am	**PRO/CON Debate: Supplemental Oxygen Should Be Used Routinely During Cesarean Section** Moderator: David J. Birnbach, MD Pro: Scott Segal, MD Con: Prof. Warwick Ngan Kee
9:30 - 10:30 am	**Poster Case Reports: You did What? The Best Case Reports of the Year!** Moderator: Robert McKay, MD
10:30 am	**Adjournment**

NOTES

Panel: Tort Reform

Moderator: Donald Penning, MD, MSC, FRCPC

Panelists: Patricia Dailey, MD;
Andrew Harris, MD, MHS; A Terry Walman, MD, JD

Sunday, April 30, 2006
7:30 – 8:30 a.m.

Learner Objective: The learner will be able to describe recent developments to tort reform at the State and Federal Level.

PRO/CON Debate: Supplemental Oxygen Should Be Used Routinely During Cesarean Section

Moderator: David J. Birnbach, MD

PRO: Scott Segal, MD
CON: Prof. Warwick Ngan Kee

Sunday, April 30, 2006
8:30 – 9:30 a.m.

Poster Case Reports: You Did What? The Best Case Reports of the Year!

Moderator: Robert McKay, MD

Sunday, April 30, 2006
9:30 – 10:30 a.m.

Learner Objective: To discuss and review updates and advances in the practice of obstetric anesthesia.

SOAP A-89 **Subarachnoid Hemorrhage in a Previously Healthy Pre-Term Parturient**
C. P. Clinkscales, R. L. Dunkailo, K. K. Wilkins, M. V. Greenfield, L. S. Polley;
University of Michigan Health System, Ann Arbor, MI

SOAP A-90 **Thoracolumbar Epidural Abscess after Combined Spinal-Epidural for Labor and Tubal Ligation**
J. Chalasani, T. A. Davis, L. H. Bottros, S. Snow, B. L. Leighton;
Washington University School of Medicine, St.Louis, MO

SOAP A-91 **Anesthesia Management of a Parturient with Arrhythmogenic Right Ventricular Dysplasia and an Implantable Cardiac Defibrillator Undergoing Cesarean Delivery**
V. A. Campitelli, B. Carvalho, L. Roland, E. T. Riley;
Stanford University Medical Center, Stanford, CA

SOAP A-92 **Excision of a Large Pheochromocytoma with Fetal Preservation in a Parturient**
R. L. Dunkailo, C. P. Clinkscales, K. K. Wilkins, M. V. Greenfield, D. W. Healy;
University of Michigan Health System, Ann Arbor, MI

SOAP A-93 **Can PUPPP Increase the Risk of an Epidural Abscess?**
K. C. Cummings, J. A. Dolak;
Cleveland Clinic Foundation, Cleveland, OH

SOAP A-94 **Epidural Labor Analgesia in a Patient with Pemphigoid Gestationis**
L. Roland, J. Collins, B. Carvalho;
Stanford University Medical Center, Stanford, CA

SOAP A-95 **Successful Vaginal Delivery Following Total Spinal Anesthesia During Labor**
D. G. Mann, B. E. Groff, J. M. Nicholson, J. G. Hecker, V. A. Arkoosh;
University of Pennsylvania, Philadelphia, PA

Poster Case Reports (continued)

SOAP A-96 **When Transfusion Leads to Life-Threatening Anemia: Hyperhemolysis in a Parturient with Sickle Cell Disease**
N. M. Scaccia, B. L. Leighton;
Washington University School of Medicine, St. Louis, MO

SOAP A-97 **Ex Utero Intrapartum Treatment Procedure in a Patient with Arthrogryposis Multiplex Congenita via Continuous Spinal Anesthetic and Intravenous Nitroglycerine for Uterine Relaxation**
J. G. Benonis, A. S. Habib;
Duke University Medical Center, Durham, NC

SOAP A-98 **Posterior Reversible Encephalopathy Syndrome (PRES): A Complicated Case of Post-Partum Headache**
T. Torrillo, D. J. Bronster, Y. Beilin;
Mount Sinai School of Medicine, New York, NY

SOAP A-99 **Transient Paraplegia After Neuraxial Labor Analgesia: A Case Report.**
T. A. Wafa, C. A. Wong;
Northwestern University, Chicago, IL

SOAP A-100 **Uterine Inversion and Postpartum Hemorrhage Treated with Recombinant Factor VIIa**
A. J. Butwick, M. L. Kolz, E. Riley;
Stanford University School of Medicine, Stanford, CA

SOAP A-101 **Anaesthesia for Caesarean Section in a Case of Spina Bifida and Pierre-Robin Sequence**
G. Mc Dermott, R. O'Donoghue, C. Mc Caul, C. A. Daly;
Waterford Regional Hospital, Waterford, Ireland

SOAP A-102 **Right Ventricular Thrombus in a Patient with Severe Pre-eclampsia**
P. Agudelo-Suarez, J. N. Pulido, J. N. Bakkum, C. H. Rose, G. M. Vasdev;
Mayo Clinic College of Medicine, Rochester, MN

SOAP A-103 **Pulmonary Artery Hypertension During Pregnancy**
K. E. Stack, C. L. Sullivan, R. Y. Gershon;
Emory University School of Medicine, Atlanta, GA

SOAP A-104 **Nitrous Oxide as a Cause of Internal Iliac Artery Occlusion Balloon Rupture**
K. M. Kuczkowski, U. B. Eisenmann;
University of California, San Diego, San Diego, CA

SOAP A-105 **Modified Rapid Desensitization in Obstetric Patient with Needle Phobia**
A. Briskin, A. Ioscovich, S. Halpern;
SWCH, Toronto, ON, Canada

SOAP A-106 **Anesthetic Management of Labor and Delivery in Congenitally Corrected Transposition of the Great Arteries**
K. W. Arendt, W. J. Watson, H. M. Connolly, M. O. Kinney, J. R. Hebl, P. A. Craigo;
Mayo Clinic, Rochester, MN

SOAP thanks the following Exhibitors for their support of the 2006 Annual Meeting

Exhibit Hall Hours:
Thursday, April 27, 7:00 a.m. – 4:00 p.m.
7:00 – 7:45 a.m. Breakfast with Exhibitors; Posters
9:45 – 10:15 a.m. Coffee with Exhibitors; Posters
12:30 – 1:30 p.m. Lunch with Exhibitors
3:30 – 4:00 p.m. Coffee with Exhibitors; Posters

Friday, April 28, 7:00 a..m. – 10:30 a.m.
7:00 – 8:00 a.m. Breakfast with Exhibitors
10:00 – 10:30 a.m. Coffee with Exhibitors

B. Braun Medical Inc. **Booth #200**
Bethlehem, PA

B. Braun Medical offers a full range of regional anesthesia products like the Perifix® FX springwound epidural catheter, Espocan® CSE sets with Docking System, Pencan® pencil point spinal needles, Perifix® Safety Epidural Needle, Stimuplex® and Contiplex® peripheral nerve block products. For PCEA, B. Braun's Curlin CMS4000 Pump offers programming convenience.

BD **Booth #209**
Franklin Lakes, NJ

BD features the broadest array of safety-engineered injection products, IV and PICC catheters, anesthesia needles and trays, surgical blades/scalpels, sharps disposal, skin preps, scrubs and flush syringes.

Diagnostic Ultrasound Corporation **Booth #104**
Bothell, WA

Diagnostic Ultrasound (DU), markets innovative airway management instruments and standard of care, handheld ultrasound devices. Designed for 1st Pass Success, the GlideScope® Video Laryngoscope offers a consistently clear view of the airway, enabling quick intubation. The innovative design makes GlideScope® less traumatic for patients than traditional methods, and it is easy to learn and use.

Elsevier **Booth #101**
Philadelphia, PA

Elsevier is the leading international publisher of medical journals, books and electronic products. Journals on display include International Journal of Obstetrics and Gynecology and others. Please stop by our booth and view our outstanding selections in the field of obstetric anesthesia and perinatology.

Endo Pharmaceuticals **Booth #201**
Chadds Ford, PA

We are specialty pharmaceutical company with an established leadership in pain management. We research, develop and market prescription pharmaceuticals used primarily to treat and manage pain and are expanding our presence in complementary areas.

Indigo Orb, Inc. / Episure **Booth #105**
Santa Clara, CA

Automatic Loss of Resistance (LOR) syringe for visual and objective detection of the epidural and peritoneal cavities by use of an engineered spring mechanism.

International Medical Development **Booth #106**
Huntsville, UT

Innovative Needles for Anesthesiology

Jawalekar C.S.E. model **Booth #202**
Charleston, WV

Jawalekar C.S.E. model is a simulator designed for teaching/learning epidural and combined spinal epidural anesthesia. The feel of loss of resistance, dural puncture, and placement of epidural catheter mimics the clinical situation. The procedure for measuring the length of the epidural catheter in the epidural space can also be demonstrated.

Lippincott, Williams & Wilkins **Booth #204**

Lippincott Williams & Wilkins is the proud publisher of Obstetric Anesthesia Digest. SOAP members receive a discounted rate of over 70% on this valuable resource. Visit our booth to review our entire product line; including essential references such as Drs. Barash, Cullen, and Stoelting's brand-new Clinical Anesthesia, Fifth Edition.

Masino **Booth #110**
Irvine, CA

Masimo is the inventor of motion and low perfusion tolerant pulse oximetry. Over 70 independent studies demonstrate the superior performance of Masimo SETT pulse oximetry. Masimo now introduces Rainbow SET Pulse CO-OximetryT, which adds the ability to measure carboxyhemoglobin and potentially other parameters such as methemoglobin and fractional saturation.

Ortho-McNeil, Inc. **Booth #207**
Raritan, NJ

PriCara, Unit of Ortho-McNeil, Inc. provides innovative pharmaceutical products to healthcare professionals and is committed to ongoing research and development. Please stop by the PriCara Booth to discuss our products with our professional sales representatives.

PDL BioPharma **Booth # 108**

Cardene® I.V. (nicardipine hydrochloride) is approved in the United States for the short-term treatment of hypertension when oral therapy is not feasible or desirable. Cardene I.V. is the only intravenous calcium channel blocker (calcium ion influx inhibitor) for this indication. Cardene I.V. offers rapid, precise blood pressure control and has been proven to be as effective as sodium nitroprusside with fewer dose adjustments (1). Cardene I.V. is administered directly into the bloodstream, so it can be distributed to the tissues faster than orally administered drugs. This route of administration is critical in patients who are:

- Experiencing acute hypertension or hypertension requiring a fast-acting drug
- NPO (nothing by mouth) for surgery
- Unable to swallow a pill
- Intubated

PharMEDium Services, LLC **Booth #102**
Lake Forest, IL

PharMEDium is a leading provider of outsourced pharmacy compounded admixtures. We provide trusted solutions to more than 1400 hospitals nationwide. Supported Specialty Services include: Pain Management, Labor and Delivery, Cardiovascular/Cardioplegia, Electrolyte Solutions, and Renal Replacement Solutions.

Sheridan Healthcare **Booth #205**
Sunrise, FL

Sheridan Healthcare Inc. is a National Physician Owned and Managed Group that provides Anesthesia Services for over 58 Anesthesia Practices. Our practice settings range from Community Based Facilities, to Tertiary Care Centers, Children's Hospitals and Ambulatory Surgical Centers. The locations include: Arkansas, Colorado, Connecticut, Florida, Louisiana, Maryland, Pennsylvania, Missouri and Texas. Please contact D.R Richards, our Recruiting Manager at (800) 816-6791 or recruitment@shcr.com to discuss your career goal. www.sheridanhealthcare.com

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Smiths Medical **Booth #100**
St. Paul, MN

Smiths Medical MD, Inc., manufactures the CADD-Prism(r) PCSII infusion pump for hospital post-op pain programs; along with a full range of regional anesthesia products for the intraoperative, postoperative, and chronic pain markets. For additional information, visit Smiths Medical's web site at www.smiths-medical.com.

US Army Healthcare Recruiting **Booth #103**
Gainesville, FL

The Army and Army Reserves provide numerous opportunities for adventure, advancement and experience in many of the healthcare fields. Are you up to the challenge? Stop by the U.S. Army Healthcare Recruiting Booth to see if you qualify. CPT Jeff Hillis • Florida Healthcare Recruiting Team OIC • 3101 Maguire Blvd, Suite 166A Orlando, FL 32803 • (407) 896-4288 (o) • (888) 568-7579 (c) • (407) 894-7528 (f) JEFFREY.HILLIS@USAREC.ARMY.MIL

NOTES

Society for Obstetric Anesthesia and Perinatology

Future Meetings

SOAP 39th Annual Meeting
Fairmont Banff Springs
"Castle in the Rockies"
Alberta, Canada
May 16-19, 2007

SOAP 40th Annual Meeting
Renaissance Chicago Hotel
Chicago, Illinois
April 30 - May 4, 2008

SOAP 41st Annual Meeting
Renaissance Washington DC Hotel
Washington, District of Columbia
April 29 - May 3, 2009

Society for Obstetric Anesthesia and Perinatology

39th Annual Meeting
Fairmont Banff Springs
"Castle in the Rockies"
Alberta, Canada
May 16-19, 2007

Abstract submission site available
November 2006 • www.soap.org

Appendix 3

Published Abstracts of SOAP Annual Meeting in *Anesthesiology*

Society for Obstetric Anesthesia and Perinatology

Abstracts of Scientific Papers presented at the 38th Annual Meeting

April 26-30, 2006

The Westin Diplomat Resort & Spa

Hollywood, Florida

Abstract Supplement

Society for Obstetric Anesthesia and Perinatology
2 Summit Park Drive, Suite 140 • Cleveland, Ohio 44131
Phone: 216-447-7863 • Fax: 216-642-1127 • Email: soaphq@soap.org • Web: www.soap.org

Society for Obstetric Anesthesia and Perinatology

39th Annual Meeting
May 16-19, 2007

The Abstract submission site will be available
November 2006 • www.soap.org

Abstracts of Scientific Papers

presented at the
Society for Obstetric Anesthesia and Perinatology
38th Annual Meeting
April 26-30, 2006

The Westin Diplomat Resort & Spa
Hollywood, Florida

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Wichita, KS

Yaakov Beilin, MD
Mount Sinai School of Medicine
New York, NY

David J. Birnbach, MD
University of Miami School of Medicine
Miami, FL

Brenda Bucklin, MD
University of Colorado
Denver, CO

William R. Camann, MD
Brigham & Women's Hospital
Boston, MA

Brendan Carvalho, MB, BCh
Stanford University Hospital
Stanford, CA

Jose Carvalho, MD, PhD, FRCPC
Mount Sinai Hospital
Toronto, Ontario, Canada

David Chestnut, MD
Gunderson Clinic
LaCrosse, WI

Patricia A. Dailey, MD
Mills-Peninsula Health Services
Hillsborough, CA

M. Joanne Douglas, MD, FRCP
British Columbia Women's Hospital
Vancouver, British Columbia, Canada

Roshan Fernando, FRCA
Consultant Anesthesiologist
Royal Free Hospital
London, England, United Kingdom

Helene Finegold, MD
Magee Women's Hospital
Pittsburgh, PA

Regina Fragneto, MD
University of Kentucky
Lexington, KY

Robert Gaiser, MD
University of Pennsylvania
Philadelphia, PA

Stephen Halpern, MD
University of Toronto
Toronto, Ontario, Canada

Andrew Harris, MD, MHS
Johns Hopkins University
Baltimore, MD

Joy L. Hawkins, MD
University of Colorado
Denver, CO

David L. Hepner, MD
Brigham & Women's Hospital
Boston, MA

Philip Hess, MD
Beth Israel Deaconess Medical Center
Boston, MA

Samuel Hughes, MD
San Francisco General Hospital
San Francisco, CA

Bupesh Kaul, MD
Magee Women's Hospital
Pittsburgh, PA

Erin Joanne Keely, MD, FRCPC
University of Ottawa
Ottawa, Ontario, Canada

Barbara Leighton, MD
Washington University School of Medicine
St. Louis, MO

Gordon Lyons, MD
St. James Hospital
Leeds, England, United Kingdom

Mary McHugh, MD
University of Pennsylvania Hospital
Pittsburgh, PA

Robert McKay, MD
Wesley Medical Center
Wichita, KS

Howard Minkoff, MD
Maimonides Medical Center
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Professor Warwick Ngan Kee
The University of Hong Kong
Shatin, China

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University of Colorado
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Robert Wood Johnson Medical School
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Jayanthie Ranasinghe, MD
University of Miami
Miami, FL

Felicity Reynolds, MD
St. Thomas Hospital
London, England, United Kingdom

Edward Riley, MD
Stanford University School of Medicine
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Benjamin Sachs, MD
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Alan Santos, MD
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Barbara Scavone, MD
Northwestern University Medical School
Chicago, IL

Scott Segal, MD
Brigham & Women's Hospital
Boston, MA

Shiv Sharma, MD
University of Texas
Southwestern Medical Center
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Richard Smiley, MD, PhD
Columbia University
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SOAP 38th Annual Meeting Exhibitor Listing:

B. Braun Medical Inc.
BD Medical Diabetes Care
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Endo Pharmaceuticals Inc.
International Medical Development
Jawalekar CSE Model
Lippincott Williams & Wilkins
Sheridan Healthcare
Smiths Medical MD, Inc.

The exhibit hours are:

Thursday, April 27 - 7:00 a.m. - 4:00 p.m.
Friday, April 28 - 7:00 a.m - 10:30 a.m.

Please plan time in your schedule to visit our exhibitors.
Our annual meeting would not be possible without their generous support.

Scientific Program

WEDNESDAY, APRIL 26, 2006

1:00 - 5:00 pm — **Critical Care Obstetric Anesthesia Workshop**
(By Ticket Only – Limited Registration) Gurinder M. S. Vasdev, MD; et al.

6:00 - 8:00 pm — **SOAP Opening Reception**

THURSDAY, APRIL 27, 2006

7:00 - 7:45 am — **Breakfast with Exhibitors; Posters**

7:45 - 8:00 am — **Opening Remarks and Welcome**
William R. Camann, MD; David J. Wlody, MD; David J. Birnbach, MD; Jose Carvalho, MD, PhD, FRCPC

8:00 - 9:30 am — **Gertie Marx Symposium (6)**
Moderator: G. M. Bassell, MD
Judges: Stephen Halpern, MD; Philip Hess, MD; Alan Santos, MD, MPH; Jonathan Waters, MD; Jess Weiss, MD

9:30 - 9:45 am — **Distinguished Service Award**
Awarded to Felicity Reynolds, MD
Presenter: William R. Camann, MD

9:45 - 10:15 am — **Coffee with Exhibitors; Posters**

10:15 - 11:30 am — **Oral Presentations (5)**
Moderator: Linda S. Polley, MD

11:30 - 12:30 pm — **PRO/CON Debate:** A Non-Particulate Antacid Should be Used Routinely in All Patients Undergoing Cesarean Section
Moderator: David J. Wlody, MD
Pro: Yaakov Beilin, MD
Con: Jose Carvalho, MD, PhD, FRCPC

12:30 - 1:30 pm — **Lunch with Exhibitors; Posters**

1:30 - 2:30 pm — **What's New in Obstetrics?**
Introduction: David J. Wlody, MD
Howard Minkoff, MD

2:30 - 3:30 pm — **Zuspan Award Symposium (4)**
Moderator: M. Joanne Douglas, MD, FRCP
Judges: Samuel Hughes, MD; Barbara Leighton, MD; Howard Minkoff, MD; Shiv Sharma, MD

3:30 - 4:00 pm — **Coffee Break with Exhibitors; Posters**

4:00 - 6:00 pm — **SOAP Business Meeting – Awards Presentations**
Moderator: William R. Camann, MD

FRIDAY, APRIL 28, 2006

6:00 - 7:00 am — **Fun Run/Walk**

7:00 - 8:00 am — **Breakfast with Exhibitors; Posters**

8:00 - 9:00 am — **Oral Presentations (4) –** Moderator: Barbara Scavone, MD

9:00 - 10:00 am — **Obstetric Medicine Update: Endocrine Disease in Pregnancy**
Introduction: Joy L. Hawkins, MD
Erin Joanne Keely, MD, FRCPC

10:00 - 10:30 am — **Coffee with Exhibitors; Posters**

10:30 - 11:30 am — **Poster Review #1 –** Moderator: Cynthia Wong, MD

11:30 - 1:00 pm — **Panel: Team Training in Obstetrics**
Moderator: Stephen Pratt, MD
Panelists: Paul Preston, MD; Benjamin Sachs, MD; TBD

1:30 pm — **SOAP Golf and Tennis Activities**

Scientific Program

SATURDAY, APRIL 29, 2006

7:00 - 8:00 am	**Breakfast with the Experts** Moderator: Robert Gaiser, MD Experts: Jodie Buxbaum, MD; Jose Carvalho, MD, PhD, FRCPC (Portuguese); Helene Finegold, MD; Regina Fragneto, MD; David Hepner, MD (Spanish); Bupesh Kaul, MD; Gordon Lyons, FRCA; Edward McGonigal, MD; Mary McHugh, MD; Deborah Qualey, MD; Jayanthie Ranasinghe, MD; Edward Riley, MD; Gurinder M. S. Vasdev, MD; Lela Weems, MD
7:00 - 8:00 am	**Continental Breakfast; Posters**
8:15 - 9:15 am	**Gerard W. Ostheimer Lecture: What's New in OB Anesthesia?** Introduction: Brenda Bucklin, MD Roshan Fernando, FRCA
9:15 - 9:45 am	**Coffee Break; Posters**
9:45 - 10:45 am	**Poster Review #2 –** Moderator: Edward Riley, MD
10:45 - 11:45 am	**Fred Hehre Lecture** Introduction: William R. Camann, MD David Chestnut, MD
11:45 - 1:00 pm	**Lunch (On Your Own)**
1:00 - 2:30 pm	**Best Paper Presentations (6)** – Moderator: Gordon Lyons, MD Judges: William R. Camann, MD; Prof. Warwick Ngan Kee; Kiki Palacios, MD; Richard Smiley, MD, PhD
2:30 - 4:00 pm	**Panel: Obstetric Anesthesia and Coexisting Diseases** Moderator: Richard Wissler, MD, PhD Panelists: Brendan Carvalho, MB, BCh; Manuel Vallejo, DMD, MD; Richard Wissler, MD, PhD
4:00 - 5:00 pm	**Open Forum: Proposed Revisions to the ASA Practice Guidelines on Obstetric Anesthesia**
6:00 -11:00 pm	**SOAP Banquet**

SUNDAY, APRIL 30, 2006

7:00 - 7:30 am	**Continental Breakfast**
7:30 - 8:30 am	**Panel: Tort Reform** Moderator: Donald Penning, MD, MSC, FRCPC Panelists: Patricia Dailey, MD; Andrew Harris, MD, MHS; A. Terry Walman, MD, JD
8:30 - 9:30 am	**PRO/CON Debate: Supplemental Oxygen Should Be Used Routinely During Cesarean Section** Moderator: David J. Birnbach, MD Pro: Scott Segal, MD Con: Prof. Warwick Ngan Kee
9:30 - 10:30 am	**Poster Case Reports: You did What? The Best Case Reports of the Year!** Moderator: Robert McKay, MD
10:30 am	**Adjournment**

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SOAP 38th Annual Meeting Exhibitor Listing:

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Jawalekar CSE Model
Lippincott Williams & Wilkins
Sheridan Healthcare
Smiths Medical MD, Inc.

The exhibit hours are:

Thursday, April 27 - 7:00 a.m. - 4:00 p.m.
Friday, April 28 - 7:00 a.m - 10:30 a.m.

Please plan time in your schedule to visit our exhibitors.
Our annual meeting would not be possible without their generous support.

Scientific Program

WEDNESDAY, APRIL 26, 2006

1:00 - 5:00 pm — **Critical Care Obstetric Anesthesia Workshop**
(By Ticket Only – Limited Registration) Gurinder M. S. Vasdev, MD; et al.

6:00 - 8:00 pm — **SOAP Opening Reception**

THURSDAY, APRIL 27, 2006

7:00 - 7:45 am — **Breakfast with Exhibitors; Posters**

7:45 - 8:00 am — **Opening Remarks and Welcome**
William R. Camann, MD; David J. Wlody, MD; David J. Birnbach, MD; Jose Carvalho, MD, PhD, FRCPC

8:00 - 9:30 am — **Gertie Marx Symposium (6)**
Moderator: G. M. Bassell, MD
Judges: Stephen Halpern, MD; Philip Hess, MD; Alan Santos, MD, MPH; Jonathan Waters, MD; Jess Weiss, MD

9:30 - 9:45 am — **Distinguished Service Award**
Awarded to Felicity Reynolds, MD
Presenter: William R. Camann, MD

9:45 - 10:15 am — **Coffee with Exhibitors; Posters**

10:15 - 11:30 am — **Oral Presentations (5)**
Moderator: Linda S. Polley, MD

11:30 - 12:30 pm — **PRO/CON Debate:** A Non-Particulate Antacid Should be Used Routinely in All Patients Undergoing Cesarean Section
Moderator: David J. Wlody, MD
Pro: Yaakov Beilin, MD
Con: Jose Carvalho, MD, PhD, FRCPC

12:30 - 1:30 pm — **Lunch with Exhibitors; Posters**

1:30 - 2:30 pm — **What's New in Obstetrics?**
Introduction: David J. Wlody, MD
Howard Minkoff, MD

2:30 - 3:30 pm — **Zuspan Award Symposium (4)**
Moderator: M. Joanne Douglas, MD, FRCP
Judges: Samuel Hughes, MD; Barbara Leighton, MD; Howard Minkoff, MD; Shiv Sharma, MD

3:30 - 4:00 pm — **Coffee Break with Exhibitors; Posters**

4:00 - 6:00 pm — **SOAP Business Meeting – Awards Presentations**
Moderator: William R. Camann, MD

FRIDAY, APRIL 28, 2006

6:00 - 7:00 am — **Fun Run/Walk**

7:00 - 8:00 am — **Breakfast with Exhibitors; Posters**

8:00 - 9:00 am — **Oral Presentations (4) –** Moderator: Barbara Scavone, MD

9:00 - 10:00 am — **Obstetric Medicine Update: Endocrine Disease in Pregnancy**
Introduction: Joy L. Hawkins, MD
Erin Joanne Keely, MD, FRCPC

10:00 - 10:30 am — **Coffee with Exhibitors; Posters**

10:30 - 11:30 am — **Poster Review #1 –** Moderator: Cynthia Wong, MD

11:30 - 1:00 pm — **Panel: Team Training in Obstetrics**
Moderator: Stephen Pratt, MD
Panelists: Paul Preston, MD; Benjamin Sachs, MD; TBD

1:30 pm — **SOAP Golf and Tennis Activities**

Scientific Program

SATURDAY, APRIL 29, 2006

7:00 - 8:00 am	**Breakfast with the Experts** Moderator: Robert Gaiser, MD Experts: Jodie Buxbaum, MD; Jose Carvalho, MD, PhD, FRCPC (Portuguese); Helene Finegold, MD; Regina Fragneto, MD; David Hepner, MD (Spanish); Bupesh Kaul, MD; Gordon Lyons, FRCA; Edward McGonigal, MD; Mary McHugh, MD; Deborah Qualey, MD; Jayanthie Ranasinghe, MD; Edward Riley, MD; Gurinder M. S. Vasdev, MD; Lela Weems, MD
7:00 - 8:00 am	**Continental Breakfast; Posters**
8:15 - 9:15 am	**Gerard W. Ostheimer Lecture: What's New in OB Anesthesia?** Introduction: Brenda Bucklin, MD Roshan Fernando, FRCA
9:15 - 9:45 am	**Coffee Break; Posters**
9:45 - 10:45 am	**Poster Review #2 –** Moderator: Edward Riley, MD
10:45 - 11:45 am	**Fred Hehre Lecture** Introduction: William R. Camann, MD David Chestnut, MD
11:45 - 1:00 pm	**Lunch (On Your Own)**
1:00 - 2:30 pm	**Best Paper Presentations (6)** – Moderator: Gordon Lyons, MD Judges: William R. Camann, MD; Prof. Warwick Ngan Kee; Kiki Palacios, MD; Richard Smiley, MD, PhD
2:30 - 4:00 pm	**Panel: Obstetric Anesthesia and Coexisting Diseases** Moderator: Richard Wissler, MD, PhD Panelists: Brendan Carvalho, MB, BCh; Manuel Vallejo, DMD, MD; Richard Wissler, MD, PhD
4:00 - 5:00 pm	**Open Forum: Proposed Revisions to the ASA Practice Guidelines on Obstetric Anesthesia**
6:00 -11:00 pm	**SOAP Banquet**

SUNDAY, APRIL 30, 2006

7:00 - 7:30 am	**Continental Breakfast**
7:30 - 8:30 am	**Panel: Tort Reform** Moderator: Donald Penning, MD, MSC, FRCPC Panelists: Patricia Dailey, MD; Andrew Harris, MD, MHS; A. Terry Walman, MD, JD
8:30 - 9:30 am	**PRO/CON Debate: Supplemental Oxygen Should Be Used Routinely During Cesarean Section** Moderator: David J. Birnbach, MD Pro: Scott Segal, MD Con: Prof. Warwick Ngan Kee
9:30 - 10:30 am	**Poster Case Reports: You did What? The Best Case Reports of the Year!** Moderator: Robert McKay, MD
10:30 am	**Adjournment**

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GERTIE MARX SYMPOSIUM

A-1.

STERILE TECHNIQUE PRACTICES (STP) FOR OBSTETRICAL NEURAXIAL ANALGESIA AND ANESTHESIA (ONAAA) - YEAR 2005 SURVEY

AUTHORS: L. GRONDIN, V. MISA, G. FELTUS, R. D'ANGELO, P. H. PAN;
AFFILIATION: Wake Forest University School of Medicine, Winston-Salem, NC.

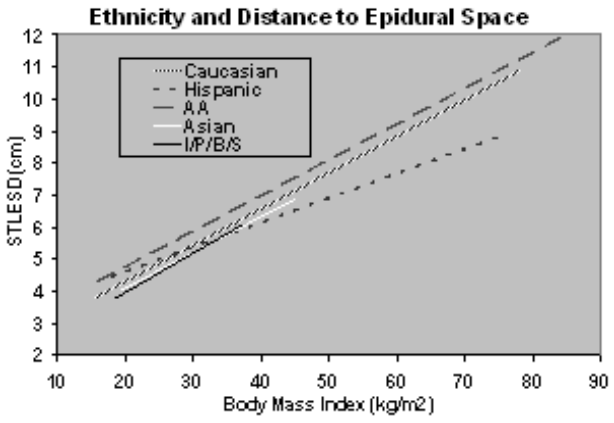
Introduction: What is the standard of care for sterile technique practice(STP) in performing obstetrical neuraxial analgesia and anesthesia(ONAAA)? It remains controversial and a potential medico-legal issue. On review of anesthesia societies guidelines and consensus statements, there are none established on STP for ONAAA. The practice varies among anesthesiologists and warranted a debate at ASA2004. This survey aims at identifying the most prevalent current ONAAA sterile technique practices.
Method: After IRB exemption, a 3-page survey on STP for ONAAA was distributed at SOAP2005 annual meeting, followed by email survey through SOAP to members who hadn't completed survey. The survey was designed to collect information on demographics, factors influencing STP, choice of sterile prep solutions, drapes, tapes, handwashing practices, removal of jewelry and the practices of using and changing mask/cap/gown/gloves. The survey also assessed serious infection experience and difference in STP between C/S anesthesia and labor analgesia. Descriptive statistics and Chi-Squares were used.
Results: Preliminary results from 277 completed survey forms (228USA,29Canada,18others) indicated an average anesthesia experience of 17 years, with an average 4426 deliveries/year and 3216/year labor neuraxial blocks at their affiliated hospital(s). Factors reported influencing STP were residency training(87%), clinical experience(45%) and literature(31%). 76% reported using betadine, 9% use chlorhexidine with alcohol and 7% use Duraprep as their prep solution. 64% use full sterile drape, 32% use partial/half drape while 6% use none. 80% reported taping epidural catheter sites with sterile tegaderm and 20% with non-sterile tape. Handwashing prior to procedures is not practiced in 34% of participants, while 3% reported using a full surgical hand scrub. Soap with water(33%) and antiseptic solutions(33%) are common choices with handwashing. Only 48% reported removal of any jewelry (bracelets, watches, rings, necklace) prior to performing ONAAA. 86% and 90% reported wearing mask and cap respectively for labor neuraxial analgesia, while 97% wear mask and cap for C/S anesthesia. Only 31-36% reported changing masks and 11-14% changing caps between ONAAA cases. However 6% reported wearing sterile surgical gown and 86% non-sterile surgical scrubs for ONAAA. 8% reported different STP between labor neuraxial analgesia and C/S anesthesia, besides location. 5.4% of participants reported at least 1 case of serious infection (meningitis/abscess) in their own patients.
Conclusion: Despite a lack of guidelines from major anesthesia societies, our survey suggests some parts of STP(such as the use of mask, cap, betadine solution, tegaderm) are quite uniform at least for the great majority of practitioners, while other parts of STP(such as handwashing, removal of jewelry, change of mask/cap between cases) vary widely. About 1 in 20 also had experience of serious infectious complications in their practice despite current STP. Vigilance, patient education and diligent post-operative follow up remain essential for patient safety.

A-2.

ETHNICITY AND THE DISTANCE TO THE EPIDURAL SPACE IN PARTURIENTS

AUTHORS: R. C. D'Alonzo[1], E. Campbell[2], W. White[1], M. Noone[2], M. Neumann[2], J. R. Schultz[1];
AFFILIATION: [1]Duke University Health System, Durham, NC, [2]Loma Linda University Medical Center, Loma Linda, CA.

Introduction: We previously performed a pilot study that demonstrated a significantly higher average skin to lumbar epidural space distance (STLESD) in our obstetric population compared to previously published distances[1]. In addition, we demonstrated differences in the STLESD based on ethnicity. This current study presents a more comprehensive analysis of the STLESD in parturients, by expanding both the patient number and number of ethnic groups from patient populations at our east coast institution (East). Furthermore, these results were supplemented by data retrieved from a pilot study from our west coast collaborative institution (West).
Methods: Data from 3305 patients was obtained from the Saturn electronic database at East beginning in 9/2003 until 11/2005. Data from 135 patients was collected from West from 6/2005 until 12/2005. The information included ethnicity, height, weight, and STLESD. Self-declared ethnicity included five categories: African American (AA), Hispanic, Caucasian, Asian, and Indian/Pakistani/Bangladeshi/Sri Lankan (I/P/B/S). Body mass index (BMI) was calculated using the standard equation (weight(kg)/height (m^2)). The influences of BMI, ethnicity, and their interaction on the STLESD were tested with multiple linear regression.
Results: The mean STLESD for all patients was 5.71 cm at East and 5.48 cm at West. When all ethnic groups from East were compared, as expected, BMI had a significant influence on STLESD ($p<0.0001$), but so did ethnicity ($p=0.0004$). The Hispanic group demonstrated a BMI effect that was significantly lower than the other four groups ($p<0.0001$). At high BMI, Hispanic ethnicity predicted a more shallow depth than the other groups. When the Hispanic group was removed from the analysis, all four groups had very similar slopes; the influence of BMI on STLESD was similar for each group. In this subanalysis, the AA group had a significantly deeper epidural space ($p<0.0001$) compared to the other three ethnic groups, regardless of BMI. Differences between the African American groups from East compared to West were observed, but further study is needed to draw reliable conclusions.
Discussion: This study demonstrates that ethnicity, in addition to BMI, influences the STLESD. Also, the average STLESD from our patients was higher than previously reported. This information may be clinically helpful in performing neuroaxial procedures in patients expected to have, or that have evolved into, difficult placements.
References: 1. Jaklitch, et al., Anesthesiology, 2003. 98: p.56.



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GERTIE MARX SYMPOSIUM

A-3.

PERIPHERAL VENOUS PRESSURE AS A HEMODYNAMIC VARIABLE IN PREGNANT PATIENTS UNDERGOING SPINAL ANESTHESIA

AUTHORS: A. G. O'Shea[1], R. Peterfreund[2], L. Tsen[3], J. Charnin[2], L. Leffert[2], M. Pian-Smith[2];
AFFILIATION: [1]Brigham and Womens / Mass General Hospital, Boston, MA, [2]Mass General Hospital, Boston, MA, [3]Brigham and Womens Hospital, Boston, MA.

Introduction: Hypotension associated with sympathectomy following spinal anesthesia for cesarean section is difficult to predict and prevent. Recent studies have used Peripheral Venous Pressure (PVP) as a physiological volume monitor that closely reflects trends in CVP.
PVP reflects an "upstream" venous variable that is coupled to CVP by a column of blood, analogous to the fluid continuity between a pulmonary artery catheter and the left atrium. We report preliminary results of an observational study in which perioperative PVP measurements are determined at cesarean delivery.
Methods: Term patients undergoing elective cesarean delivery with spinal anesthesia were recruited with informed consent. Patients with known vascular disease were excluded. A three-way stopcock was used to intermittently transduce the peripheral IV cannula with the patient positioned supine with left uterine displacement. PVP was measured at predetermined time points: pre and post a standardized fluid bolus (10cc/Kg of LR fifteen minutes prior to spinal), pre and post spinal block, and then at two minute intervals throughout the case. Measurements were then correlated with intraoperative events including hypotension, nausea, pressor and fluid administration, and delivery.
Results: Preliminary data from eight patients of a projected cohort of forty were collected. ASA I or II patients ranged from 30 to 41years. Estimated blood loss ranged from 600 to 1000cc, total fluids administered ranged from 2050 to 3200cc and ephedrine administered ranged from 10-55mgs. Mean PVP increased from 14.75 to 18.5mmHg after fluid bolus although there were large variations in individual responses (net change of -1 to + 9mmHg). The mean PVP decreased from 19.5 prior to the spinal to 16.25mmHg post spinal with individual responses of -12 to + 4 (the +4 measurement occurring after prophylactic ephedrine). Intraoperative PVP was affected by many factors including ephedrine, delivery and surgical manipulations. There were only two patients with a dramatic elevation of PVP after fluid preload (60 & 70% from baseline) and surprisingly both subsequently experienced intraoperative hypotension or nausea.
Discussion: Because PVP reflects changes in both volume and venous tone, it may be a useful monitor during surgeries that do not require central catheters. Measuring PVP is inexpensive and noninvasive. In our patients PVP changes occurred with fluid boluses and spinal blockade. Previously published data from other patient populations have noted a close correlation between CVP and PVP. One might expect a large PVP response to a fluid bolus to limit the degree of hypotension seen with regional anesthesia. However this was not seen in our patients and we postulate that the high PVP reflected a preoperative raised venous tone that was abolished with the sympathectomy. If substantiated by further data, preoperative PVP measurements may help identify patients at increased risk of intraoperative hypotension.
References: Anesth Analg 92:172-9,2001

A-4.

COMPARISON OF LOSS OF RESISTANCE TECHNIQUE WITH AIR VERSUS SALINE TO IDENTIFY EPIDURAL SPACE FOR COMBINED SPINAL EPIDURAL LABOR ANALGESIA

AUTHORS: L. GRONDIN, K. NELSON, L. HARRIS, P. H. PAN;
AFFILIATION: Wake Forest University School of Medicine, Winston-Salem, NC.

Introduction: The use of air or saline in the loss of resistance (LORT) technique for epidural placement is a continuing debate. Studies have shown that air in the epidural space may increase in failure rate and complications. Saline has been implicated in decreased epidural efficacy due to drug dilution.[1] The comparison of air vs. saline for LORT in combined spinal epidural(CSE) has not been evaluated . Some advocates postulate that air would provide more reliable results as saline could be mistaken for CSF flow. We hypothesized no difference in the spinal analgesia success rate or epidural catheter efficacy between using saline vs. air LORT during CSE.
Methods: After IRB approval and informed consent, patients were randomized to either air or saline LORT to identify epidural space with a 17g Weiss needle. A 27g Whitachre needle was advanced, using the needle through needle technique, into the subarachnoid space. CSF flow was documented for free fluid return to spinal needle hub. Injected spinal dose consisted of bupivicaine 1.5mg with fentanyl 20mcg. Pre- and post-injection aspiration of fluid return was documented. A multiport epidural catheter was placed 5cm in the epidural space. No epidural medications were administered until 15min. after spinal dose administration. Evaluation of function of the spinal dose was based on VAPS, maternal hemodynamics, and sensory level to cold. After the initial 15-min,. an intrathecal test dose of the epidural catheter was given and an EPCA with basal infusion was initiated in the usual manner. Top up doses of ¼% to 1/2% bupivacaine were allowed in increments of 5 mls for breakthrough pain. Primary outcome measure was success of spinal labor analgesia as defined by VAPS <=3 at 15 min post spinal dose administration. Secondary outcomes were epidural catheter replacement rate, epidural drug consumption during the first 4 hours of epidural infusion. Prior power analysis revealed a sample size of 160/gp was needed to demonstrate a 10% difference between groups in the primary outcome variable. Unpaired t-test and Chi-Squares were used as appropriate.
Results: Preliminary data from 60 patients enrolled are shown below with no statistical difference between groups.

		Gp Air (n=34)	Gp Saline (n=26)
Demo-graphics:	Age(yr)	26 ± 6	26 ± 6
	Weight (kg)	83 ± 15	86 ± 17
	Height(cm)	166 ± 7	164 ± 7
	Cervix Dilation(cm)	4.0 ± 1.3	3.9 ± 1.4
	Fetal Wt (gm)	3475 ±602	3485 ±531
	Apgar @ 1min (median)	8	8
	Apgar @5 min (median)	9	9
	Anesthesia Provider Experience(yr)	3.2 ± 1	2.7 ± 1.1
Outcomes	Spinal Analgesia Success Rate (%)	91	92
	Initial Free Fluid Return Incidence (%)	100	96
	Pre-Injection Aspiration Fluid Return Incidence (%)	97	92
	Post Injection Aspiration Fluid Return Incidence (%)	95	88
	Epidural Catheter Replacement Rate (%)	3	4
	Epidural Drug consumed (mls/hr of 1/8% bupiv equivalent)	18.5 ± 9.8	18.2 ± 7.6
	Epidural Needle Wet tap rate (%)	2.9	0

Discussion: Preliminary results from this ongoing study suggest similar spinal analgesia success rate and epidural efficacy independent of whether air or saline is used for LORT during CSE.

GERTIE MARX SYMPOSIUM

A-5.

PROPHYLACTIC GRANISETRON DOES NOT PREVENT NAUSEA AND VOMITING DURING ELECTIVE CESAREAN SECTION UNDER SPINAL ANESTHESIA

AUTHORS: S. Kasodekar, S. Dhumne, M. Balki, J. Carvalho;
AFFILIATION: Department of Anesthesia, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

Introduction: Intraoperative nausea and vomiting (IONV) during Cesarean section (CS) under regional anesthesia remains a challenge in clinical practice. The etiologies of IONV include hypotension, vagal hyperactivity, visceral pain, intravenous opioids and uterotonics. The efficacy of prophylactic anti-emetics remains controversial. Different studies have shown their beneficial effects; however, the high incidence of IONV in their control groups suggests inadequate control of the multiple causative factors[1]. The purpose of our trial was to determine the efficacy of granisetron for prevention of IONV during CS under spinal anesthesia with strict control of the causative factors.
Methods: With REB approval, a prospective, randomized, double-blinded, placebo-controlled trial was conducted in 176 patients undergoing elective CS under spinal anesthesia. After preload with 10 ml/kg of lactated Ringer's solution, spinal anesthesia was administered with 0.75% hyperbaric bupivacaine 15 mg, fentanyl 10 µg and morphine 0.1 mg. Aliquots of phenylephrine were used to maintain systolic blood pressure at 100% of baseline. Upon delivery of the fetus, oxytocin boluses of 0.5 IU were administered as needed followed by maintenance infusion. The patients randomly received either granisetron 1 mg or normal saline (placebo), intravenously, immediately after clamping of the umbilical cord. In case of persistent nausea or vomiting, rescue dimenhydrinate 50 mg was administered intravenously. The primary outcome was the presence of postdelivery IONV. Secondary outcomes included need for rescue medication, hypotension, pain and nature of the surgical stimuli.
Results: There was no difference in maternal demographics and obstetric data between the groups. The overall incidence of postdelivery nausea and vomiting was 17% and 4% respectively. The incidence of IONV was similar in both groups. Other results are presented in the table.
Discussion: In contrast to the majority of studies in the literature[1-3], our study shows that prophylactic granisetron 1 mg is not effective in reducing the incidence and severity of IONV when the causative factors are strictly controlled. As compared to a previous study done at our institution[4], our current study suggests that a higher dose of bupivacaine might result in more effective block thereby reducing visceral pain and thus IONV, especially when uterine exteriorization is performed.
References:
1. Int J Obstet Anesth 2005; 14: 230-4
2. J Clin Anesth 2001;13: 430-5
3. Anaesthesia 1999; 54: 479-82
4. Anesthesiology 2005;102: SOAP A13

Outcome measures and intraoperative data

Data	Granisetron N =88	Placebo N =88	p- value
Nausea (n, %)	16 (18.2)	14 (15.9)	0.69
Retching (n, %)	1 (1.1)	2 (2.3)	1.00
Vomiting (n, %)	3 (3.4)	4 (4.6)	1.00
Rescue antiemetic (n, %)	7 (8)	6 (6.8)	0.77
Hypotension (n, %)	1 (1.1)	0 (0)	1.00
Pain (n, %)	1 (1.1)	2 (2.3)	1.00
Uterine exteriorization (n, %)	55 (62.5)	67 (76.1)	0.05
Duration of uterine repair (min, mean±SD)	11.13 (4.5)	11.69 (4.8)	0.43
Tubal ligation (n, %)	11 (12.5)	18 (20.5)	0.15
Sensory block level (median, range)	T4 (T1-T7)	T4 (T1-T5)	0.34

A-6.

EFFECTS OF CRYSTALLOID AND COLLOID PRELOADS ON COAGULATION ASSESSED BY THROMBOELASTOGRAPHY IN PARTURIENTS PRIOR TO ELECTIVE CESAREAN SECTION

AUTHORS: A. J. Butwick, P. van der Starre, B. Carvalho;
AFFILIATION: Stanford University School of Medicine, Stanford, CA.

Introduction: Fluid preloading with colloids reduces hypotension more effectively than crystalloids before spinal anesthesia for Cesarean delivery (CS).[1] However, colloidal solutions such as hydroxyethyl starches can adversely affect coagulation by decreasing factor VIII and vWF, and impairing platelet function.[2] The hemostatic effects of preloading with HES are unknown in pregnant patients. We investigated the coagulation effects of fluid preloading with 6% Hetastarch (HES) versus lactated Ringer's solution (LR) using thromboelastography (TEG) in patients prior to elective CS.
Methods: Following IRB approval and written informed consent, 30 patients presenting with uncomplicated pregnancies for elective CS were randomized to receive either 1500 mL LR or 500 mL HES (670/0.75) over 30 min prior to spinal anesthesia. TEG (Haemascope Corp. Niles, IL) was performed prior to fluid preloading with blood drawn from an 18-g iv cannula. A second sample was obtained for TEG analysis from the contralateral arm after preloading. One ml of whole blood was placed into a vial containing kaolin and, after mixing, 360 µL kaolin-activated whole blood was pipetted into a plastic cup in a prewarmed TEG. Maternal HR, NIBP and SpO_2 were also assessed. Data were analysed using Wilcoxon signed rank, Mann Whitney U tests and Students t-test as appropriate ($P<0.05$).
Results: Baseline TEG values and patient demographic data were similar between study groups. We observed no statistically significant changes in TEG parameters after preloading in group LR (table). However, in group HES, there were statistically significant increases in r and k times after preloading compared to baseline values (p= 0.01 and 0.004 respectively).
81.

TEG parameters	LR baseline	LR post-preload	HES baseline	HES post-preload
r (min)	3.7 [1.2]	5 [2.6]	3.8 [1.6]	5.5 [2.7] *
k (min)	1.2 [0.5]	1.2 [0.3]	1.3 [0.4]	1.7 [0.5] *
α angle (°)	70.1 [7.3]	71.7 [11.3]	67.5 [9.7]	61.7 [12.2]
MA (min)	79.7 [6.5]	80.2 [7.8]	75.9 [9.4]	74.0 [11.4]

Values are median [interquartile range]. * p <0.02 HES post-preload compared to HES baseline values
Conclusion: We conclude that preloading with 500 mL 6% HES produces modest hemostatic effects as measured with TEG prior to spinal anesthesia for CS. Previous TEG studies have shown that pregnancy is associated with a relatively hypercoagulable state.[3] Therefore, we speculate that the trend towards hypocoagulability observed with HES preloading in our study is unlikely to affect perioperative maternal morbidity e.g. intraoperative blood loss. However, further clinical investigations are necessary to determine whether these hemostatic changes are altered by different volumes and preparations of hydroxyethyl starches in pregnant patients prior to CS.
References:
1. Anesth Analg 2001;92:997-1005. 2. Anesthesiology 2005;103:654-60. 3. Anesth Analg 2000;91:1279-1281.

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ORAL PRESENTATIONS #1

A-7.

LUMBAR DURAL SAC WIDTH DETERMINED BY ULTRASOUND DOES NOT CORRELATE WITH SENSORY LEVELS OF SPINAL ANESTHESIA FOR ELECTIVE CESAREAN SECTION

AUTHORS: C. Arzola, M. Balki, J. Carvalho;
AFFILIATION: Department of Anesthesia and Pain Management, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

Introduction: The lumbosacral CSF volume, as assessed by MRI(1,2), has been reported to be one of the key factors influencing intrathecal spread of local anesthetics. Ultrasound imaging of the lumbar spine, although not able to determine CFS volume, allows us to assess the width of the lumbar dural sac (DSW)(3). One could hypothesize that DSW is an estimation of CSF volume. The purpose of this study was to investigate whether DSW correlates with sensory levels of spinal anesthesia for elective Cesarean sections (CS).
Methods: After REB approval and written informed consent, 22 patients scheduled for elective CS under spinal anesthesia were enrolled. The dural sac width (DSW=distance between the inner surfaces of the dural sac) was measured by ultrasound imaging performed with the patient in the sitting position, at the L3/4 interspace, using the transverse approach, with a portable Titan Ultrasound System equipped with a 5.0-MHz curved array probe (Sonosite Canada Inc.). Spinal anesthesia [1.6 ml hyperbaric 0.75% bupivacaine + fentanyl 0.2 ml (10 mcg) + morphine 0.2 ml (100mcg)] was administered at L3-L4, with the patients in the sitting position, using a 27G Whitacre needle, with the needle aperture directed cephalad. The intrathecal solution was injected over 30 seconds. After the intrathecal injection, the patients assumed the supine position with a left lateral tilt. Sensory block levels were assessed bilaterally, in the midclavicular line, by ice and pinprick (25-gauge needle). Assessments were done every 5 minutes until peak sensory levels (PSL) were achieved. Spearman's rank correlation was used to correlate PSL and time to develop PSL with DSW. Multiple linear regression analysis was used to estimate the influence of patients' demographics on sensory block levels.
Results: Patient demographics, DSW values and sensory block levels are shown in the table. There were no significant correlations between PSL and DSW. DSW appeared to be an independent variable evaluated by Spearman's rank correlation. Multiple regression analysis showed no influence of patients' demographics on PSL.
Discussion: The lumbar dural sac width, as determined by ultrasound, is not a predictor of spinal anesthesia spread. Further studies are necessary to understand how ultrasound findings can translate specific compartments in the spine and therefore be useful predictors of spinal spread of local anesthetics.
References: 1) Anesthesiology1998;89:24-29; 2)Anesthesiology 2004;100:106-14; 3)Can J Anaesth 2003;50:R1-R8

Patient demographics	n = 22
Age (yr)	35.4 ± 4.4
Height (cm)	162.9 ± 6.5
Weight (kg)	82.8 ± 14.6
BMI (kg/m^2)	31.2 ± 5.5
Neonatal weight (g)	3445 ± 497
Dural sac width (cm)	0.79±0.13 (0.59-1.17)
Sensory block	
Peak level to ice	T3 (T1-T4)
Peak level to pinprick	T3 (T1-T5)
Time to peak level to ice (min)	12.5 (5-20)
Time to peak level to pinprick (min)	15 (5-20)

values are mean±SD or median, with ranges in parenthesis

A-8.

A RANDOMIZED CONTROLLED TRIAL OF THE IMPACT OF COMBINED SPINAL-EPIDURAL ANALGESIA ON THE SUCCESS OF EXTERNAL CEPHALIC VERSION FOR BREECH PRESENTATION

AUTHORS: J. T. Sullivan, B. M. Scavone, S. Grouper, R. Patel, C. Robles, R. J. McCarthy, C. A. Wong;
AFFILIATION: Northwestern Feinberg School of Medicine, Chicago, IL.

Introduction: Improving the success rate of external cephalic version (ECV) for breech presentation provides an opportunity to reduce the rising incidence of Cesarean delivery. There are conflicting data about the impact of neuraxial anesthesia on the success rate of ECV.[1,2,3] We hypothesized that combined spinal-epidural (CSE) analgesia will increase the success rate of ECV for breech presentation and incidence of subsequent vaginal delivery as compared with systemic opioid analgesia (SYS).
Methods: After IRB approval and written informed consent was obtained, we randomized 86 term subjects with singleton breech presentation to receive CSE analgesia [intrathecal bupivacaine (2.5 mg) plus fentanyl (15 mcg) followed by a lidocaine (45 mg) and epinephrine (15 mcg) epidural test dose] or systemic fentanyl (50 mcg IV). Patients received analgesic intervention and terbutaline timed to provide peak analgesic and uterine relaxant effect at the time of ECV initiation. Sample size was determined to demonstrate a 20% difference in the success rate of ECV between groups (α=0.05, power=90%). Demographic data (maternal age, height and weight, parity and estimated gestational age (EGA)) and outcome data (success of ECV, mode of delivery, obstetrician identity, obstetrician predicted ECV difficulty (pre and post procedure), assessment of muscle relaxation, duration of ECV procedure, number of ECV attempts, incidence and severity of nausea, incidence of vomiting, patient pain and satisfaction) were compared between groups using the χ^2 and Mann-Whitney U tests. $P<0.05$ was used to reject the null hypothesis.
Results: The success rate for ECV was 43% for the CSE group and 33 % for the SYS group (P=0.39). The incidence of vaginal delivery was 36% for CSE and 24% for SYS (P=0.26). Pain scores were lower with CSE (VAS=11±18 mm) compared to systemic opioid analgesia (36±24 mm) ($P<0.005$) and patient satisfaction was higher (CSE median VRS (range) = 10 (0-10), SYS 7 (0-10), $P<0.005$). Higher parity ($P<0.005$), greater EGA (P=0.04), and shorter procedure duration ($P<0.005$) were associated with ECV success, however, height (P=0.55), weight (P=0.75), and sensory level associated with CSE (P=0.38) were not.
Discussion: There were no differences in the rate of successful ECV and vaginal delivery with combined spinal-epidural as compared with systemic opioid analgesia. However, maternal pain was reduced and satisfaction increased with CSE versus systemic opioid analgesia.
References:
[1]Am J Obstet Gynecol 1997; 177: 1133-7
[2]Obstet Gynecol 1999; 93: 345-9
[3]Obstet Gynecol 2000; 95: 648-51

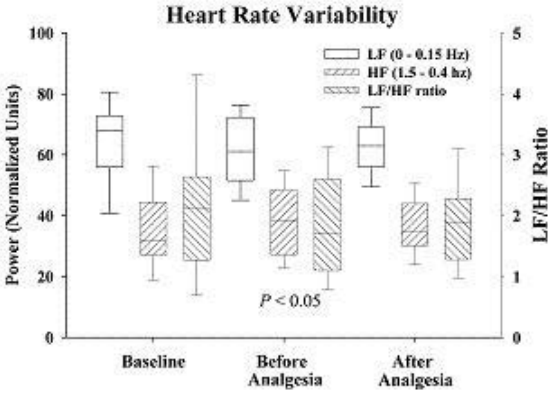
ORAL PRESENTATIONS #1

A-9.

MATERNAL HEART RATE VARIABILITY BEFORE AND AFTER COMBINED SPINAL-EPIDURAL LABOR ANALGESIA

AUTHORS: C. A. Wong, M. K. Bokermann, N. T. Diaz, R. J. McCarthy;
AFFILIATION: Northwestern University, Chicago, IL.

Introduction: The maternal heart rate variability (HRV) power spectrum was altered after epidural bupivacaine/fentanyl labor analgesia[1] and the HRV low to high frequency ratio (LF/HF) predicted severe hypotension after spinal anesthesia.[2] The purpose of this study was to quantify HRV before and after the initiation of combined spinal-epidural (CSE) labor analgesia.
Methods: Forty-three healthy parous women scheduled for induction of labor, who requested labor analgesia with cervical dilation ≤5 cm, consented to participate in the IRB-approved study. HRV monitoring was performed for 30 min shortly after labor induction began (baseline) and immediately before the induction of analgesia (after hydration with LR 500-1000 mL), and for 60 min after the induction of CSE analgesia. Subjects were randomized to receive intrathecal fentanyl 25µg (F) or bupivacaine 2.5mg combined with fentanyl 25µg (BF), followed by a lidocaine/epinephrine epidural test dose in all subjects. Verbal rating scores (VRS) for pain and blood pressures were monitored at regular intervals. HRV power spectrum densities were calculated for low frequency (LF) and high frequency (HF) using fast Fourier transformation. Data were compared between groups using the Mann-Whitney U test and within groups with the Friedman test. $P<0.05$ was considered significant.
Results: Median (IQR) VRS were baseline 2.5 (0,4), hydration 6 (5,7), and CSE 0 (0,0). The median sensory level was T5 (T1-T3). There were no differences in LF, HF, and the LF/HF at baseline, hydration, and CSE (Figure); and there were no differences between groups F and BF at any time. Seventeen of 43 subjects were treated with ephedrine for hypotension after CSE. The risk of hypotension requiring ephedrine was 2.9 (95% CI 0.75-11.6) times greater when the LF/HF after hydration was ≥2.5 compared to <2.5.
Discussion: Similar to studies of spinal anesthesia,[3,4] the LF/HF did not change after the induction of CSE analgesia with either fentanyl alone or fentanyl combined with bupivacaine. This is in contrast to a study of epidural labor analgesia in which the LF/HF was decreased after the initiation of analgesia.[1] Differences in the use of prehydration before initiation of neuraxial blockade may explain these results.[2] Similar to women undergoing spinal anesthesia for Cesarean delivery, a LF/HF>2.5 after prehydration predicted post-block hypotension.[2]
References: [1]Anesthesiology 2004;101:21. [2]Anesthesiology 2005;102:1086. [3]Reg Anesth 1994;19:189. [4]Anesth Analg 1995;80:315.

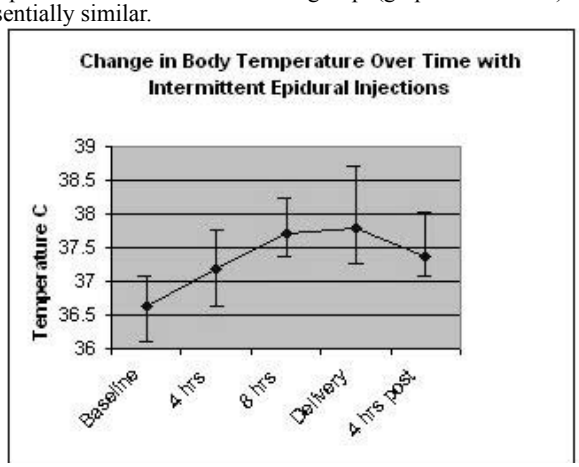


A-10.

MATERNAL BODY TEMPERATURE CHANGES WITH INTERMITTENT VERSUS CONTINUOUS LABOR EPIDURAL ANALGESIA

AUTHORS: V. R. Mantha, V. Ramesh, A. Daftary, M. Vallejo, S. Ramanathan;
AFFILIATION: Magee-Womens Hospital, Pittsburgh, PA.

Introduction: Labor epidural analgesia (LEA) is associated with maternal intrapartum fever (tympanic temperature > 38^0 C). The incidence in nulliparous women is 24-33%[1,2]. The mechanisms are thought to be multiple and physiological. One proposed mechanism is sympathetic blockade from the epidural local anesthetic, which is thought to interfere with heat loss by inhibiting sweating in the lower half of the body. All the studies reporting LEA with intrapartum fever were done in parturients who received continuous epidural infusions. We hypothesized that intermittent LEA, by allowing intermittent recovery of the sweating mechanism, might be protective.
Methods: This was a prospective, randomized study. After IRB approval and informed consent, 92 healthy nulliparous women in labor were recruited. They were randomized to either a continuous group (CLEA, n = 46) or an intermittent group (ILEA, n = 46). Both groups had initial placement and activation of the epidural catheter, with 8-10 ml of local anesthetic (0.125% bupivacaine or 0.1% ropivacaine), with fentanyl 0.0002 %. The CLEA group was then placed on a continuous infusion to maintain a continuous sensory block above T-10. The ILEA group received the medications as necessary at the patient's request, when the block partially regressed. Typically, this regression was from a sensory level of T-8/T-10, to about L-1/L-3. Tympanic temperatures were checked at baseline (at the time of the catheter insertion), and then every four hours until four hours post-partum. Demographic data in the two groups were compared using student's t-test. Temperature comparisons at different time periods within the two groups were evaluated using repeated measures ANOVA. A P value of < 0.05 was considered statistically significant. Post hoc analysis after ANOVA included Fisher's LSD.
Results: Demographic data were comparable between the two groups. Repeated measures ANOVA showed statistically significant elevations in the temperature in both groups at all time points compared to baseline values. The graph shows the mean temperatures in the ILEA group at various time points. Vertical bars in the graph represent 0.95 confidence intervals. The temperature trend in the CLEA group (graph not shown) was essentially similar.



Discussion: Our study shows that maternal intrapartum temperature increases even with intermittent injections, as it does with continuous infusions.
References: 1. Anesthesiology 1999; 90:1271-5.
2. Anesthesiology 2002; 96:546-51.

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ORAL PRESENTATIONS #1

A-11.

SIMULATION IN LABOR AND DELIVERY: FULL TEAM, IN SITU DRILLS IN A LARGE HMO

AUTHORS: P. Preston[1], J. Nunes[2], S. McFerran[2], N. Corbett[2], B. Merl[2], G. Escobar[2];
AFFILIATION: [1]Kaiser Foundation Hospital, San Francisco, CA, [2]Kaiser Foundation Hospital, Oakland, CA.

Introduction: Kaiser Permanente has sponsored a multi-center Perinatal Patient Safety Program (PPSP) for 4 years. On site, intermediate fidelity simulation training for obstetric emergencies has been a key part of this program. Our hypothesis is that simulation, as part of a safety program with education on error, human factors, systems problems and routine communications, will allow us to improve safety and communications in our units.
Methods: Many birth injuries relate to human error, systems problems and communications. We created a safety program using the characteristics of High Reliability perinatal units as defined by Eric Knox, human factors concepts as described by Robert Helmreich, and simulation (ACRM) as described by David Gaba and others. This allowed us to provide comprehensive error and human factors training to almost everyone working in a unit, and additional critical event training to those who must manage such events.
4 of our 11 perinatal units were pilot sites for the PPSP. Pre and post Safety Attitude Questionnaire (SAQ) data were collected from all units, > 74% response rates. OB emergencies were created using the Laerdal Sim Man, NRB 1000 infant, Noelle and Fetalsim simulators. Scenarios are run in actual clinical areas, managed with the available resources and staff. These are videotaped and debriefed using ACRM concepts, with an emphasis on systems issues that require attention in that unit.
Results: The results of the SAQ show statistically significant improvement in all 11 perinatal sites with greater changes in the four pilot sites. Such changes correlate with improved patient outcomes and staff retention in medical environments. Our outcome data are not yet significant, and our staffing metrics suggest improved retention. Simulation has allowed units to find and fix a large number of systems hazards. Best practices are more widespread. Certain findings (lack of a common language for FHR) have resulted in extensive work. Case reports from our facilities suggest that communication and rescue skills have improved.
This has also been a powerful tool to identify chronic communication difficulties between services. Analysis of the effects of such barriers by these services has often resulted in a new and improved unit dynamic. This effort has been well received, with numerous providers becoming simulation trainers. This has become a national effort, with more than 2000 participants having been trained to date.
Discussion: Medicine is the last high risk industry where people are expected to perform flawlessly in emergencies, and yet are not supported with high quality team training. We find that simulation, while stressful, is feasible and sustainable on L&D. This is a tool to improve performance, find system problems and transform unit cultures. With planning, operational disruptions are manageable.

ORAL PRESENTATIONS INCLUDING THE ZUSPAN AWARD

A-12.

A WOMB WITH A VIEW: ANESTHETIC, OBSTETRIC, AND NEONATAL CARE ISSUES FOR IN-UTERO FETAL SURGERY

AUTHORS: V. Silva[1], L. C. Tsen[2], L. Wilkins-Haug[3], E. Cappiello[2], B. Kodali[2];
AFFILIATION: [1]Center for Labor and Delivery, Brigham and Women's Hospital, Boston, MA, [2]Dept of Anesthesiology, Brigham and Women's Hospital, Boston, MA, [3]Dept of Maternal Fetal Medicine, Brigham and Women's Hospital, Boston, MA.

Recent advances in imaging, monitoring and care have led to antepartum fetal interventions to correct various anomalies. Although still a novelty, in-utero fetal procedures have found increasingly diverse applications and success, but are associated with significant anesthetic, obstetric and neonatal issues.
Methods: Following approval from the hospital's human research committee, a retrospective analysis of medical records of women undergoing in-utero fetal interventions from 2001-2005 was performed. The data abstracted included patient demographics, fetal anomalies and interventions, anesthetic techniques, intraoperative monitoring, technical difficulties, and postoperative maternal and fetal outcomes.
Results and discussion: 77 pregnant women with average age (mean/SD): 30/6 years, height: 64/2.7 inches, weight; 162/32 pounds and gestational age: 26/5 weeks. Fetal diagnosis and anesthesia techniques are as shown:

Fetal anomaly	Number	Intervention	GA	RA	GA+RA
Diaphragmatic hernia	12	EXIT	8	0	4
Aortic stenosis	43	Balloon	25	0	18
Pulmonary stenosis	6	Balloon	4	0	2
Restrictive septum (cardiac)	10	Septostomy	8	0	2
Twin Transfusion	4	Cord ligation	2	2	0
Bladder obstruction	2	Shunt	0	2	0

General with regional anesthesia was used to facilitate postoperative pain relief in cases where laparotomy was likely (stenotic valves). General anesthesia (1-1.5 MAC) was preferred for uterine relaxation and fetal analgesia. SBP were maintained with ephedrine or phenyephrine. Additional IM fetal injections with muscle relaxants, fentanyl and atropine were used. (1) Cardiac interventions produced transient fetal bradycardia, which, if persistent, was treated with fetal cardiac epinephrine. Postoperative indocin was used to minimize premature uterine contractions and augmented with magnesium and terbutaline if necessary. In 59 cardiac procedures, 19 required a laparotomy after a failed percutaneous approach. Uterine relaxation due to general anesthesia was thought to result in fetal positional instability and difficulty with the percutaneous approach. There were 5 fetal deaths (4-48 hours) and 13 deaths (0-3 yr) following intervention. One maternal complication (maternal mirror syndrome) occurred.
Conclusion: In-utero fetal interventions are associated with increasing success; regional anesthetic techniques may be used more commonly in the future.
References: Anesthesiology 2001;95:828-35.

ORAL PRESENTATIONS INCLUDING THE ZUSPAN AWARD

A-13.

PATIENT-CONTROLLED ANALGESIA WITH BACKGROUND REMIFENTANIL INFUSION FOR LABOR PAIN

AUTHORS: M. Balki[1], S. Kasodekar[1], S. Dhumne[1], P. Bernstein[2], J. Carvalho[1];
AFFILIATION: [1]Department of Anesthesia, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada, [2]Department of Obstetrics and Gynecology, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

Introduction: Although epidural is the gold standard for labor analgesia, it may not be indicated or chosen by some patients. Intravenous remifentanil is currently being investigated as an alternative to labor epidurals.[1,2] The purpose of this study was to determine the efficacy and safety of different regimens of patient-controlled analgesia (PCA) with remifentanil.
Methods: With REB approval, a prospective, randomized controlled trial was conducted in 14 term parturients (target 20 patients). Patients were randomized to one of 2 study groups. In both groups, analgesia was started with remifentanil infusion 0.025 μg/kg/min and patients were offered PCA bolus of 0.25 μg/kg, with a lockout interval of 2 min. In Group 1 (fixed bolus, increasing infusion), infusion was increased in a stepwise manner from 0.025 to 0.05, 0.075, 0.1 μg/kg/min as required; bolus was fixed at 0.25 μg/kg. In Group 2 (fixed infusion, increasing bolus), the bolus was increased from 0.25 to 0.5, 0.75 and 1 μg/kg as necessary; infusion was fixed at 0.025 μg/kg/min. The primary outcome was maternal satisfaction (VAS 0-10). The secondary outcomes were pain, sedation, remifentanil consumption and side effects.
Results: There was no difference in maternal demographics and obstetric data between the 2 groups. The overall satisfaction, pain and sedation scores were similar in both groups. Maternal side effects were more frequent in Group 2. One neonate in Group 1 required intubation for meconium aspiration. Other data are presented in the table.
Discussion: Patients in both groups were highly satisfied irrespective of relatively high pain scores. This discrepancy could reflect high patient motivation or perhaps altered pain perception in patients choosing remifentanil for labor analgesia. Patients in Group 1 seemed to have more effective pain control, as they had more successful PCA attempts and required less amount of drug/h compared to Group 2. As a consequence, side effects such as drowsiness and desaturation were less frequent in this group. Therefore, the regimen with increments in continuous infusion in the presence of fixed bolus appears to be superior to the regimen with increments in boluses in the presence of fixed infusion. We conclude that remifentanil is safe for mother and neonate, when administered in an appropriate manner.
References:
1.Br J Anaesth 2001; 87: 415-20
2.Anesth Analg 2002; 94: 913-7

Outcome and complications	Group 1 N = 7	Group 2 N = 7
Satisfaction score (0-10)	8.71± 0.95	9.14± 0.90
Pain score (0-10)		
Baseline	7.43±2.99	8.14±2.54
Overall during PCA	5.29±1.50	6.57± 1.62
Lowest pain	3.14±2.61	2.00±2.52
Duration of PCA (h)	5.54±2.25	9.36±9.02
Remifentanil requirement (μg/h)	408±138	532±253
Number of PCA attempts	78±38	251±295
% Successful PCA attempts	77±9	56±31
Crossover to epidural n (%)	1 (14)	0 (0)
Desaturation n (%)	1 (14)	4 (57)
Drowsiness n (%)	2 (29)	7 (100)
Nonreassuring FHR n (%)	1(14)	2 (29)
Apgar(1&5 min)>7 n (%)	7 (100)	7 (100)

A-14.

DOES EATING IN LABOR INFLUENCE OBSTETRIC OUTCOME: A RANDOMIZED CONTROLLED TRIAL IN 2400 PRIMIPAROUS WOMEN?

AUTHORS: G. O'Sullivan, B. Liu, A. Shennan, D. Hart;
AFFILIATION: St Thomas' Hospital, London, United Kingdom.

Introduction, The practice guidelines for obstetrical anesthesia state that "The oral intake of modest amounts of clear liquids may be allowed for uncomplicated laboring patients." These guidelines also state: "Solid food should be avoided in laboring patients."[1] In the United Kingdom, significant numbers of women are allowed solid food in the belief this may improve outcome, including reducing operative deliveries. There is also a strong consumer demand to be allowed to eat and drink during labor. Risking aspiration by allowing women to eat in labor could only be justified if there were significant advantages in the policy of feeding in labor. We performed a trial to investigate the effect of feeding in labour on obstetric outcome. We also evaluated women's experiences and views of this policy.
Methods, Over a five year period in our institution, (2001-6) primiparous women in spontaneous labor at term (≥36 weeks gestation, singleton, cephalic presentation), <6 cm. cervical dilatation and without significant medical complications were randomly allocated to light diet, or water in labor. Actual consumption was at each women's discretion. A subset of women were interviewed postpartum. The primary outcome measure was normal vaginal delivery rate. Secondary maternal measures included length of labor, vomiting, ketonuria and satisfaction (by visual analogue score), and secondary neonatal endpoints included Apgar scores, and admission to special or neonatal intensive care. Assuming alpha 0.05 and 1-beta 90%, 1126 women in each would be required to detect a 5% difference in anticipated normal delivery rate. This would also be powered to detect a 10% change in the length of labor.
Results, At time of writing >2200 women have been successfully randomized with the primary outcome endpoint achieved. The trial will be complete by SOAP 2006. In the 2200 women, 45% have had spontaneous vaginal delivery; 70% of women have actually fed in the "intervention" arm.
Discussion, This trial will answer definitively whether the policy of eating in labor will influence the mode of delivery. It will dictate whether the policy of eating solids in labor can be justified.
References,
1. Practice Guidelines for Obstetrical Anesthesia. Anesthesiology 1999; 90:600-611.

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ORAL PRESENTATIONS INCLUDING THE ZUSPAN AWARD

A-15.

EXPLICIT COMMUNICATION IN AN OBSTETRICAL EMERGENCY

AUTHORS: H. Kobayashi[1], T. B. Walzer[2], R. Gardner[2], M. C. Pian-Smith[3], D. B. Raemer[3];
AFFILIATION: [1]Harvard School of Public Health, Boston, MA, [2]Brigham & Women's Hospital, Boston, MA, [3]Massachusetts General Hospital, Boston, MA.

Introduction: One of the hallmarks of a high-performance team is the use of a common language during emergency situations. In domains where formed teams are the typical organizational structure, clear conversation using common terms is especially important to avoid misunderstandings and to reduce the communication burden. We believe that labor and delivery teams might benefit from standardizing vocabulary during obstetrical emergencies. To understand the current vocabulary used we observed the declaration of a relatively common obstetrical emergency, shoulder dystocia, during a simulation exercise.
Methods: Obstetricians, labor nurses, and anesthesiologists participate in a simulation-based teamwork course at the Center for Medical Simulation on a weekly basis. All participants are post-graduate practitioners with a wide range of experience (6mo to >30yrs) from one of 14 different institutions. One of the case scenarios presented is an unanticipated shoulder dystocia using an apparatus we have described previously. [1] Investigators reviewed a sample of 12 videotapes randomized within institutions from a pool of 46 to document the vocabulary used in declaring the emergency. The obstetrical maneuvers that were used initially to relieve the shoulder dystocia were also recorded.
Results: The most common terminology used was: “shoulder dystocia” (33%), “ we have a shoulder” (33%), “get a stool” (20%), and “it’s stuck” (13%). All participants used the McRoberts maneuver and/or suprapubic pressure as their first maneuvers to manage the shoulder dystocia. There were no apparent misunderstandings between the team members that were observed.
Discussion: Although we saw no obvious sequela, we noted a variety of terms used to declare this critical event. During debriefings the most common reason cited by the obstetrician for not using the term “shoulder dystocia” was a desire not to alarm the patient and family. We remain concerned that the lack of a common terminology could result in misunderstanding and a delay in treatment during this critical event. We hope to develop a universal practice of declaring a shoulder dystocia by its technical name throughout our obstetrical practices.
Refereces: 1. Obstetrical Emergency - an Apparatus to Simulate Shoulder Dystocia. Anesth Analg, 2004; 98 S39

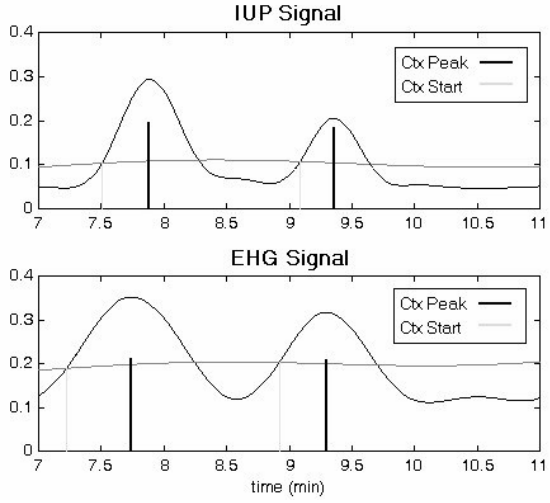
ORAL PRESENTATIONS #2

A-16.

COMPARISON OF CONTRACTIONS: IUP VS EHG

AUTHORS: T. Y. Euliano[1], M. Nguyen[2], D. Marossero[2], E. Tighe[1], R. K. Edwards[1];
AFFILIATION: [1]University of Florida, Gainesville, FL, [2]Convergent Engineering, Gainesville, FL.

Introduction: The electrical activity of the uterus, electrohysterogram (EHG), has long been recognized as being linked to mechanical activity. In fact, EHG analysis may provide information regarding predicting preterm labor(1) and characterizing uterine contractions(2). This study compared EHG-derived contraction parameters with the gold-standard, intra-uterine pressure (IUP) monitoring.
Methods: We developed signal processing hardware to non-invasively extract the fetal ECG and EHG. After written, informed consent and skin preparation, an array of eight 3-cm^2 $Ag/AgCl_2$ electrodes was placed over the maternal abdomen and signals amplified with high gain, low noise amplifiers. All signals were measured with respect to a reference electrode, with driven right leg circuitry to reduce common mode noise. The amplifier 3dB bandwidth is 0.1Hz and 100Hz, with a 60Hz notch. The contraction location was derived by downsampling the signal at 20Hz, filtering at 0.015Hz (EHG) or 0.03Hz (IUP), then low pass filtering at 0.003Hz. Contraction localization was the time of maximum amplitude. Contractions were rejected if: duration <30s, amplitude <40% of mean of last 10 contractions. We report detection rate (# EHG contractions/ # IUP contractions), over-detection rate (% additional EHG contractions) and timing.
This study evaluated term laboring subjects who were simultaneously monitored by IUPC placed for obstetric indications. Invalid data regions from IUP or EHG signals were cropped.
Results: From 51 patients (maternal weight 94.5±25.6 kg), 3343 contractions were detected in the IUP tracings. EHG detected 95.1±8.2% of these, with an 8.3±10.7% over-detection rate. EHG-derived contractions are left-shifted relative to IUP with an earlier detection (-8s±14s) but similar duration (56.8±12.2s vs 56.3±10.9s for IUP and EHG, respectively). See figure.



Discussion: Because EHG and IUP detect different signals (electrical vs mechanical) generated by the same event, it is expected that their timing might differ. Specifically, electrical activity stimulates contractions and, therefore, should anticipate the increase in intrauterine pressure. With improved signal processing and clinical analysis, the EHG-derived contraction curve has the potential to improve upon the information obtained from a tocodynamometer, and perhaps serve as a non-invasive surrogate for the IUP.References: (1)Obstet.Gynecol. 101:1254,2003. (2)Am.J.Obstet.Gynecol. 193:23,2005.

ORAL PRESENTATIONS #2

A-17.

CSF CONCENTRATION DOES NOT PREDICT ONSET OR DURATION OF SPINAL FENTANYL FOR LABOR ANALGESIA

AUTHORS: K. E. Nelson, J. C. Eisenach;
AFFILIATION: Wake Forest University, Winston-Salem, NC.

Introduction. Cerebrospinal fluid (CSF) circulation occurs at variable rates in volunteers.[1] Furthermore, CSF flow velocity influences the duration of spinal bupivacaine.[2] We tested the hypothesis that CSF velocity, which occurs in a pulsatile manner tied to the cardiac cycle, would affect the onset and duration of labor analgesia with spinal fentanyl by using a novel approach to indirectly estimate initial CSF mixing velocity by measuring CSF fentanyl concentration.
Methods. Fifty six women were enrolled and 52 completed the study. Upon request for labor analgesia, CSE was performed in the sitting position. Spinal fentanyl 50μg in saline 2ml was injected over 10 seconds, and the stylette replaced. One minute later, 0.5ml of CSF was collected. An epidural catheter was inserted for later use. Time to onset of analgesia, pinprick levels at 5 and 15 minutes, and duration of analgesia were recorded. Maternal vital signs and continuous FHR monitoring were recorded throughout.
Results. Pain score upon entry was 7.8 ± 0.2 cm on a 10 cm VAS. Sampling was completed at 72 ± 0.5 sec after injection, with a range of 67-81 sec. CSF fentanyl concentrations were 3.1 ± 5.9 μg/ml, with a 7 fold range (0.9-5.9 μg/ml). There was no relationship between time of sampling and CSF fentanyl concentration. CSF fentanyl did not correlate with onset, sensory level at 5 and 10 min, or with duration of analgesia. Additionally, CSF fentanyl was not related to blood pressure, heart rate, or their sum or product. There were significant positive relationships ($P<0.03$) between sensory level at 5 min or at 10 min and onset ($R=0.29$ and 0.32, respectively) and a negative relationship ($P<0.03$) between onset and duration ($R=-0.29$). There was a significant positive relationship ($P<0.03$) between height and duration ($R=0.30$).
Discussion. These data with spinally administered fentanyl for analgesia confirm previous observations with spinally administered local anesthetics for surgery which indicate a negative relationship between onset and duration, with shorter onset times correlating with longer duration.[2] We failed, however, to confirm our primary hypothesis, that extent of rapid mixing would negatively correlate with onset and duration. We also failed to observe an effect of blood pressure or heart rate on CSF drug concentration. We conclude that a sample of CSF shortly after injection does not predict the clinical characteristics of analgesia during CSE for labor.
References:
1. Eisenach et al. Anesthesiology 2003; 99: 166-73.
2. Higuchi H et al. Anesthesiology 2004; 100: 106-11.

A-18.

COMBINED SPINAL-EPIDURAL VERSUS EPIDURAL ANALGESIA IN MULTIPAROUS WOMEN

AUTHORS: S. R. Goodman, R. M. Smiley, M. A. Negron, P. A. Freedman, R. Landau;
AFFILIATION: Columbia University, New York, NY.

Introduction: While patient satisfaction has been reported to be higher with combined spinal-epidural (CSE) versus epidural (EPID) analgesia (1), controversy exists regarding which technique is better. We presented non-randomized, non-blinded data (2) suggesting that parturients who received CSE early in labor required fewer boluses of analgesic medication (top-ups) compared to EPID (52% EPID vs. 27% CSE, $p<0.01$). The CSE group also delivered faster (266 minutes vs. 356 minutes EPID, $p<0.05$). The difference between top-up requests was largest in multiparous women, therefore the current randomized study was performed in this sub-group to confirm these findings.
Methods: After IRB approval and informed consent, 100 ASA I or II multiparous women at term (37-41 weeks gestation) in early labor (<5cm) requesting analgesia were randomized in double blind fashion to receive one of the following:
-EPID: Bupivacaine (Bup) 0.25% 3ml "test dose" + Bup 0.125% 10ml with fentanyl 50mcg "loading dose";
-CSE: Intrathecal Bup 2.5mg + fentanyl 25mcg;
Both groups received an infusion of Bup 0.0625% with fentanyl 2mcg/ml @12ml/hr. Top-ups were administered upon patient request according to a protocol (first top-up Bup 0.25% 5ml + fentanyl 50 mcg). The need for any top-up, time from analgesia until first top-up, and time to delivery were recorded. Demographic data and mode of delivery were recorded. Data were analyzed using Student's t-test, Chi Squared, Mann Whitney and Kruskall Wallis tests as appropriate ($p<0.05$ significant). Time data is reported as median (interquartile range) because it was non-normally distributed.
Results: There was no significant difference in percentage of patients requesting top-ups between the two groups (44% CSE vs. 51% EPID) nor in the need for multiple top-ups (14% CSE vs. 15% EPID). The cesarean section rate was not different between the groups (10% CSE vs. 13% EPID). The time (in minutes) from analgesia to request for first top-up was 144 (129, 204) in CSE patients vs. 160 (70, 239) in EPID, and time to delivery was 159 (110, 265) in CSE vs. 197 (119, 287) in EPID and did not differ between the groups. There was no difference in cervical dilation at study entry or neonatal weight between the groups.
Discussion: Assuming that the need for top-ups is an indicator of analgesia quality, our findings suggest that for multiparous patients who are early in labor, there is no difference between the use of CSE or EPID in terms of analgesia quality. It is likely that our non-randomized study results were biased since the patients who were given CSE had greater cervical dilation and shorter time from analgesia to delivery compared to EPID. The current study provides further evidence for the need for randomized studies.
References: 1. Cochrane Database Syst Rev 2003; 4:CD003401 2. SOAP 1999, A18.

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ORAL PRESENTATIONS #2

A-19.

ANESTHESIA-RELATED MATERNAL MORTALITY IN MICHIGAN: 1985-2003

AUTHORS: J. M. Mhyre[1], M. N. Riesner[1], V. Grigorescu[2];
AFFILIATION: [1]University of Michigan Health System, Ann Arbor, MI, [2]Michigan Department of Community Health, Lansing, MI.

Introduction: Michigan Maternal Mortality Surveillance (MMMS) has been conducted by the State of Michigan since 1950. We reviewed case files from 1985 to 2003 to identify opportunities for anesthesiologists to decrease the incidence of maternal death.
Methods: Case ascertainment for MMMS relies on multiple sources, including voluntary report by care providers. In addition, the Michigan Department of Community Health matches death certificates for all women of reproductive age (10 to 45 years) with live birth certificates for that year and the prior year. Starting in 1999, the Michigan Office of Vital Statistics has electronically linked women's death certificates with records of live birth and fetal death. Resulting case files include hospital records, autopsy reports, death certificates, a standardized summary, and a report from the MMMS medical review committee. Two authors reviewed each file to classify cases according to definitions reported in the Confidential Enquiries into Maternal Deaths in the UK(1), and to identify cases that appeared to involve peripartum or perioperative disasters in anesthetic, airway, hemodynamic or cardiovascular management.
Results: From 1985-2003, 855 pregnancy-associated deaths were reported to the State of Michigan. Of these, 490 were pregnancy-related. Five deaths resulted from failures in airway management. There were two hypoventilatory arrests during emergence from general anesthesia, both prior to 1990. Three deaths resulted from lost airway or failed intubation in the ER or ICU. Three of five women were morbidly obese, one was obese, one had unknown weight. In 5/56 cases of postpartum hemorrhage, signs of bleeding were missed, and led to delays in diagnosis, resuscitation, and obstetric intervention. Of 129 cardiovascular deaths, 17 may have been prevented with meticulous perioperative hemodynamic management (n=12), treatment of cardiomyopathy prior to induction of labor (n=3), and communication with long-term care providers about perioperative cardiac abnormalities (n=2). One patient experienced local anesthetic toxicity following paracervical block for elective abortion. One morbidly obese woman died after an uneventful cesarean section under spinal. The documentation was consistent with postoperative PCA overdose and hypoventilatory arrest.
Discussion: From 1985-2003, there were only 2 pregnancy-related deaths due to perioperative airway disaster. To continue to reduce the incidence of maternal mortality, anesthesiologists should: 1) maintain current safety procedures for anesthetic care; 2) offer consultation services for optimal airway management for selected obstetric patients in non-operative settings (obese parturients with evolving illness, critically ill parturients with airway edema); 3) encourage interdisciplinary preparedness initiatives (emergency drills); 4) develop fail-safe systems for postoperative hemodynamic monitoring and management of postpartum hemorrhage; 5) carefully evaluate every parturient for symptoms of cardiovascular disease; and 6) relay observations gathered during the anesthetic to those responsible for the patient's long-term medical care.
References:(1)Report on confidential enquiries into maternal deaths in the United Kingdom, 2000-2002

BEST PAPER PRESENTATIONS

A-20.

MATERNAL PNEUMOPERITONEUM WITH CARBON DIOXIDE DOES NOT DEPRESS NEAR-TERM FETAL SHEEP CEREBRAL OXYGENATION

AUTHORS: M. B. Moeller[1], K. Shimazutsu[1], D. J. McClaine[1], M. C. Jones[1], S. Eubanks[2], J. S. Stamler[1], J. D. Reynolds[1];
AFFILIATION: [1]Duke, Durham, NC, [2]University of Missouri, Columbia, MO.

Introduction: Laparoscopy for non-obstetric related surgery during pregnancy is increasing in popularity despite incomplete knowledge of all its effects. Several research groups have determined that peritoneal insufflation of pregnant animals can produce significant fetal hypercarbia and acidosis. However, it is unclear if such systemic effects actually alter the supply of oxygen to the developing brain. Using near-term pregnant sheep, the goal of the present study was to monitor for changes in fetal cerebral oxygenation during a period of maternal insufflation with CO_2.
Methods: Ewes and fetuses at gestational day 120 (n=9) were surgically-instrumented with arterial catheters and a near-infrared spectroscopy (NIRS) probe was secured to the fetal brain to record changes in cerebral oxygenation (viz, oxygenated, deoxygenated, and total hemoglobin; oxyHb, deoxyHb, and totalHb) along with relative changes in blood flow. After a 2-3 day recovery period, each ewe was anesthetized (1.5-2.0% isoflurane in oxygen) and prepped; through out the pneumoperitoneum study ventilation was actively managed to keep end-tidal CO_2 below 40 mm Hg. After a baseline recording period, each ewe was insufflated with CO_2 to a final abdominal pressure of 15 mm Hg. Pneumoperitoneum was maintained for 60 min after which the animal was manually-deflated. Cardiovascular and NIRS parameters were continuously recorded while blood gas status was determined before and at 15 min intervals during insufflation.
Results: Insufflation produced the expected (and previously described) systemic effects on the ewe and fetus. On the maternal side there was a rise in heart rate and blood pressure and a decline in uterine blood flow; on the fetal side, we observed bradycardia, acidosis (pH nadir of 7.20 ± 0.05), and hypercarbia (pCO_2 peak of 75 ± 11 mm Hg). Fetal SaO_2 initially increased in response to anesthesia but returned to baseline levels during insufflation. With respect to fetal cerebral oxygenation, oxyHb increased during general anesthesia (range 116 ± 6 % to 127 ± 27% of the awake baseline level, $p=0.001$) and trended even higher during insufflation. Reductions in deoxyHb and increases in totalHb, while not significantly different from their respective baseline, were sufficient to temporally account for the increase in oxyHb.
Conclusion: In the near-term fetus, maternal pneumoperitoneum significantly alters cardiovascular and blood gas parameters but these systemic changes do not affect the supply of oxygen to the fetal brain. While it is premature to conclude that laparoscopy during pregnancy is safe, the present findings do indicate that insufflation changes systemic but not central fetal physiologic status.
Supported by grants HD042471 and NS42664 from the NIH.

BEST PAPER PRESENTATIONS

A-21.

3 HOLES ARE NOT BETTER THAN 1: A RANDOMIZED, PROSPECTIVE COMPARISON OF 2 WIRE-REINFORCED EPIDURAL CATHETERS FOR LABOR ANALGESIA

AUTHORS: J. E. Spiegel, M. Chahal, A. Vasudevan, Y. Li, P. Hess;
AFFILIATION: Beth Israel Deaconess Medical Center, Boston, MA.

The ideal labor epidural catheter design incorporates ease of placement, and consistent and uniformly distributed analgesia. Using these criteria we performed a large, randomized, prospective study to compare the efficacy of 2 flexible, wire-reinforced epidural catheters: the single, end-hole (Arrow) catheter, and the 3-holed, lateral eye (Portex) epidural catheter for labor analgesia.
Methods: With institutional approval, parturients were randomized to receive 1 of 2 wire-reinforced catheters; either a single, end-hole (Arrow) catheter, or a 3-holed (Portex) epidural catheter at the time of request for labor analgesia. A 3cc, 1.5% lidocaine with epinephrine test dose was given through the epidural catheter. A subsequent 15cc bolus of bupivacaine 0.04/fentanyl1.67mcg/cc was administered followed by 15cc/hr of the same solution. Patients were assessed for initial quality of analgesia, IV or IT placement, bolus rate, catheter failure, need for replacement, and success for c-section. Data was analyzed by Chi Square analysis where $P<0.05$ was considered significant.
Results: We enrolled a total of 500 term parturients for analysis. There were no significant differences between the groups with respect to patient demographics, parity, neonatal weight, cervical exam at the time of placement, and mode of delivery. There were no differences between groups with respect to incidence of parasthesias on catheter insertion, and inadvertent IT or IV placements. Unsuccessful initial analgesia was described as asymmetric, unilateral, breakthrough in a covered area, or no sensory block. Group A (Arrow catheters) had an initial analgesia success rate of 79.6%, and Group B (Portex catheters) had a success rate of 74.4%, $P=0.52$; overall, 6% of the Group A catheters required replacement versus 10% of the Group B catheters, $P=0.14$. Five Arrow catheters proved difficult to pull from the epidural space and required persistent manipulation to remove.
Discussion: Previous studies have shown the superiority of the 3-holed, lateral eye catheter for labor analgesia when nylon catheters were tested. This is the first study to examine if similar differences exist with the newer flexible, wire-reinforced catheters. Contrary to previous studies, there appears to be no benefit to the 3-holed design over a single hole with respect to catheter success. One explanation for this is due to mechanics of differential flow during slow epidural local anesthetic infusions; unless a bolus is administered, flow travels preferentially via the proximal hole of the 3-hole design at normal infusion rates of 8-15cc/hr, as tested in vitro. Portex catheters were preferred over Arrow catheters due to the problem of occasional difficulty with removal. Careful withdrawal of the Arrow catheter and placing the patient upright facilitated removal. Whether labor analgesia managed by boluses rather than continuous infusion is more successful when using 3-holed catheters versus a single hole, is unknown.
1. Anesth Analg 1997; 84(6):1276-1279 2. JCA 9:109-112, 1997

A-22.

NEUROPATHIC INJURY TO THE LEVATOR ANI OCCURS IN 1 IN 4 PRIMIPAROUS WOMEN

AUTHORS: A. C. Weidner, V. Branham, M. M. South, K. L. McKiernan-Borawski, M. G. Jamison, H. A. Muir;
AFFILIATION: Duke University Medical Center, Durham, NC.

Introduction: We measured levator ani neuromuscular function before and after the first obstetric delivery to identify the location, timing, and mechanism of injury.
Methods: Fifty eight primiparous women recruited in the early third trimester underwent concentric needle electromyographic (EMG) exam of the levator ani at four sites (right and left, lateral and medial) during voluntary muscle contraction. Exams were repeated 6 weeks and 6 months post partum. Data were saved digitally and analyzed using a quantitative EMG analysis program to assess muscle. Turns/amplitude analysis was used, measuring the relationship between density of the muscle recruitment pattern (represented by electrical turns in direction around the baseline) and amplitude of the motor unit potentials in μV. This method yielded an XY plot of number of turns vs. log(amplitude). Turns/amplitude data from all 58 subjects at the antepartum visit were pooled to create a normal range through the full muscle. Individual subjects with ≥10% of observed data points outside 95% confidence intervals of the normal range were considered abnormal. We calculated percent outliers for each subject at both 6 weeks and 6 months post partum at each muscle site and assessed relationships between mode of delivery and extent of injury. Appropriate obstetrical and demographic data were collected.
Results: Of the 58 subjects, 36 had spontaneous vaginal delivery, 8 operative vaginal delivery, 11 cesarean sections in labor, and 3 elective cesareans without labor. Body mass index at 6 months post partum was 26±5.6 kg/m^2. Neonatal weight was 3337±590g. At 6 weeks post partum, 14/58 (24.1%) had EMG evidence of abnormal muscle function with 9 of 14 recovering by 6 months. At 6 months post partum, 17/58 (29.3%) were abnormal, including 12 new injuries that were not evident at 6 weeks. Subjects having cesarean in labor had the greatest proportion of levator injury at 6 weeks, while subjects having vaginal delivery had a slightly greater proportion of injury at 6 months. Subjects having elective cesarean had virtually no injury. Analysis by muscle site showed injury across all sites. Women who had either spontaneous vaginal delivery or cesarean in labor sustained more injury to lateral muscle sites, whereas operative vaginal delivery was associated with greater injury to the medial muscle, particularly on the right.
Discussion: Obstetrical delivery is frequently associated with EMG evidence of neuropathic injury to the levator ani both in the early and late post partum period. While some spontaneous recovery occurs, new observations of abnormal muscle at 6 months are consistent with the established mechanism of recovery from a neuropathic injury and emphasize the lengthy time course of muscle repair. Our observed localization of injury indicates that the entire levator ani complex is at risk and that cesarean in labor is not protective.

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BEST PAPER PRESENTATIONS

A-23.

TOCOLYTIC DESENSITIZATION: PLASMALEMMAL SODIUM CALCIUM EXCHANGER (NCX) ACTIVITY AND FUNCTION IN MYOMETRIAL CYTOSOLIC FREE CALCIUM CONCENTRATION ($[CA^{2+}]_{CYT}$) OSCILLATIONS AND RELAXATION

AUTHORS: M. K. Slodzinski;
AFFILIATION: Johns Hopkins University, Baltimore, MD.

Introduction: Preterm birth occurs in 12% of all delivery in the United States, accounting for $7.4 billion (2002) hospital charges for premature infants. Because of densentization, tocolytics only temporally abate preterm labor. In a paradigm shift to understand tocolytic desensitization, I shifted focus to myometrial relaxation, i.e., decrease in $[Ca^{2+}]_{cyt}$. In rodents, the expression of the NCX, a $[Ca^{2+}]_{cyt}$ reducing protein, increases during gestation. In human cells, two hypotheses were examined. First, the NCX is present and critical for quiescent gestation. Second, expression of the NCX is a unifying factor in tocolytic desensitization.

Methods: Human myometrial myocyte culture was obtained from the lower uterine segment of a pregnant woman undergoing elective cesarean delivery at term. Intracellular calcium concentrations ($[Ca^{2+}]_{cyt}$) were measured using ratiometric imaging (340/380nm; fura-2/am, 2μM) on a Nikon TE2000 microscope (40x fluorescent lens) with DG-4 illumination (340/380nm excitation). Western blots (using standard molecular techniques) were stained with monoclonal NCX1 or smooth muscle specific actin antibodies and counterstained with horseradish peroxidase labeled secondary antibodies..

Results: Previously, I reported Na^+ dependent Ca^{2+} efflux and influx were present in human myometrial cells. Now, I show that inhibition of NCX activity (reduction of extracellular Na^+ to 5 mM) augments oxytocin increase $[Ca^{2+}]_{cyt}$. Furthermore, in cells that responded to oxytocin with $[Ca^{2+}]_{cyt}$ oscillations, inhibition of NCX increased the rate and amplitude of oscillations. With terbutaline (10μM) or Mg^{2+} (5mM), an in vitro tocolytic effect was produced; oxytocin induced increase in $[Ca^{2+}]_{cyt}$ was blocked for 48 hours. After 72 hours, the inhibitory effects of terbutaline and Mg^{2+} diminished as the myometrial myocytes desensitized to tocolysis. At 96 hours exposure, full tocolytic desensitization was observed (terbutaline and Mg^{2+} groups were identical to controls). Next, NCX protein expression was determined during tocolytic densentization. In both, terbutaline and Mg^{2+}, NCX expression initially increased with tocolytic application. After 72 hours, the physiological beginning of tocolytic desensitization, NCX protein expression began to decrease. Therefore, NCX protein expression temporally correlated with tocolytic desensitization of two tocolytics that act through separate pathways.

Discussion: In this model of tocolytic desensitization, NCX activity and expression initially increased with the application of two agents (terbutaline and Mg^{2+}) that act through separate pathways. After 72 hours (correlating with tocolytic desensitization) CX expression decreased. Overall, this is very novel evidence of a unifying role of NCX in human tocolytic desensitization.

A-24.

MRI FOLLOWING NEURAXIAL ANALGESIA. CAN A RADIOLOGIST DETERMINE WHAT IS PATHOLOGIC?

AUTHORS: E. M. Davidson, L. Garcia, E. M. Sklar, R. G. Bhatia, I. M. Hernandez, J. Frohock, D. J. Birnbach;
AFFILIATION: Miller School of Medicine, University of Miami, Miami, FL.

Introduction:

Epidural & spinal infections, hematoma and injury are rare complications of neuraxial blocks. Conformation of diagnosis is an emergency since neurological prognosis worsens if there is a delay between the spinal insult and decompressive laminectomy.

The clinical symptoms of spinal infection or bleeding are non-specific especially at the early and evolving stage. Moreover, the classical features of epidural hematoma (i.e., backache, neural deficits) may be masked by the neuraxial block.

The gold standard imaging diagnostic test applied to this clinical condition is MRI, however baseline studies to define normal MRI following epidural infusions have not been performed. Radiologists may be confused since it has been suggested that epidural infusions, unintended epidural vein puncture, and CSF leak following dural puncture may all cause a distortion of the MRI image that may mimic spinal pathology although having no clinical significance.(1)

Patients who develop symptoms after injection will often undergo MRI evaluation and thus there is a need for a characterization of "normal" findings after epidural injection and infusion.

The purpose of this study was to determine the normal MRI findings in parturients after uneventful epidural labor analgesia by comparing the MRI findings in parturients who received epidural analgesia to those who did not.

Methods:

Following IRB approval and signed informed consent, 30 parturients were prospectively enrolled; 15 women who received CSE and 15 women who delivered without receiving epidural analgesia. After completing an uneventful delivery and removal of the epidural catheter (in the women who received epidurals) they received an MRI of the lumbar spine, within 12 hours.

MRI images were reviewed by 2 neuroradiologists who were blinded to patient group.

They evaluated the MRIs for the presence of epidural fluid collections, air, and hematoma. They also stated whether a needle tract could be identified and if they could determine if an epidural injection preceded the MRI study.

Results:

There were no fluid collections, hematomas, or mass effect on the thecal sac in any of the 30 MRI studies. A small amount of epidural air was seen in 73/80% (reader 1/reader 2) and an injection track was identified in 40/60% in the studies that were preformed after injections. The readers were able to correctly identify if an epidural injection preceded the MRI study in 90/93% of the cases.

Discussion:

Following neuraxial analgesia for labor, MRI findings were present that allowed the reader to identify that the injection had occurred. The lack of significant collections or mass effects seen in our uncomplicated patients suggests that the presence of these findings in patients who undergo MRI for new onset of neurologic symptoms after neuraxial techniques should be considered pathologic.

References:

1. AJNR 26:991-995, May 2005

BEST PAPER PRESENTATIONS

A-25.

THROMBOEMBOLISM RISK ASSESSMENT: GUIDELINES ALONE WILL NOT CHANGE PRACTICE!

AUTHORS: R. Ledger, R. Sashidharan;
AFFILIATION: The Royal London Hospital, London, United Kingdom.

Introduction: Thromboembolism remains the leading direct cause of maternal death in the UK.[1] The most recent report on confidential enquiries into maternal deaths found that following the introduction of the RCOG guidelines on thromboprophylaxis,[2,3] although deaths after caesarean section have fallen dramatically, deaths after vaginal deliveries have unfortunately not improved.[1]
Methods: For a period of 6 weeks, we prospectively audited the presence or absence of risk factors and the use of thromboprophylaxis in all women admitted to our unit. The mothers were classified as low/medium risks for labour and moderate/high risk for caesareans according to RCOG risk assessment profiles. [2,3] Staff caring for the mothers was not aware of the audit. We compared the results with our previous audits in 1999 and 2003 following which local guidelines were developed.
Results: A total of 310 women were reviewed during this period. All women who had caesareans who were considered to be at risk received prophylaxis. Although all medium risk women in labour received thromboprophylaxis, only 12% of the low risk women received prophylaxis. On the other hand none of the women in the audit developed deep vein thrombosis or pulmonary embolus.
Discussion and conclusion: Our audits confirm the findings of the last confidential enquiries into maternal deaths in the UK. The last three reports recommended that all women with risk factors should be carefully screened and consideration should be given to a wider use of thromboprophylaxis. Despite the establishment of guidelines in our unit for thromboprophylaxis for both women having caesareans and in labour, improvement in practice was seen only in one group of women. Developing guidelines alone will not improve practice. Re-audits, education, changes in attitudes and practice by members of staff is needed if improved outcomes are to be achieved.
References
1. Dept. of Health. Why mothers die. Report on Confidential Enquiries into Maternal and Child Health in the United Kingdom 2000-02. London: TSO, 2004.
2. Thromboprophylaxis during Pregnancy, Labour and after Vaginal Delivery. RCOG Clinical Green Top Guidelines 2004.
3. RCOG Working Party on Prophylaxis against Thromboembolism 1995.

At risk women given thromboprophylaxis		
Labour	2003	2005
Low Risk	0/58 (0%)	2/17 (12%)
Medium Risk	8/21 (38%)	3/3 (100%)
Caesareans	1999	2005
Moderate Risk	12/65 (18%)	21/21 (100%)
High Risk	3/21 (14%)	7/7 (100%)

POSTER REVIEW 1

A-26.

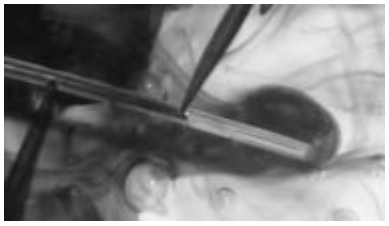
FLOW DYNAMICS OF MULTI-PORT EPIDURAL CATHETERS.

AUTHORS: A. Vasudevan, P. Hess, M. Hanna, A. Wall, B. Jakubowicz;
AFFILIATION: Beth Israel deconess Medical center, Boston, MA.

Introduction:The aim of this in vitro model was to asses flow characteristics through multi port (Portex) epidural catheters. Our aim was to asses variations, in flow characteristics with variations in infusion rates.
Methods: This simplified model utilized a fluid layer. A multi port catheter was placed in the fluid. A standard epidural solution with Methylene blue was used. Flow through the catheter was initiated at 15mls/hr via a Baxter pump. This was followed by a bolus.
Results: At 15 ccs/hr flow occurred through the proximal and the middle ports only (fig.1). A bolus of 3ccs (similar to a test dose) was administered. This changed the flow characteristics and flow occurred through all ports (Fig.2). Background infusion was reestablished.Over a period of time, flow occurred through the proximal port only. Each time a bolus dose was administered, the dispersion was multidirectional.
Discussion: The observation from this model suggests that a multiport catheter might develop end hole catheter characteristics with continuous infusions. With periodic boluses flow rates increase and multiport function is re-established. Gravity usually does not strongly influence the spread of drugs in the epidural space unlike spread of drugs in cerebro spinal fluid where baricity and gravity influence spread. In the clinical scenario where a parturient is in either right or left lateral decubitus position (to avoid aorto caval compression) and has a continuous lumbar epidural infusion gravity may have a greater influence in the spread of drugs in the epidural space. This may be one of the reasons for the development of unilateral blocks even with a functioning multiport catheter. (1)
Reference:
Beilin Y, Zahn J, Bernstein HH, Zucker-Pinchoff B, Zenzen WJ, Andres LA.
Treatment of incomplete analgesia after placement of an epidural catheter and administration of local anesthetic for women in labor. Anesthesiology. 1998 Jun;88(6):1502-6.

Fig 1

fig2



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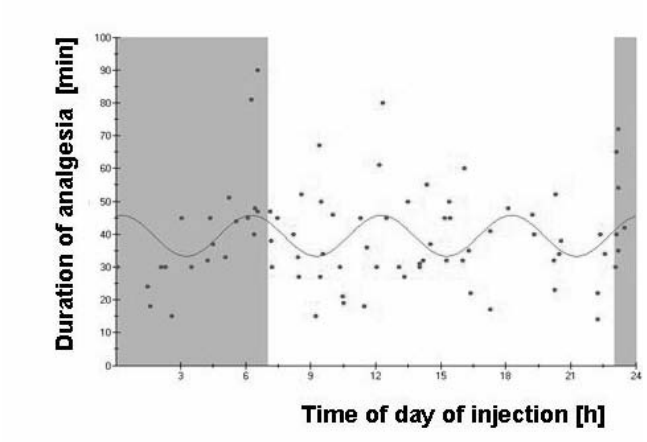
POSTER REVIEW 1

A-27.

CHRONOBIOLOGY OF SPINAL BUPIVACAINE DURING INTIAL PHASE OF LABOR

AUTHORS: D. Chassard[1], E. Boselli[1], N. Thenoz[1], L. Bouvet[1], B. M. Scavone[2], B. Lemmer[3], B. Bryssine[1];
AFFILIATION: [1]Hotel Dieu Hospital, Lyon, France, [2]Northwestern Medical Faculty, Chicago, IL, [3]University Heidelberg, Mannheim, Germany.

Introduction: A temporal pattern of the kinetics of local anaesthetics has been demonstrated when injected into the epidural space, with an important variation in the duration of action related to the hour of administration [1]. The aim of this study was to determine whether the hour of the injection could influence the duration of spinal plain bupivacaine during labor.
Methods: After informed consent, women with singleton term pregnancies in vertex presentation, cervical dilation < 5 cm, pain score > 5 and requesting labor analgesia were enrolled in this study. Spinal bupivacaine (2.5 mg, 2 mL) was administered. When additional analgesia was requested (visual analog score > 40 mm), the study protocol was terminated and analgesia duration was recorded. The time from study drug administration until a request for additional analgesia was assessed as duration of analgesia. The duration of action of intrathecal bupivacaine was analyzed by the COSINOR method which calculates the mesor (rhythm-adjusted mean), amplitude (half of the peak-to-trough of the rhythm adjusted harmonic), and acrophase (time of occurrence of the rhythm adjusted harmonic).
Results: Eighty two women were enrolled. Rhythm analysis revealed a mean (± SD) duration of analgesia (mesor) of 39.5 ± 1.6 min (Figure 1). A highly significant 06-h rhythm was found, with four peaks: one was near noon ($P < 0.05$). The amplitude of this 6-h component was 6.2 ± 2.3 min.
Conclusion: Spinal analgesia duration at the first stage of labor with small doses of plain bupivacaine exhibits a temporal pattern throughout the day period. With spinal sufentanil, we have previously observed a 12-h rhythm [2]. Interestingly, with bupivacaine there is again one peak around noon as found with spinal sufentanil and epidural ropivacaine. The duration of intrathecal bupivacaine analgesia exhibited a temporal pattern with 25% variations throughout the day period. The lack of consideration of chronobiological conditions in intrathecally administered analgesia studies can cause significant statistical bias.
References: [1] Anesthesiology. 101:978-982, 2004 [2] Anesthesiology. 96:542-545, 2002

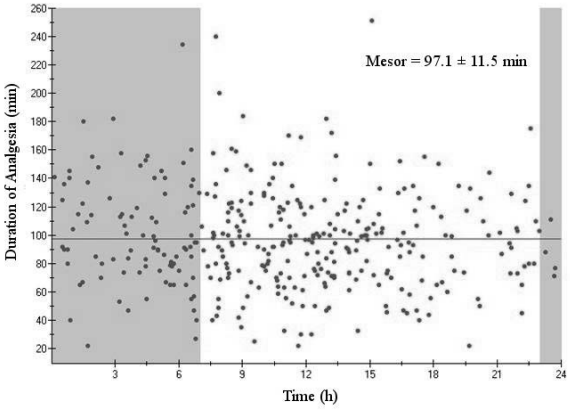


A-28.

INFLUENCE OF CHRONOPHARMACOLOGY ON DURATION OF INTRATHECAL FENTANYL LABOR ANALGESIA

AUTHORS: B. M. Scavone[1], R. J. McCarthy[1], C. A. Wong[1], J. T. Sullivan[1], D. Chassard[2];
AFFILIATION: [1]Northwestern University Feinberg School of Medicine, Chicago, IL, [2]Hopital de L'Hotel-Dieu, Lyon, France.

Introduction: Studies have demonstrated chronopharmacologic properties for intrathecal labor analgesia, and investigators have suggested this may impact the findings of clinical studies.[1,2] The purpose of this secondary analysis of data collected as part of a RCT comparing parturients who received CSE versus systemic opioid analgesia early in labor was to examine whether a chronopharmacologic effect of intrathecal fentanyl existed.[3]
Methods: Analgesic naive, nulliparas in spontaneous labor (n=366) were randomized early in labor (<4cm dilation) to receive intrathecal fentanyl 25µg followed by a standard lidocaine/epinephrine epidural test dose at first analgesia request in this IRB approved study. Verbal rating scores for pain (VRSP) were obtained at first and second analgesic requests, as was the subject's assessment of average pain between requests. Duration of analgesia was defined as the time from initial to second analgesia request. Rhythm analysis was performed using a non-linear WIN-ABPM-FIT program.[4] The analysis calculates the mesor (rhythm-adjusted mean), the amplitude (half of the peak-to-trough of the rhythm-adjusted harmonic), and the acrophase (time of occurrence of the rhythm-adjusted harmonic). Data were evaluated for 24, 12 and 8 hour harmonics. $P < 0.05$ was required to reject the null hypothesis.
Results: Data from 342 subjects were evaluated. The mesor of the VRSP at first analgesia request was 7.9±1.5 and did not exhibit harmonic variation. Likewise no harmonic patterns were observed for the VRSP at second analgesia request (5.0±2.3) or for the duration of analgesia (Figure). A 24 hour harmonic cycle was seen for both cervical dilation at analgesia request and average VRSP ($P<0.01$). Maximum and minimum cervical dilation were near 5pm and 5am, and average VRSP at 10pm and 10am, respectively.
Discussion: We found no chronobiology influence on duration of intrathecal opioid analgesia, although diurnal rhythms were found for cervical dilation at analgesia request and average VRSP. Differences in our findings from those previously reported may be due to a higher fentanyl dose, the local anesthetic test dose, collection of data over a wider time period, as well as total sample size. In addition, examination of periodicity of analgesia effectiveness was not a primary objective of the study (Hawthorne effect). Chronobiology as a possible confounding factor in labor analgesia studies requires further study.
References: 1)Anesthesiology 2004;101:978. 2)Anesthesiology 2005;103:595. 3)N Eng J Med 2005;352:655. 4)Chronos-Fit, http://www.ma.uni-heidelberg.de/inst/phar/forschunglemer.html, 2004.



POSTER REVIEW 1

A-29.

A COMPARISON OF COMBINED SPINAL-EPIDURAL-PCA ANALGESIA WITH CONTINUOUS EPIDURAL-PCA ANALGESIA ALONE FOR LABOR PAIN

AUTHORS: S. Cohen, D. Zuker, C. B. Pantuck, C. W. Hunter, A. Solina, N. Prieto, D. New;
AFFILIATION: UMDNJ-RWJMS, New Brunswick, NJ.

We provide epidural with ambulation using ropivacaine (R) 0.04%, sufentanil (S) 1mcg/ml & epinephrine (E) 2mcg/ml. We determined whether the addition of spinal sufentanil with ropivacaine to our routine epidural-PCA with ambulation can improve our neuraxial analgesia technique for labor pain.
Following IRB approval and informed consent 136 parturients who requested epidural analgesia for labor pain were randomized to: Group I (n= 68): received CSE which was initiated by intrathecal R 2mg + S 5mcg via PENCAN 25g spinal needle followed by epidural-PCA analgesia. Group II (n=68): received 20 ml of R 0.04% + S 1 mcg/ml + E 2 mcg/ml epidural study solution followed by epidural-PCA analgesia. All p'ts received an infusion of the study solution at 4ml/hr, PCA dose 4ml, lockout time 10min (Abbott PCA pump). After initial neuraxial dose administration (time = 0min), p'ts were queried with each contraction as to their satisfaction with analgesia. If at time = 20min, VAS>3, p'ts were given a 5-10ml bolus of the study solution every 10min for a maximum of 20ml as needed until VAS≤3. If analgesia was still inadequate (VAS>3), p'ts were rescued with 5ml of 0.25% R every 10min as needed to a max of 20ml & p'ts could no longer ambulate. At each interval where intervention was required the infusion rate was increased by 2ml/hr to a maximum of 16ml/hr. Pain, nausea, pruritus, sedation, and motor block were evaluated hourly, or sooner if intervention was required. Patients were asked to rate their satisfaction for 1st stage, 2nd stage, and overall. Data were expressed as mean ± SD.
There were no differences among the groups with respect to weight, height & parity. 1st & 2nd stage duration, initial cervical dilation, total infusion time, pain scores at time of satisfaction, IV pitocin, pruritus, sedation, nausea, vomiting, urinary retention, 1st & 2nd stage & overall satisfaction, number of patients able to ambulate, or APGAR scores. Thirty two (47%) & 41 (60%) parturient ambulated in G I & II respectively.

	Initial pain score	Fetal Brady During 1st 30min n(%)	Infus Time (min)	Inf Total vol (ml)	PCA vol (ml)	Extra bolus vol (ml)	Resc ropiv .25% (ml)	Itime to full sat-isf (min)	Pru-ritRx n(%)	Motor bl <5 (n)	lowBP Rx (n)	Bladder Cath n (%)
Gr I N=68 CSE	7.8±2*	7(13)	333±248	69±43	22±20**	12±13	2.6±4.6	8.4±6.8***	42 (78)**	54 (79)***	0	15 (22)
Gr II N=68 Epi	6.9±3	3(4.4)	293±215	60±43	13±13	12±12	2.8±6	15.6±6.7	38 (56)	68 (100)	3	23 (34)

*GI>II, p=0.03, **GI>GII, p<0.01, ***GI<GII, p<0.0001
The addition of spinal analgesia to our routine epidural-PCA analgesia with ambulation for labor pain provided a shorter time to full satisfaction without affecting the quality of the block, its side effects, & pt's satisfaction.

A-30.

THE USE OF INTRATHECAL CATHETER AFTER ACCIDENTAL DURAL PUNCTURE

AUTHORS: W. Yi, M. Jackson, D. Santos;
AFFILIATION: Montefiore Medical Center/Albert Einstein College of Medicine, Bronx, NY.

Introduction: When an accidental dural puncture occurs during epidural placement, one can either re-insert the epidural at another site (resite) or thread the epidural catheter in the subarachnoid space (intrathecal catheter). The advantage of the latter is the ability to administer rapid, precise and titratable anesthesia. In addition, the incidence of postdural puncture headache (PDPH) appeared to be lower in the patients who had intrathecal catheter placement when compared to those whose epidurals were resited. We decided to determine if we can improve patient outcome by managing the "wet taps" with intrathecal catheters.
Methods: The anesthesia, medical and billing records of 2223 obstetric patients who received epidural anesthesia between March 1 to December 31, 2005 was reviewed after IRB approval. At the discretion of the attending anesthesiologist, patients who had a "wet tap" either had the epidural resited and managed as epidural anesthesia or the epidural catheter were inserted intrathecally and managed as spinal anesthesia. Patients were followed postoperatively for the development of PDPH and were managed according to established protocols.
Results: Of the 2223 patients, 49 had accidental dural puncture for a rate of 2.2%. Twenty six patients had their epidurals resited (11 delivered by cesarean section (C/S), 15 vaginally) while 23 cases had intrathecal catheters (12 delivered by C/S, 11 vaginally). There was no difference in demographic data between the two groups. The incidence of PDPH in the resited group was 77%; 23% required epidural blood patch (EBP). In the intrathecal group, 35% developed PDPH and 9% required EBP. The average length of stay (LOS) in the resited group was 3.8 days following vaginal delivery and 4.4 days following C/S. On the other hand, the average LOS in the intrathecal group who delivered vaginally was 2.6 days and 4 days following C/S. Three patients from the resited group returned to the Emergency Department (ED) for PDPH. One of these patients returned to the ED three times and also had a CT scan of the head, making a total of 5 visits for the group. Four patients in the intrathecal group returned to the ED for a total of 4 visits. No other complications were noted.
Discussion: PDPH is the most common complication of accidental dural puncture. The headache is often severe and debilitating. Although prevention of "wet taps" is the ultimate goal, our preliminary data is encouraging us to conduct a prospective, randomized study comparing patient outcome between resited epidurals and intrathecal catheters. A few studies have been published showing the effectiveness of intrathecal catheters in reducing the frequency and severity of PDPH, but in our study we were able to demonstrate some difference in average LOS and overall cost.

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A-31.

WOMEN WITH INDUCED LABOR DO NOT RECEIVE BENEFIT FROM DELAYING LABOR EPIDURAL ANALGESIA

AUTHORS: P. E. Hess, A. Vasudevan, S. D. Pratt;
AFFILIATION: Beth Israel Deaconess Medical Center, Boston, MA.

Introduction: The placement of early labor epidural analgesia (LEA) was previously believed to adversely affect the course of labor. It was commonly stated that parturients should wait until 5 centimeters of cervical dilation to minimize the effects of LEA. A recent study showed that women in spontaneous labor who received parenteral narcotics in order to delay LEA had similar obstetric outcomes compared to those who received early epidural placement. Induced labor is associated with a higher operative delivery rate than spontaneous labor; therefore, the effects of LEA may be different. We investigated the outcomes of women undergoing labor induction who requested early pain relief.
Methods: IRB approval was received for this prospective observational trial. 796 consecutive women undergoing labor induction who requested early (<4cm dilation) analgesia were evaluated. Women received parenteral opioid or LEA based on their Obstetrian's protocol. We also simultaneously collected a cohort of women in spontaneous labor as a comparison group. Outcomes were compared using chi-squared or t-test as appropriate. $P<0.05$ considered significant.
Results: 350 women received early LEA (mean dilation 2.5cm), and 446 women received parenteral opioid (dilation at LEA 4cm, $P<0.01$). Demographics were similar, except BMI, which was higher in the opioid group (31+/-6 vs. 32+/-6, $P<0.01$). The operative delivery rate was statistically similar between groups ($P=0.63$). The comparison cohort of women in spontaneous labor (n=503) had similar demographics to the induction group. The operative delivery rate was significantly lower than the rate among women with induced labor ($P=0.014$)
Discussion: We found that women with induced labor who received parenteral opioid in order to delay the initiation of LEA had the same labor outcome as women who were allowed to receive an early epidural placement. This result is similar to the finding of a previous study that demonstrated that women with spontaneous labor do not receive benefit from delaying LEA.
References: 1) NEJM 2005;352:655-65.

Operative delivery rate by group

Group	Operative Delivery Rate	Significance
Early labor epidural	28%	
Delayed placement, IM opioid	26.5	0.63 vs. above
Spontaneous labor (received epidural)	21%	0.014 vs. induced labor groups

A-32.

THE INFLUENCE OF SEVERE PREECLAMPSIAON MATERNAL CEREBRAL CIRCULATION HAEMODYNAMICS.

AUTHORS: E. M. Shifman, E. G. Goumeniouk, A. A. Ivshin, S. E. Floka;
AFFILIATION: Republican Perinatal Center, Petrozavodsk, Russian Federation.

Introduction: Analysis of cerebral haemodynamics in pregnant patients with preeclampsia represents an area of special interest. New method of transcranial color scan let us to improve and to simplify cerebral blood flow investigations. Use of digital wide-range ultrasound image in gray-scale mode and energetic Doppler scan combination showed a possibility of detail study of cerebral blood flow.
Goal of the present study was to estimate and to compare values of cerebral haemodynamics in pregnancy, complicated by preeclampsia and in uncomplicated pregnancy.
Methods: We designed and performed prospective study, which included 45 patients, age of 17 - 38 years (27.5 ± 5.3) with verified diagnosis of severe preeclampsia and 72 patients with normal pregnancy, 3rd trimester, without significant co-morbid states, age ranged from 19 to 34 years (24.5 ± 4.3) - this was a control group.
In preeclampsia group study of cerebral blood flow and cerebrovascular reactivity was performed after initiation of treatment. Inclusion criteria - absence of the following features: potentially haemodinamically significant stenosis or occlusion of magistral arteries of head and basilar region; clinical features of congestive heart failure; arrhythmia; significant haemorheological changes; clinical and laboratory features of diabetes mellitus; craniospinal trauma and syncope.
All patients underwent duplex scan of extracranial portions of brachiocephalic arteries with linear probe, frequency 5 MHz and transcranial duplex scan (TCDS) in the area of middle cerebral artery (MCA) (segment M1) with sector probe, frequency 2.5 MHz.
By transtemporal approach in MCA M1 segment we determined peak systolic flow velocity (Vps), maximal end-diastolic velocity (Ved), time - adjusted maximal velocity (TAMX), resistance index (RI), pulsative index (PI), systolic/diastolic ratio (S/D). Significance of mean values differences were calculated with use of «STATISTICA 6.0» program with determination of Student t-criteria with normal spread in group, that was confirmed by Colmogorov-Smirnov and Lillieforts tests.
Results: From the analysis of our data we could find the following: all haemodynamic values in M1 segment of MCA in preeclamptic patients were decreased in comparison with the same values in healthy pregnant women with different significance: PI (mean 0,77 vs. 0,84, $p<0,01$); RI (mean 0,52 vs. 0,54, $p<0,05$); Vps (mean 90,22 vs. 104,74 cm/sec, $p<0,001$); Ved (mean 43,25 vs. 48,53 cm/sec, $p<0,001$); TAMX (mean 61,48 vs. 67,30 cm/sec, $p<0,01$); S/D (mean 2,02 vs. 2,06, $p<0,05$).
These pathophysiological changes of cerebral haemodynamics were consistent with dopplerographic pattern of diminished perfusion and are typical for vascular segments, which are located proximally to the zone of abnormally high haemodynamic resistance: pre-stenotic arterial segments, episodes of arterial hypertension and distal vasoconstriction. The results of the performed study showed that patients with severe preeclampsia had decreased cerebral perfusion.

POSTER REVIEW 1

A-33.

EPIDURAL NEOSTIGMINE-BUPIVACAINE FOR THE TREATMENT OF LABOR PAIN

AUTHORS: V. H. Ross, P. H. Pan, L. C. Harris, B. B. Clyne, V. S. Misa, M. D. Owen, J. C. Eisenach;
AFFILIATION: Wake Forest University Baptist Medical Center, Winston-Salem, NC.

Introduction: Epidural neostigmine has been shown to produce analgesia in patients with chronic and postoperative pain. In parturients, a bolus of 10 mg epidural ropivacaine with neostigmine (4 μg/kg) produced analgesia equivalent to 20 mg ropivacaine without side effects[1]. Epidural neostigmine (500 μg) with 10 μg sufentanil produced similar analgesia as 20 μg sufentanil without side effects or emesis.[2] The purpose of this study was to test the local anesthetic sparing properties of epidural neostigmine and side effects when administered by patient controlled epidural labor analgesia (PCEA).

Methods: After IRB approval and informed consent, 39 healthy ASA I-II, singleton parturients in active labor (≤6 cm dilated) were enrolled. After lumbar epidural catheter placement and a negative test dose (3 ml; 1.5% lidocaine with 5 μg/ml epinephrine), patients received 15 ml of 0.125% bupivacaine (B) or 0.125% bupivacaine with 4 μg/ml neostigmine (BN) in a randomized double blind fashion. Patient controlled infusions (B or BN) were started at 6 ml/hr with a 5 ml bolus, 10 min lockout and 30 ml/hr limit. Breakthrough pain was treated with top-up doses of 0.25% bupivacaine (5-10 ml) during 1st stage labor and with 0.25% bupivacaine, 2% 2-chloroprocaine or 2% lidocaine (5-10 ml) during 2nd stage labor. Patients were excluded for no analgesia 20 min following catheter initiation or if two top-ups were required within any two hr period. Maternal demographic data, vital signs, VAPS, side effects and FHR patterns were recorded. The primary outcomes were the average (mean ± SD) ml/hr volume of epidural solution required and the bupivacaine dose equivalents of infusion and top-ups (mean ± SD) mg/hr. Secondary outcomes were the number of pump bolus demands, top-up's and patient satisfaction. Unpaired t-test and Chi-Squares were used as appropriate with $P<0.05$ as significant.

Results: Thirty-two patients completed the study (17 BN, 15 B); 7 were excluded for catheter failure or protocol deviation. There were no differences in patient demographics, labor characteristics or FHR, Apgar scores, and infant weight. Fetal late decelerations occurred sometime after epidural placement in 4 patients/group and resolved spontaneously (P=NS). The average volumes of epidural solutions administered were 10.7 ± 2.5 (BN) and 11.3 ± 4.1 (B) ml/hr (P=NS). The average mg/hr doses were 14.8 ± 4.6 (BN) and 17.2 ± 6.7 (B) (P=NS). The incidence of top-up doses (29% vs. 40%), hypotension (35% vs. 20%) and nausea treatment (0% vs. 7%) were similar between BN and B, respectively. Pain scores, delivery mode and patient satisfaction were also similar.

Conclusion: Preliminary results indicate that neostigmine (4 μg/ml) added to bupivacaine did not improve labor analgesia or reduce bupivacaine requirements, nor did it increase maternal or fetal side effects.

References: [1]Anesth Analg 2003;96:1161-6. [2]Anesthesiology 2004;101:439-44.

A-34.

DEVELOPMENT OF AN ASSESSMENT TOOL FOR EVALUATING PERFORMANCE DURING GENERAL ANESTHESIA FOR CESAREAN SECTION UTILIZING A HUMAN PATIENT SIMULATOR

AUTHORS: C. L. Baysinger, B. Kendall, E. M. Lockhart, J. K. Boyle;
AFFILIATION: Vanderbilt University Departments of Anesthesiology and Center for Medical Simulation, Nashville, TN.

Introduction: Recent declines in the use of general anesthesia (GA) for cesarean section (C/S) have raised concerns that current trainees may receive inadequate training in GA-C/S (1) with emergency GA-C/S the most likely first GA exposure(2). Human simulation may allow training in and assessment of competency in GA-C/S (1). We have developed scenarios for resident training in GA-C/S utilizing the SimMan™ (Laerdal Medical, Wappingers Falls, NY). Using a modified Delphi technique (3) we developed an assessment tool which assigns importance to the specific tasks for GA-C/S.

Methods: We surveyed trainee records of current third-year anesthesia residents through November 2005, and recent graduates as to the number of GA for elective and emergent C/S. Six obstetric anesthesiologists at our institution independently reviewed a task list for performance of GA for emergent C/S and assigned each task a weighted score (1= no importance and 5 = extremely important). Panelists could suggest addition and deletion of tasks and make comments on the importance of each task. First round median scores, ranges, and comments were then redistributed for a second round of scoring. Concordance between raters was assessed in each round using Kendall's W scores for all tasks and for tasks grouped into 4 categories: 1. Pre-operative evaluation and preparation; 2. Preinduction (in OR); 3.Induction and Pre-delivery Maintenance; 4. Post-delivery Maintenance and Emergence.

Results: 42 trainees averaged 3.1 GA-C/S (range 1-6) over 3.7 months of OB anesthesia training (82% emergencies). 2 graduates experienced only 1 GA-C/S. Panelists did not delete any tasks and added one. Concordance results are listed in table. A complete task list and relative weighting will be presented.

Phase	Round 1	Round 2
Pre-operative evaluation and preparation	.48	.91
Pre-induction (operating room)	.58	.82
Induction and Pre-Delivery Maintenance	.66	.94
Post-Delivery Maintenance and Emergence	.62	.86
Overall	.75	.89

Discussion: Resident experience in GA-C/S is minimal at our institution and this may be true nationwide. Human simulation experiences for GA-C/S can help to supplement this experience (1). The GA-C/S assessment tool showed excellent consensus among raters on specific tasks and on task weighting, similar to others who have utilized modified Delphi techniques (3)(4). After documentation of our tool's reliability and validity, simulation will be used to assess resident performance and skill improvement over time.

References: (1) IJOA 14; 2-4, 2004. (2) Anaesthesia 58; 1114-1118, 2003. (3) Anesthesiology 101; A1338, 2004. (4) Anesth Analg 88: 1085-1091, 1999([4)

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A-35.

DESCRIPTORS AND MANAGEMENT OF PATIENTS REQUIRING IMMEDIATE POST-PARTUM BLOOD TRANSFUSION: A CHART REVIEW

AUTHORS: S. Dhumne[1], S. Kasodekar[1], M. Moore[1], M. Balki[1], G. Seaward[2], J. C. Carvalho[1];
AFFILIATION: [1]Department of Anesthesia, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada, [2]Department of Obstetrics and Gynecology, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

Introduction: Obstetric hemorrhage continues to be a major cause of morbidity and mortality. The 2000-2002 Confidential Enquiry into Maternal Deaths reported 17 deaths due to hemorrhage, compared to 7 in the previous triennium; 10 were due to postpartum hemorrhage (PPH) compared to one in the previous report.[1] Major risk factors for PPH include nulliparity, obesity, macrosomia, multiple pregnancies, prolonged or augmented labors, prolonged third stage, ante-partum hemorrhage, previous PPH and operative deliveries particularly emergency C-sections (CS).[2,3] This chart review was undertaken to describe the most common patient characteristics and the clinical management of patients requiring blood transfusions within 24 hours of delivery. Our goal is to use this information to better strategize the clinical care of these patients, including preparedness for blood transfusion.
Methods: After REB approval, a chart review was carried out in all patients who received blood transfusions in the first 24 hours post-delivery from June 2000 through June 2005.
Results: The blood transfusion rate was 0.31% (104 patients out of 33,631 deliveries). The causes of PPH were atony (38.5%), retained products (33.7%) and genital tract trauma (12.5%). Sixty-seven patients (64.4%) delivered vaginally, 25 (24 %) by emergency CS during labor and only 12 (11.5%) by elective CS. Amongst those delivering vaginally, 61 (58.6%) were in spontaneous labor and 31(29.8%) were induced; only 26% underwent augmentation of labor. As regards duration of labor, 13 (12.5%) and 6 (5.76%) patients had prolonged first and second stages respectively. The majority of patients had normal placentation (82%). Other important risk factors were multiple gestation (17%) and PIH (13%). Lowest values for hemoglobin, hematocrit and platelets were 6.3±1.5 g%; 19±4.4%; 128,000±74,000/mm^3. The blood products (mean) transfused were as follows: PRBC (4.9 units) in 100% patients; FFP (5.9 units) in 42% patients; platelets (7.4 units) in 18% patients; cryoprecipitate (6 units) in 9% patients. The uterotonic agents (mean) used were as follows: oxytocin (47 units) in 100% patients; ergot (0.45 mg) in 56% patients; carboprost (0.73 mg) in 49% patients; misoprostol (976 mg) in 24% patients. Dilatation and curettage (26.9%), manual removal of placenta (17.3%), hysterectomy (16.3%) and uterine artery embolization (16.3%) were the most common surgical procedures performed. Twenty-one percent of patients developed coagulopathy and 24% required admission to ICU. No deaths occurred.
Discussion: Severe PPH requiring blood transfusion is rather unpredictable. Most cases are healthy laboring patients with no identified risk factors. A better prophylactic pharmacological strategy and early recognition of retained products might reduce the incidence of blood transfusion, coagulopathy and ICU admission. We suggest that all laboring patients should undergo blood group typing and screening.
References:
1. Why Mothers Die 2000-2002 http://www.cemach.org.uk/
2. Obstet Gynecol 1991; 77:77-82
3. Obstet Gynecol 1991; 77: 69-76

A-36.

ASSESSMENT OF COAGULATION IN PREECLAMPTIC WOMEN WITH THROMBOCYTOPENIA

AUTHORS: L. Reed, R. Garrison, S. Sharma;
AFFILIATION: University of Texas southwestern medical center, Dallas, TX.

Introduction: Placement of an epidural catheter in parturients with preeclampsia is often desired, but concern exists over the risk of spinal hematoma formation. There are two case reports in the literature of spinal hematoma in a parturient with preeclampsia after receiving regional anesthesia (1,2). Some investigators believe that it is safe to place a regional anesthesia in preeclamptics with a platelet count as low as 75,000/mm^3 . We suggest a guideline for regional anesthesia placement in parturients with preeclampsia. We measured platelets, PT, aPTT, fibrinogen, and Thromboelastography (TEG) in 200 patients with preeclampsia requesting epidural labor analgesia.

Methods: After IRB approval and informed consent, 200 parturients with preeclampsia requesting epidural labor analgesia were enrolled in this prospective study. 100 patients with a platelet count of less than 100,000/mm^3 (PC < 100) were compared to 100 patients with a platelet count of greater than 100,000/mm^3 (PC > 100). A coagulation profile, consisting of PT, aPTT, fibrinogen and TEG, was performed on all patients. Thromboeslastography was performed using 360 mc1 1% celite activated whole blood, and 355 mcl of whole blood with 5 mcl of (2mg/l) c7E3 (Reopro, Centocor, Malvern, PA) on a thromboelastograph® (Haemoscope Corp, Skokie, IL). Platelet contribution to maximum amplitude (MA_{PLT}) was derived by abrogating the maximum amplitude of the c7E3 treated sample (MA_{reo}) from MA_{wb} (MA_{wb} - MA_{reo} = MA_{PLT}).
Results: Fourteen percent of patients in the PC <100 group had at least one abnormal value in their coagulation profile while only 2% of patients in the PC >100 group had one abnormal value in the coagulation profile (Table). All patients in the PC >100 and 69% patients in the PC <100 group received epidural analgesia. There were no cases of spinal epidural hematoma.

Discussion: There is no reliable test to determine the risk of regional anesthesia in a parturient with preeclampsia, but our data suggests that patients with a platelet count < 100,000/mm^3 are at a higher risk of having one or more abnormal test of coagulation. We suggest in preeclamptic women when platelet count is less than 100,00mm^3, other tests of coagulation should be performed to improve the safety of regional analgesia /anesthesia.
References
1. Anaesthesia 1999; 54:350-371.
2. Can J Anaesth 1993; 40:340-345.

Table: Data are expressed as mean + SD and range;n(%).*P < 0.05.

	Platelet count < 100 N = 100	Platelet count > 100 N = 100
Platelet count (1000/mm^3)	76 ± 20	212 ± 54*
PT (sec)	11 ± 2	9 ± 0.1*
PTT (sec)	28 ± 7	27 ± 4
Fibrinogen mg%	446 ± 170	563 ± 109*
MA (mm)	70 ± 9	76 ± 5*
Coagulation index	1.8 ± 2.6	3.2 ± 2.1*
Platelet MA (mm)	37 ± 7	43 ± 9*
Labor Epidural	69	100
Abnormal coagulation profile	14 (14%)	1(1)*

POSTER REVIEW 1

A-37.

EVALUATION OF LABOR PAIN USING HAND MANOMETRY

AUTHORS: N. P. Nonoy[1], D. B. Olson[2], J. R. Schultz[1], M. M. Neumann[2], H. Muir[1], J. Reynolds[1];
AFFILIATION: [1]Duke University Medical Center, Durham, NC, [2]Loma Linda University Medical Center, Loma Linda, CA.

Introduction: Evaluation of pain is complicated by subjectivity, in terms of an individual's unique perceptions as well as the methods used to describe pain. Such methods, including the Verbal Rating Scale (VRS) and the Visual Analogue Scale, require a patient to assign an arbitrary value for pain. Unfortunately, a "ten-out-of-ten" score can mean different things to different people. In the obstetric population hand squeeze is often observed in the parturient experiencing labor pain. We designed this study to test the hypothesis that the strength of hand grip, measured by hand manometry, correlates with the intensity of labor pain and could be potentially used as an objective measure of pain.
Methods: After informed consent and IRB approval 31 parturients admitted to the labor-and-delivery service of two institutions were enrolled. Maximal hand grip strength was measured using a hand dynamometer on three occasions: on admission, at epidural request, and after establishment of epidural analgesia. Three separate readings were obtained on each occasion and averaged. The parturient was asked on each occasion to rate her pain on the 0 - 10 VRS scale. Analysis was performed using the paired t-test, ANOVA, and linear regression.
Results: Pain scores were significantly lower after epidural placement when compared to scores at admission and before epidural placement ($p < 0.001$). Admission pain scores were also significantly lower than scores prior to epidural placement ($p < 0.001$). There was no difference in grip strength among the three time points. There was also no correlation between hand grip strength and pain score at any time point, nor between change in hand grip strength and change in pain score.

	Admission	Before Epidural	After Epidural
VRS	2.2 (2.5) †	6.5 (2.9)	0.7 (1.6)*
Grip Strength (kg)	22.6 (6.2)	19.9 (7.8)	21.3 (8.3)

Data are mean (SD)
†$p<0.001$ vs. before epidural VRS
*$p<0.001$ vs. admission and before epidural VRS
Discussion: The results of this study show no correlation between VRS pain score and hand grip strength. Hand grip strength does not appear to be an objective measure of labor pain.

A-38.

ANESTHESIA FOR CESAREAN DELIVERY: A SURVEY OF WHAT WOMAN WILL TOLERATE

AUTHORS: M. M. Cardoso, A. R. Amaro, M. R. Rosa, E. Lorenz;
AFFILIATION: Hospital e Maternidade Santa Joana, Sao Paulo, Brazil.

INTRODUCTION: Patient satisfaction and clinical outcomes can be enhanced by considering a woman's preference for anesthesia (1). Parturients have different expectations than general surgical patients (2). This study evaluates what occurrences women can find acceptable during and after CS.
METHODS: After IRB approval, 45 consecutive women were given a written survey on arrival for a scheduled CS. Patients were eligible to participate if 18 years or older, were healthy (ASA1), at term of pregnancy and were not in labor. Private medical insurance was required. The written survey was divided into three parts: demographic and educational background; ranking of anesthetic options and a relative value section). In the ranking and relative value section, a list of possible adverse scenarios were briefly described for the women. They were told to assume that each outcome was equally likely to occur and would last the same length of time. Outcomes that were specifically investigated were intraoperative and postoperative pain, nausea, vomiting, pruritus, shivering, motor block, sensory block, weakness sensation and the feeling of touch sensation during surgery but without pain. They were asked to rank possible perioperative occurrences from the most to the least acceptable. To determine the value of each outcome relative to the others, women were also asked to assign a hypothethical amount of money, up to US100 dollars, to each occurrence (more money should be given to the less desirable outcomes).
RESULTS: All patients returned the written survey. Pain during and after c- section was the greatest concern followed by vomiting and motor block both in the ranking and relative value section. Common side effects such as pruritus and shivering caused only small concern.The ranking and relative value of each outcome is summarized in table 1.
CONCLUSION: Although there is some variability in patients tolerance for postoperative outcomes, avoiding pain and vomiting and reducing motor block seem to be high priority for most women in our study.
REFERENCES: 1. Critic Care Med 1996;24:1811-7; 2. Anesth Analg 2005;101(4):1182-7.

Table 1.Ranking and Relative Value of Anesthesia Outcomes .Mean (SD)

	Intraopera-tive pain	Postopera-tive pain	Vomit-ing	Motor block	Nau-sea	Weak-ness	Deep touch	Sensory block	Shiver-ing	Pruri-tus
Ranking	9.4	8.0	5.5	5.4	4.6	5.2	4.5	4.4	3.2	3.2
Values	(1.8)	(1.7)	(2.3)	(2.8)	(2.3)	(2.1)	(6.0)	(2.6)	(2.2)	(2.2)
Relative	33.5	21.1	6.3	7.2	5.7	5.5	6.0	5.1	5.2	4.8
Value	(15)	(13.8)	(3.0)	(7.7)	(3.9.)	(3.5)	(4.1)	(4.2)	(4.7)	(3.1)

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POSTER REVIEW 1

A-39.

THREE TECHNIQUES FOR THE PROPHYLAXIS OF POST-DURAL PUNCTURE HEADACHE FOLLOWING UNINTENTIONAL DURAL PUNCTURE IN PATURIENTS: A PRELIMINARY REPORT.

AUTHORS: C. L. Baysinger, A. Robertson, J. W. Downing, E. Lockhart;
AFFILIATION: Vanderbilt University, Nashville, TN.

Introduction: The incidence of post dural puncture headache (PDPHA) in parturients following unintentional dural puncture (UDP) with 17 gauge Tuophy needles is reported as 50-80% (1). One retrospective study reports a significant reduction in PDPHA if intrathecal catheters used for labor analgesia are retained following delivery (2); another does not (3). We retrospectively reviewed our data for PDPHA following UDP in parturients for labor cesarean section.
Methods: Following IRB approval, 49 patient records from November 2003 and November 2005 were reviewed for deliveries complicated by UDP. Informed consent was waived. 3 techniques for PDPHA prophylaxis were identified. Group A had repeat epidural placement with catheter removal following delivery, group B had an intrathecal catheter placed and retained for 24 hours after block initiation, and group C had an intrathecal catheter and an infusion of 3 ml/hr of normal saline following delivery. The duration of labor, number who developed PDPHA, percentage who received epidural blood patch (EBP), and time to epidural blood patch placement were recorded. Headache severity was graded on a 1-3 scale with 1 = mild analgesics, patient ambulatory; 2 = narcotic analgesics with ambulation; 3 = narcotic analgesics, non-ambulatory. Variables were compared using Kruskall-Wallis and Chi square tests for ordinal/nominal data and ANOVA for continuous data with adjustments for multiple comparisons, $p<0.05$ was considered significant.
Results: Groups were similar for demographics and obstetric variables, duration of labor, and the number of cesarean sections. Results are recorded in Table 1. The percentage of patients developing PDPHA was similar in all 3 groups, but the percentage of patients requiring blood patches and headache severity scores were significantly less in Group B.

	Group A (N=12)	Group B (N=10)	Group C (N=27)
PDPHA (%)	59	50	70
EBP (% of PDPHA)	85	20*	58
HA Severity Score 1	0	2*	7
2	4	3*	4
3	3	0*	8
Time to EBP (days)	2.3	5	2.7

* $P<0.05$ compared to Groups A and C

Discussion: Our results are in agreement with those of others who report that intrathecal catheters placed following UDP and retained for 24 hours following delivery are associated with lower rates of EBP and headache severity following UDP (2). We did not show a reduction in headache rate. Use of an intrathecal infusion to replace CSF volume lost due to leakage appears to reverse the salutary effects of retaining intrathecal catheters for 24 hours following UDP.
References: (1) Reg Anesth 22; 66-72, 1997. (2) Reg Anesth Pain Med 28; 512-515, 2003. (3) Reg Anesth 15; 285, 1990

A-40.

INCIDENCE OF ACCIDENTAL DURAL PUNCTURE "WET TAP" IN PARTURIENTS WITH DISPOSABLE V/S REUSABLE EPIDURAL KITS AMONG ANESTHESIA RESIDENTS IN TRAINING

AUTHORS: N. EL-SHAMMAA, M. SOLIMAN, C. KAYPEKIAN, R. BESHARA, R. MICHAEL, A. R. ABADIR;
AFFILIATION: THE BROOKDALE UNIVERSITY HOSPITAL MEDICAL CENTER, BROOKLYN, NY.

Accidental dural puncture (ADP) is one of the most common major complications of labor epidural analgesia. Following epidural puncture with a large epidural needle, up to 86% of patients experience post dural puncture headache. In 63% of these patients, the headache is severe and can be incapacitating1.
The purpose of this study was to compare the difference in the frequency of ADP when anesthesia residents in different levels of training use a disposable or reusable epidural kit.
Five hundred and seventeen parturients receiving epidural anesthesia for labor or caesarean section were randomly assigned to anesthesia residents in second (CAII) or third (CAIII) year of clinical anesthesia training. Anesthesia residents were given the choice to use either a reusable or disposable epidural kit and to perform the procedure in either sitting or lateral position. Patient age, ease of needle and catheter placement, position of the patient during the procedure and incidence of ADP were recorded. ADP was identified by CSF from the needle or catheter, positive test dose, or occurrence of characteristic PDPH. All parturients were evaluated 24-48 h after delivery for PDPH.
Our results showed that the incidence of accidental wet tap3.28%. Although anesthesia resident (CAII) used reusable kits significantly more than group CAIII which used disposable kits significantly more than CAII, there was no significant difference between the incidences of wet tap between the two resident groups, with a highly significant difference in the incidence when the residents used reusable versus disposable ones. Only three patients out of the seventeenth whom they suffered the accidental dural wet tap complained of typical post dural puncture headache. None of our patients suffered any neurological, respiratory or cardiovascular complications from the accidental dural puncture.
We concluded that the incidence of accidental dural pucture among resident in training is mostly due to the usage of the sharp edged disposable epidural kits and mostly not related to the level of training.

	CA II	CA III
Total number of patients	278	239
Disposable kits	114	160*
Reusable kits	164	79*
Sitting position	234*	207
Lateral position	44	32
Difficult epidural	54*	28
Easy epidural	224	211
Accidental wet tap	9	8
Successful epidural	269	231

Table 1: Cumulative data for incidence of accidental dural puncture "wet tap" with disposable versus reusable epidural kits among anesthesia residents.

References
(1)
Berger C, Crosby E, Grodecki W. North American survey of the management of dural puncture occurring during labor epidural analgesia.Can J Anaesth 1998; 45:110-114

POSTER REVIEW 1

A-41.

THE BENEFITS OF INTRAOPERATIVE SMALL-DOSE KETAMINE ON POSTOPERATIVE PAIN AFTER CESAREAN SECTION

AUTHORS: p. kashefi;
AFFILIATION: Isfahan university of medical sciences, Isfahan, Iran (Islamic Republic of).

Introduction:Perioperative pain remains prevalent and poorly treated.This study was established to examine the value of preemptive and preventive ketamine in patients undergoing cesarean under general anesthesia.
Methods:In a randomized, double-blinded study with three parallel groups, we assessed the analgesic effect of intraoperative ketamine administration in 60 ASA physical status I or II patients undergoing elective cesarean section under general anesthesia. The patients received either IV ketamine 0.15 mg/kg after the induction of anesthesia and normal saline at the end of surgery (PRE group); normal saline after the induction of anesthesia and IV ketamine at the end of surgery (POST group); or normal saline at the beginning and the end of surgery (CONT group). Anesthesia was performed with propofol (2 mg/kg for induction, 0.06-0.2 mg/kg-1 min-1 for maintenance), Atracurium (0.6 mg/kg), morphine (0.1 mg/kg) and 60% N2O in O2 via an endotracheal tube. Postoperative analgesia was provided with IV morphine (0.05mg/kg), when VAS was greater than 3. Pain scores, morphine consumption, side effects, were recorded during 24 h.
Result: Patients in the ketamine groups required significantly less morphine than those in the CONT group over 24 h postoperatively (CONT group 22.5+/- 12.7 mg versus PRE group 11.4 +/- 7.7 mg and POST group 9.8+/- 7.1 mg;P < 0.01. No differences were seen between the PRE and POST groups. No differences were observed in the timing of administration ,side effects ,preventive and preemptive administration.
Discussion: We found that intraoperative small-dose ketamine reduced postoperative morphine requirements. Intraoperative small-dose ketamine may therefore be a useful adjuvant to perioperative analgesic management.

A-42.

WHO REFUSES EPIDURAL ANALGESIA FOR LABOR AND WHY? A SURVEY OF TWO POPULATIONS

AUTHORS: K. E. Stack, R. Y. Gershon, C. Kerssens;
AFFILIATION: Emory University School of Medicine, Atlanta, GA.

Introduction: Over the past three decades, demand for labor epidural analgesia has increased. Our institution is a 1000-bed, tertiary care trauma hospital with approximately 3,800 deliveries per year, primarily serving indigent African-American (A) and Hispanic (H) patients. We conducted a postpartum survey of 2,038 consecutive parturients to determine if there were differences between A and H groups in labor epidural rates or reasons for refusing epidural analgesia for labor.
Methods: Surveys, available in English and Spanish, were presented to patients on the first or second postpartum day. Responses were anonymous. Data included race, mode of delivery, and mode of labor analgesia. If a parturient refused epidural analgesia, or if she initially declined, but did eventually receive epidural analgesia for labor, the contributing reasons were identified.
Results: Of 1787 surveys completed, 470 were eliminated from data analyses: 94 contained insufficient information; 101 were of other ethnicity; 275 respondents did not labor. Proportions for A and H groups (n=838 vs. 479) were compared using the z-test for binomial distributions, corrected for multiple comparisons (n=14). P<0.05 was considered statistically significant. The overall incidence of epidural analgesia for labor was 63% (A=66%, H=57%, p<0.05). More Hispanic parturients refused labor epidural analgesia (H=39%, A=27%, p<0.01) due to one or more reasons (table 1, top). An equal percentage of patients in both groups initially declined a labor epidural, but did eventually receive one, and reasons for the change of mind were comparable (table 1, bottom).

Table 1

	African-American (A)		Hispanic (H)		
	n	%	n	%	p
I Did Not Want an Epidural, Because					
1 "I labored too quickly."	105	47	60	32	<0.05
2 "Pain is normal, and I was ready to handle the pain."	52	23	68	36	ns
3 "I was too frightened of the epidural."	44	20	29	15	ns
4 "The pain wasn't bad enough."	25	11	26	14	ns
5 "I have heard too many bad things about epidurals."	24	11	27	14	ns
6 "I felt family pressure not to have an epidural."	12	5	17	9	ns
7 "I didn't like my epidural in the past."	23	10	9	5	ns
8 "I had no knowledge about an epidural."	12	5	10	5	ns
9 "I was concerned I would have to pay extra."	2	1	4	2	
I Changed My Mind to Receive an Epidural, Because					
1 "The pain was unbearable."	32	50	20	63	ns
2 "I was told I was at risk of requiring a Cesarean Section."	18	28	10	31	ns
3 "A member of the obstetric, anesthesia, or nursing staff spoke with me, answered my questions, and I decided I wanted an epidural."	25	39	11	34	ns

Discussion: In this study, more Hispanic parturients refused labor epidural analgesia, for no predominant reason. African-American parturients who refused epidural analgesia were more likely to state it was because their labor progressed too rapidly. Overall, fear of epidural analgesia and acceptance of pain were major factors in refusing a labor epidural. Cost concerns were so rare that these data were not analyzed. Groups did not differ in reasons for switching to epidural analgesia. In general, unbearable pain was the most powerful persuader in the decision to receive epidural analgesia. To increase labor epidural rates in our institution, prenatal education about the safety and efficacy of epidural analgesia is crucial.

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POSTER REVIEW 1

A-43.

INCIDENCE OF POSTDURAL PUNCTURE HEADACHES FOLLOWING LABOR EPIDURAL PLACEMENT COMPARING LOSS OF RESISTANCE TO AIR VERSUS SALINE IN AN ACADEMIC INSTITUTION

AUTHORS: T. A. Saunders;
AFFILIATION: SUNY@Stony Brook, Stony Brook, NY.

Introduction: The use of lumbar epidurals for labor analgesia is widespread. Although epidurals have small failure and complication rates, a significant adverse effect particularly in parturients is postdural puncture headache (PDPH). 1-3% of new mothers who receive labor epidurals get this frequently severe and debilitating headache that can last for several days to weeks. Lumbar epidurals are usually placed using the loss-of-resistance (LOR) to air or saline technique, the choice of which often depends on the personal preference of the attending physician and/ or their training[1]. There have been no randomized studies to examine the incidence of complications comparing these two techniques in a large population of parturients. The object of this study was to compare the incidence of PDPH in parturients after labor epidural placement using LOR to air versus saline.
Methods: In a randomized, prospective single-blinded trial, parturients who consented to participate were assigned to one of two groups: saline (n = 202) or air (n = 214). Lumbar epidural was placed by the anesthesiology resident with direct supervision by the attending. The procedure for epidural catheter placement and management did not differ from standard practice. The OB Anesthesiology Team (resident and attending) monitored the patients daily until discharge to determine any complications related to the epidural. Subjects who developed postural headache after placement of epidural catheter were considered to have PDPH, counseled on their treatment options, and offered epidural blood patch. All subjects in the study received follow-up phone calls from the OB Anesthesiology attending after hospital discharge to detect late onset of PDPH.
Results: Data was analyzed using Fisher exact test. There was no significant difference in age, BMI, mode of delivery, history of chronic headaches, history of previous labor epidural or spinal anesthesia or history of PDPH between the two study groups(Table 1). The difference between the incidence of PDPH in the air and saline groups (3.27% and 2.97%) did not reach statistical significance(P>0.05).
Discussion: We have shown that within the academic setting, there is no statistically significant difference between the use of air or saline for loss-of-resistance testing during labor epidural placement and the incidence of postdural puncture headache. Therefore with regard to risk of PDPH, both techniques can be considered equally safe for parturients.
References: 1. Anaesthesia(53): 238,1998.

Table 1. Demographic Data

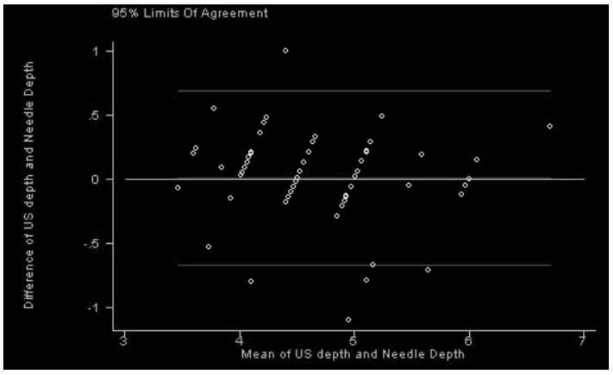
	LORA,no PDPH(n=207)	LORA,with PDPH(n=7)	LORS,no PDPH(n=196)	LORS,with PDPH(n=6)
Average Age	30.42	28.29	30.6	28.83
Average BMI	31.08(range 19.6-51.9)	32.49(range 27.4-39.7)	30.23(range 21-51)	32.02(range 24.6-41.2)
Normal Spontaneous Vaginal Delivery	164(79.23%)	7(100%)	159(81.12%)	5(83.33%)
Vacuum Assisted Vaginal Delivery	4(1.93%)	0	3(1.53%)	0
Cesarean Delivery	39(18.84%	0	27(13.78%)	1(16.67%)
History of Chronic Headaches	69(33.33%)	2(28.57%)	58(29.59%)	0
Previous Spinal or Epidural	96(46.38%)	5(71.43%)	104(53.06%)	3(50%)
History of PDPH	4(1.93%)	0	10(5.10%)	0

A-44.

THE TRANSVERSE APPROACH OF LUMBAR SPINE ULTRASOUND PROVIDES RELIABLE LANDMARKS FOR LABOR EPIDURALS

AUTHORS: J. Carvalho, C. Arzola, S. Davies, A. Rofaeel;
AFFILIATION: Department of Anesthesia and Pain Management, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

Introduction: The efficacy and safety of epidural anesthesia relies on the accurate identification of the epidural space. Ultrasound imaging of the spine, using multiple scanning planes, has recently been proposed to facilitate this identification (1). The goal of this study was to assess the accuracy and precision of the transverse approach, used as a "single-screen" method, to facilitate labor epidurals.
Methods: After REB approval and written informed consent, 61 patients requesting labor epidurals were enrolled. The ultrasound imaging was performed with the patient in the sitting position, at the L3/4 interspace, using the transverse approach, with a portable Titan Ultrasound System equipped with a 5.0-MHz curved array probe (Sonosite Canada Inc.). Using our proposed single-screen method, we identified the midline, the intervertebral space and the distance from the skin to the epidural space (ultrasound depth=UD). Epidural puncture was then performed in relation to these landmarks, and the distance from the skin to the epidural space was measured to the nearest half-cm of the gauged Tuohy needle (needle depth=ND). The accuracy of the insertion point was evaluated by the need to re-site and re-direct the needle during epidural puncture. The degree of agreement between UD and ND was calculated by the concordance correlation coefficient (CCC) (2). Bland-Altman analysis (3) was used to show the differences between UD and ND for each patient, with 95% limits of agreement.
Results: Maternal age was 33±4.6 yrs, BMI 29.7±4.8, UD 4.68±0.67 cm and ND 4.67±0.71 cm. The CCC between UD and ND was 0.874 (95% CI 0.814-0.934). The 95% limits of agreement were -0.683 to 0.702 cm (figure), and appeared to persist regardless of the BMI. The accuracy of the insertion point as defined by ultrasound was 87.7%, with no need to re-direct the needle in 73.8% of the patients.
Discussion: We found good accuracy in the ultrasound-determined insertion point and very good agreement between UD and ND, apparently unaffected by BMI. In 95% of the patients, the differences were ± 0.7 cm. This suggests that our proposed ultrasound single-screen method using the transverse approach can be a reliable guide to facilitate labor epidural insertion, even in overweight patients.
References: (1)Br J Anaesth 2001,86:798-804 (2)Biometrics 1989,45:255-268 (3)Lancet 1986 i:307-310.



POSTER REVIEW 1

A-45.

PREVALENCE OF NEONATAL HYPOGLYCEMIA IN GESTATIONAL DIABETIC WOMEN: GLYBURIDE VERSUS DIET-CONTROLLED DIABETES MELLITUS

AUTHORS: F. A. Ajayi, M. R. Hopkins, A. O. Famuyide;
AFFILIATION: Mayo Graduate School of Medicine, Rochester, MN.

Objective: To determine any association between the use of glyburide for the treatment of gestational diabetes mellitus (GDM) and the prevalence of neonatal hypoglycemia.
Methods: A retrospective study was performed among women at a Midwestern Tertiary Center with term singleton pregnancies who had GDM diagnosed, using Coustan-Carpenter criteria, with fasting plasma glucose of 190 mg/dL or more on the 1-hr glucola test or failed 2 or more values on 3-hr glucose tolerance testing (GTT) in the midtrimester between 2000 and 2005. We identified 491 women and compared the subset treated with glyburide with women that were diet-controlled. Neonatal hypoglycemia was defined as plasma glucose level less than 50 mg/dL. Statistical methods included univariate analyses, student's t-test, Fisher's exact test, and Wilcoxon/Kruskal-Wallis test.
Results: During 2000 to 2005, 491 were diagnosed with gestational diabetes, 136 (27.7%) were treated with glyburide while 355 (72.3%) were diet controlled. The 2 groups were similar with regard to age, race, parity, 1-hr glucola test results, and fetal weight at birth. However, women in the glyburide group had a higher mean body mass index (32.9±7.8 vs 27.8±7.6 kg/m^2, P <0.0001) and fasting value on their 3-hr GTT (94.2±21.2 vs 84.8±12.2 mg/dL, P = 0.0002). Of the neonates born to women treated with glyburide, 27.94% had hypoglycemia versus 8.45% in the diet controlled group (P < 0.0001). Neonatal hypoglycemia was not affected by age, race, parity, 1-hr glucola, fasting 3-hr GTT, and body mass index. The hypoglycemic neonates were found to have a higher mean fetal birth weight (3668.56±634.8 vs 3535.5±483.9 gm, P = 0.05).
Conclusions: Neonatal hypoglycemia was more prevalent in neonates born to glyburide treated gestational diabetics compared to diet-controlled gestational diabetics. Maternal age, race, parity, body mass index, and initial glycemic indices do not appear to affect the prevalence of neonatal hypoglycemia. Since peripartum maternal hyperglycemia may result in fetal hyperinsulinemia with subsequent neonatal hypoglycemia, elevated plasma glucose levels pre-delivery may be a confounding variable. A prospective study will be needed to determine any association between glyburide use and fetal hypoglycemia independent of peri-partum glycemic control.

Hypoglycemia by Glyburide			
Count Total% Col% Row%	Normoglycemic	Hypoglycemic	
Diet control	325	30	
	66.19	6.11	355
	76.83	44.12	72.30
	91.55	8.45	
Glyburide	98	38	
	19.96	7.74	136
	23.17	55.88	27.70
	72.06	27.94	
	423	68	491
	86.15	13.85	

A-46.

THE EFFECTS OF ADDING FENTANYL AND EPINEPHRINE ON THE MINIMUM LOCAL ANALGESIC CONCENTRATION OF BUPIVACAINE FOR LABOR ANALGESIA.

AUTHORS: S. S. Shue, C. Tirado, A. Grinberg, J. J. Kraemer, P. E. Hess;
AFFILIATION: Beth Israel Deaconess Medical Center, Boston, MA.

Introduction: The minimum local analgesic concentration (MLAC) for labor can be calculated using an up/down sequential allocation technique.[1] The MLAC of bupivacaine has been demonstrated to be reduced with the addition of fentanyl and of epinephrine.[2,3]
Methods: Our institutional IRB approved this prospective randomized, blinded trial. After obtaining written informed consent, healthy term parturients in active labor 3-6 cm cervical dilation with visual analogue pain scores (VAS)>40/100 mm were randomized to one of three groups: 1) bupivacaine and epinephrine 3mcg/ml (BE); 2) bupivacaine and fentanyl 3mcg/ml (BF); or, 3) bupivacaine, epinephrine 3mcg/ml, and fentanyl 3mcg/ml (BEF). The initial epidural concentration of bupivacaine for all groups was 0.08%, with a total volume of 20 ml administered in divided doses. The concentration of bupivacaine was increased or decreased in increments of 0.01 % depending on success or failure. Success was defined as a VAS≤10mm 30 minutes after injection, and would result in a decreased concentration for the subsequent patient. Failure was defined as a VAS>10mm. Failure resulted in administration of a rescue bolus. If the rescue bolus completely relieved pain, then the subsequent patient received a higher concentration. If the rescue bolus failed to relieve pain, it was considered a failed epidural and constituted a 'redo'. The next patient enrolled in the study would be dosed at the same concentration level. MLAC of bupivacaine calculated using Dixon & Massey method and checked with Probit analysis. ANOVA was used to compare the results, P<0.05 was considered statistically significant.
Results: 93 parturients were enrolled; BE group=30, BF group=31, BEF group=32. There were 3 'redo' cases (BF=2, BE=1). No differences in demographic or obstetric characteristics were noted among groups. The baseline VAS was similar among the three groups. The MLAC of bupivacaine was 0.074% in the BE group, 0.045% in the BF group, and 0.023% in the BEF group (P<0.01).
Discussion: The addition of both epinephrine and fentanyl led to a statistically significant reduction in the MLAC of bupivacaine compared to the addition of either agent alone. The combination of these three epidural medications may achieve more effective labor analgesia with a reduced concentration of bupivacaine.
References: 1) Anesth.Analg. 1995;81:833-7. 2) Br.J.Anaesth 1997;78:493-7. 3) Anesth 2002;96:1123-8.

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A-47.

THE ASSOCIATION BETWEEN BREAKTHROUGH PAIN AND REQUEST TO DISCONTINUE SECOND STAGE LABOR EPIDURAL ANALGESIA AND THE RISK OF FORCEPS DELIVERY

AUTHORS: P. Toledo, C. A. Wong, P. C. Fitzgerald, R. J. McCarthy;
AFFILIATION: Northwestern University, Chicago, IL.

Introduction: Breakthrough pain during low-dose bupivacane/ opioid epidural labor analgesia is associated with an increased risk of Cesarean delivery.[1] Epidural analgesia with bupivacaine 2.5 mg/ mL is associated with an increased risk of instrumental vaginal delivery compared to epidural bupivacaine 1 mg/mL combined with opioid.[2] Substituting saline for low dose bupivacaine, however, did not result in a decreased rate of forceps delivery, but did result in more pain.[3] We hypothesized that breakthrough labor pain and the request to decrease epidural analgesia are associated with an increased risk of instrumental vaginal delivery.
Methods: In this IRB approved retrospective study, the Obstetric Anesthesiology Database was queried to identify patients who had an instrumental vaginal delivery with neuraxial labor analgesia. Maternal age, parity, gestational age, type of analgesia, changes in epidural infusion rate/concentration, and supplemental bolus doses were recorded. A cohort who delivered vaginally in the same 24 h period matched for gravidity and parity were randomly selected. Analgesia was initiated with a neuraxial bolus of bupivacaine/ fentanyl, and maintained with PCEA and a basal infusion of bupivacaine 0.625 mg/mL and fentanyl 2 μg/mL. Variables were compared using χ^2 and the Mann-Whitney U test. $P < 0.05$ was required to reject the null hypothesis.
Results: There were no differences between groups in age, gravidity, or parity (N = 310). Gestational age was higher in the forceps group. 92% of subjects received CSE analgesia. The number of parturients requiring an increase in the basal epidural infusion rate and concentration because of inadequate analgesia was greater in the forceps compared to cohort group. The number of parturients for whom the basal epidural infusion was decreased during the 2nd stage of labor because of perceived inability to push was not different between groups.

	Forceps (N=155)	Cohort (N=155)	P
Increase in basal infusion rate (%)	20	6	<0.001
Increase in infusion concentration (%)	6	1	0.02
Decrease in 2nd stage infusion rate (%)	11	6	0.07
Duration of labor analgesia (min)	428 (75-976)	330(55-861)	<0.001

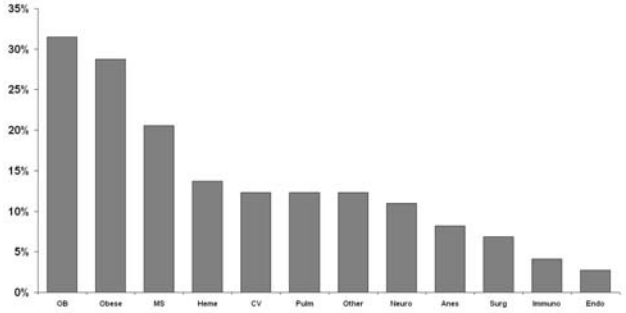
Discussion: There is an association between breakthrough pain and greater analgesia requirements during neuraxial analgesia and instrumental vaginal delivery. This mimics results of studies showing an association between breakthrough pain and analgesic requirements and Cesarean delivery.[1,4] It is unclear whether the administration of more local anesthetic to treat breakthrough pain results in increased motor blockade, and hence an increased risk of instrumental delivery, or whether breakthrough pain is a marker for dysfunctional labor with an increased risk for operative delivery.
References: 1 Anesth Analg 2000;90:881. 2)Lancet 2001;358:19. 3)Anesthesiology 1990;72:613. 4)Anesthesiology 2003;98:957.

A-48.

EVALUATION OF A HIGH-RISK OBSTETRIC ANESTHETIC CLINIC BASED IN A LARGE TERTIARY OBSTETRIC REFERRAL CENTER

AUTHORS: D. J. Horstman, A. Butwick, E. Riley, B. Carvalho;
AFFILIATION: Stanford University Medical Center, Stanford, CA.

Introduction: There are limited studies investigating the implementation of an antenatal obstetric anesthetic clinic (OAC) for high-risk patients.[1,2] An OAC may provide an ideal organizational setting for early investigation, care planning and effective multi-disciplinary communication for high-risk patients. We present a 9 month evaluation of our case load and reasons for patient referral following the introduction of an OAC at our institution.
Method: Our institution is a tertiary referral center for obstetrics with >5000 deliveries per year including a high percentage of high-risk pregnancies. We collected data from patients referred to OAC from March-November 2005. The clinic is held weekly in the antenatal clinic and all patients are reviewed by supervised obstetric anesthesia fellows. For purposes of this review, data was collected prospectively including relevant patient demographics (age, BMI, gestational age, parity) and the reasons for clinic referral. We also assessed the percentage of patients requiring follow-up. Data is presented as median (range) unless otherwise stated.
Results: 78 patients were seen in the 9 month review period. The demographic data of the case load was as follows: median age was 32 yrs (16-46). The median BMI was 29 (19-59) and the gestational age at time of referral was 34 wks (11-40).The reasons for referral to the OAC are displayed (figure). 42% of patients had multiple reasons for referral to the OAC. 29% of patients required further follow-up and 8% required multi-disciplinary discussion.
Conclusions: The high-risk patients referred to our OAC covered a wide spectrum of obstetrical, medical and surgical problems. We believe that this service can improve the anesthetic management of high risk patients, is useful for fellowship-training in obstetric anesthesia and improves physician-patient communication. Future studies should focus on the impact and cost-effectiveness of OAC on patient outcome and peripartum care.
Figure: Reasons for referral to the OAC



OB=obstetric, obese=obesity, MS=musculoskeletal, heme=hematological, CV=cardiovascular, pulm=pulmonary, neuro=neurological, anes=anesthetic, surg=surgical, immuno=immunological, endo=endocrine, other = 2 patients with psychosocial referrals, 1 patient with cirrhosis and portal hypertension. The total percentages of referrals >100% reflecting the >2 reasons for referral in 42% of patients.
References: 1. IJOA 2005; 14:219-22. 2. CJA 1993;40:346-56.

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A-49.

EVALUATION OF KYBELE PROGRAM FOR CROATIA

AUTHORS: M. Perkovic[1], D. Kopic[1], M. D. Owen[2], A. Ujevic[1], S. Perkovic[1];
AFFILIATION: [1]University Hospital Split, Split, Croatia, [2]Wake Forest University School of Medicine, Winston-Salem, NC.

Introduction: 12 visiting anaesthesiologists (VA), an internal medicine specialist and a midwife participated in a Kybele project in Croatia in September 2005. The purpose of the project was to teach regional anesthesia (RA) techniques and to improve childbirth conditions. The VAs participated in a 2 day medical meeting then extended their visit for one week of practical education to local colleagues at 9 hospitals.
Methods: Following the program, an evaluation form was distributed to 45 Croatian anesthesiologists 2 months after the project to evaluate the achieved level of cooperation and usefulness of the program. The form contained questions evaluating the VA's work and cooperation with host practitioners, the overall quality of lectures and bedside teaching, change triggered by the program and suggestions. Answers were coded as: completely agree (CA), somewhat agree (SA), neutral (N), somewhat disagree (SD), completely disagree (CD). Overall the program was graded as: Excellent, Good, Fair, Poor and Terrible. The percentage of hospitals reporting introduction in the use of RA techniques for labor and CS are also reported.
Results: The response rate was 100%. Only 53% of local participants completely knew what they wanted and expected from the VA; VA were flexible and adapted to the needs of host doctors (CA 88%, SA 6%, N 6%); VA were knowledgeable about OB anesthesia (CA 100%); VA were practical and made helpful suggestions (CA 94%, SA 6%); VA helped design research projects (CA 59%, SA 6%, N 17%, SD 12%, CD 6%). The visit by VA met host's expectations (CA 71%, SA 23%, N 6%). Out of all surveyed local practitioners 65% have maintained contact with VA, 82% are supportive of another visit, and 88% would highly recommend the program to other institutions. The overall program quality, lectures and bedside teaching is provided in the table.

	Excellent	Good	Fair	Poor	Terrible
Lectures	76%	24%	0	0	0
Bedside teaching	76%	12%	12%	0	0
Overall experience with VA	88%	12%	0	0	0

In 35% of hospitals, RA techniques for both labour and CS were introduced, in 76% RA for CS was introduced and in 24% no change took place. Conclusion: Overall the program was rated as excellent. The program resulted in the introduction of RA techniques for labour and delivery and CS in 1/3 of participating institutions. In 3/4 of participating institutions RA for CS was introduced. Suggestions recommended that the program should take place within the next 2 years.

A-50.

THE NEW LABOR PAIN SCALE (LPS): DESCRIPTION & PROPERTIES

AUTHORS: P. J. Angle[1], A. Kiss[2], J. Yee[1], R. Kung[1], Y. Murthy[1], S. Halpern[1], D. Streiner[3];
AFFILIATION: [1]Sunnybrook & Women's College HSC, Toronto, ON, Canada, [2]Institute for Clinical Evaluative Sciences, Toronto, ON, Canada, [3]Kunin-Lunenfeld Applied Research Unit, Baycrest Centre for Geriatric Care, Toronto, ON, Canada.

Introduction: Labor pain measurement is currently limited by lack of an instrument developed specifically for this purpose. We describe the initial determination of the psychometric properties of the New Labor Pain Scale (LPS), a 26 item self-report scale developed and tested in over 400 parturients.
Methods: Native English-speaking parturients of mixed parity, ethnicity, socio-economic status and delivery mode were recruited from 1 teaching and 2 urban community hospitals with a combined delivery rate of >10,000/year. Parturients with and without neuraxial analgesia (NA) were included. Sample size (n=365) was based on results of a survey of labor analgesia experts responding to same set of descriptors. Patients completed a 98 item questionnaire $\leq$ 26hrs of delivery. Items (pain/childbirth experience descriptors) were generated from our previous work.[1] Participants rated the severity of the experience for each descriptor from 0-10(0= none,10=worst possible)during labor and delivery. Unclear/confusing descriptors were recorded. Non-relevant terms were rated zero. Items with <20% endorsement were discarded unless approximating 20% and indicated for inclusion in the LPS based on clinical grounds. Factor analysis was performed using the remaining 26 descriptors as was Cronbach's alpha. One-way ANOVA and t-tests were used to examine differences between Factor Scores for important demographic variables as tests of Construct Validity.
Results: 433 parturients (n=365 with NA; n=68 without NA) participated. A greater proportion of multiparous women were in the non-epidural group and a greater number of cesarean sections were performed in the primiparous group with epidurals. Kaiser's measures of overall sampling adequacy was very good (0.913). Factor Analysis suggested 4 to 5 theoretically meaningful factors: Factor 1--"Degree of Difficulty in Coping/Maintaining self control with intense Pain"; Factor 2--"Delivery (Vaginal/Rectal) Pain"; Factor 3--"Uterine Contraction Pain"; Factor 4--"Back pain;" and, Factor 5-- "Fear/Anxiety." Markers for uterine contraction; back pain, rectal and vaginal pain, imbedded as items in the scale, loaded onto the relevant factors, increasing their interpretability. Cronbach's alpha for the 26 item scale was 0.915 (excellent internal consistency). Initial One-way ANOVA and t-tests between important demographic variables and Factor Scores suggested good construct validity. These results suggest : a greater degree of difficulty in coping/maintaining self control due to pain intensity (ie Factor l) in women without epidurals ($p=0.049$) and in primiparous patients ($p<0.0001$); increased birth pain (vaginal/ rectal, Factor 2) in women without epidurals ($p <0.0001$) and spontaneous vaginal deliveries (vs C/S) ($p<0.0003$); increased back pain (Factor 4) in primiparous women ($p<0.0001$); and increased fear/anxiety (Factor 5) in primiparous women ($p<0.0001$).
Discussion: Initial examination of the LPS suggests that it is a promising new measurement tool for use in future obstetric anesthesia research.
References: 1. Can. J. Anes, 51:A63(2004).

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A-51.

A DOUBLE-BLINDED, RANDOMIZED, PLACEBO-CONTROLLED TRIAL OF CALCIUM CHLORIDE FOR THE AUGMENTATION OF UTERINE TONE FOLLOWING CESAREAN DELIVERY

AUTHORS: E. Cappiello, L. Lugo, B. Kodali, D. Hepner, M. Harnett, L. C. Tsen;
AFFILIATION: Brigham & Women's Hospital, Boston, MA.

Introduction: Uterine atony accounts for 75-90% of postpartum hemorrhage, and remains a leading cause of hysterectomy and blood transfusion. Efforts to reverse atony with uterine massage, oxytocin, prostaglandins and ergot preparations are often inadequate. Because calcium increases uterine smooth muscle tone and contractile forces, we hypothesized that calcium with oxytocin would augment uterine tone during cesarean delivery.
Methods: Following human research committee approval, 60 subjects were randomly assigned to one of three groups: 5 units of oxytocin combined with NaCl, 200 mg CaCl or 400 mg CaCl in a total volume of 10 mL. Solutions were infused at 2mL/min after umbilical cord clamping. The obstetrician and anesthesiologist were blinded to the solution used. The attending obstetrician assessed uterine tone on a verbal analog scale every 5 min for 20 min. Ionized calcium and hematocrit levels were obtained at baseline and at 20 min after the solution was infused.
Results: In demographically similar groups, a significant difference in ionized calcium levels was observed. No differences in uterine tone, hemodynamics, vasopressor use, or hematocrit were observed.

Uterine Tone	Pre-Ca	Post-Ca	Baseline	5 min	10 min	15 min	20 min
NaCL	1.2	1.18	6.2	8.1	8.67	8.9	9
NaCl + 200 CaCl	1.2	1.25*	6.2	7.79	8.55	8.55	8.52
NaCl + 400 CaCl	1.2	1.30*	6.12	7.9	8.47	8.84	8.8

*P = < 0.5
Discussion: When added to oxytocin, calcium chloride given in doses sufficient to cause increases in serum levels does not increase uterine tone, hemodynamics, vasopresser use, or hematocrit. Small doses of oxytocin alone appear adequate for restoration of uterine tone following cesarean delivery (2).
References: 1) Sakata et al. Eur J Pharmacol 1992. 2) Sarna et al. Anesth Analg 1997

A-52.

MINIMUM LOCAL ANESTHETIC DOSE (MLAD) OF INTRATHECAL LEVOBUPIVACAINE IN CAESAREAN SECTION AND THE EFFECT OF INTRATHECAL SUFENTANIL

AUTHORS: R. R. Parpaglioni, M. Frigo, A. Lemma, G. Barbati, D. Celleno;
AFFILIATION: Fatebenefratelli General Hospital, Rome, Italy.

Introduction. We determined the minimum local anaesthetic dose (MLAD) of spinal plain levobupivacaine and levobupivacaine plus sufentanil 3 mcg for caesarean section.
Methods. Seventy women were randomly allocated to two groups and received 5 ml of study solution through combined spinal/epidural technique. According to preliminary study[1], the initial dose was 11 mg for levobupivacaine (Group L) and 11 mg plus 3 mcg of sufentanil for levobupivacaine/sufentanil groups (Group L/S). We required the test solution to achieve a visual analogue pain score (VAPS) of 30 mm or less to be considered effective, at skin incision, uterine incision, birth, peritoneal closure, and at the end of surgery. Effective or ineffective responses determined respectively a 0.5 mg decrease or increase of the same drug for the next patient in the same group, using up-down sequential allocation.
Results. The MLAD in Group L was 10.58 mg (C.I.95%: 10.08-11.09) and the MLAD in Group L/S was 5.7 mg (C.I.95%: 5.01-6.2), using Dixon and Massey formula. Hypotension has higher incidence in Group L (38.5%) than in Group L/S (20.5%).
Discussion. The addition of sufentanil 3 mcg determines a significant levobupivacaine dose-sparing effect. The higher dose and concentration of local anaesthetic administered in order to achieve the same clinical effect, may explain the higher incidence of hypotension in Group L.
Conclusions. Further studies need to be done to establish the relations of opioids and local anesthetics when used in combination in subarachnoid space.
1. International Journal Obstetric Anesthesia. 13: S9, 2004.

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A-53.

FENTANYL AND SUFENTANIL AS ADJUNCTS FOR PATIENT CONTROLLED EPIDURAL ANALGESIA IN LABOR: AN EQUIVALENCE STUDY

AUTHORS: S. Lilker, A. Rofaeel, M. Balki, J. Carvalho;
AFFILIATION: Department of Anesthesia and Pain Management, Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

INTRODUCTION: Different mixtures of local anesthetics and adjuncts have been used in patient controlled epidural analgesia (PCEA). When comparing efficacy of these mixtures, one must take into consideration the potency ratios of their components. The potency ratio of sufentanil and fentanyl used epidurally for labor analgesia has recently been determined to be 5.9:1. [1] Based on this information, we compared theoretically equipotent mixtures of bupivacaine and either sufentanil or fentanyl for use in PCEA for labor. Our hypothesis was that these solutions are clinically equivalent.
METHODS: Following REB approval, 48 patients were enrolled into this unblinded randomized controlled trial. This study was planned as an equivalence study. Patients were randomized to receive mixtures of either bupivacaine-fentanyl (BF) or bupivacaine-sufentanil (BS) for PCEA in labor. Laboring patients with dilation < 6 cm were included. After a test dose of 3 ml of 2% lidocaine, patients received a loading dose of bupivacaine 0.125% 10ml with either fentanyl 30µg or sufentanil 5µg. PCEA was maintained with bupivacaine 0.0625% with either fentanyl 2µg/ml or sufentanil 0.35µg/ml (bolus 5ml, lockout 10 minutes, infusion 10ml/h, 1-hour limit 40 ml). Patients who failed to respond to the loading dose and to two rescues (bupivacaine 0.25% 5 ml) within the first thirty minutes of initiation of epidural (VAS >2/10), and those who failed to respond to the maintenance and rescue (bupivacaine 0.125% 10ml followed by 0.25% 5ml twice if necessary) at any time during the observation period, were considered failed epidurals and excluded. Patients were observed for 4 to 6 hours. Primary outcome was bupivacaine consumption in mg/h. Secondary outcomes included need for MD rescue, quality of analgesia (VAS 0-10), motor block, side effects and overall patient satisfaction.
RESULTS: Sixty patients were randomized; 12 were excluded; 26 were analyzed in the BF group and 22 in the BS group. The groups were comparable in age, height, weight, number of primiparas and dilation. Table 1 shows the main outcomes.
CONCLUSIONS: According to this equivalence study, theoretically equipotent doses of fentanyl and sufentanil are NOT clinically equivalent as adjuncts to low concentrations of bupivacaine in labor analgesia. Our results show some trends (better pain control and patient satisfaction) suggesting that sufentanil is superior to fentanyl for that purpose.
REFERENCES:1. Anesth Analg 2003;96:1178-82.
Table 1: Outcomes

Outcome	Bupivacaine-fentanyl (n= 26)	Bupivacaine-sufentanil (n= 22)	p-value
Bupivacaine mg/h (mean ±SD)	12.39±3.17	10.96±2.36	0.25
No MD rescues required (n) [%]	18 [69.2]	18 [81.8]	0.5
Pain VAS ≥3 (n)[%]	16 [61.5]	8 [36.4]	0.08
Any motor block (n)[%]	8 [30.8]	3 [13.6]	0.19
Pruritis VAS ≥3 (n)[%]	10 [38.5]	11 [50]	0.15
Satisfaction VAS 0-10(median)	9	10	0.01

A-54.

USE OF A 360 DEGREE EVALUATION TOOL FOR ASSESSMENT OF THE ACGME GENERAL COMPETENCIES DURING AN OBSTETRIC ANESTHESIA ROTATION

AUTHORS: R. Y. Fragneto, R. Schell;
AFFILIATION: University of Kentucky, Lexington, KY.

Introduction: In 2002, the ACGME began implementation of their Outcome Project in an effort to increase emphasis on educational outcome assessment in residency training programs. Currently residency programs are expected to include in their educational programs learning opportunities in six general competencies (patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice). Residency programs are also required to evaluate residents' competence in these areas with valid assessment methods. Portfolios and 360-degree evaluations have been suggested by the ACGME as best methods for evaluation of the professionalism, interpersonal and communication skills, and practice-based learning and improvement competencies (1). Because residents assigned to the Obstetric Anesthesia rotation at our institution spend a month working with a relatively small and stable group of health care professionals, we decided to develop a 360-degree evaluation tool that could be used for assessment of the professionalism and interpersonal & communication skills competencies.
Methods: In April 2005, we introduced the 360-degree evaluation on the Obstetric Anesthesia rotation. Ten nurses, patient care technicians, and obstetric and anesthesiology resident and attending physicians complete the evaluation form. Evaluators are chosen by the division director. Areas assessed in the evaluation include: 1. Communicates effectively with coworkers; 2. Respects the knowledge/skills of coworkers; 3. Collaborates well with coworkers; 4. Ability to explain decisions (eg. educational skills); 5. Communicates effectively with patients; 6. Compassionate and caring with patients & families; 7. Demonstrates a commitment to ethical practices; 8. Cost-effective in using resources. A 4-point Likert scare is utilized: 1 - unsatisfactory, 2 - needs improvement, 3 - meets expectations, 4 - exceeds expectations. A section for narrative comments is included. All evaluations are anonymous.
Results: A response rate of 90% for completed evaluations has been achieved. Because evaluations are anonymous, they are used only as a formative evaluation with the results available to the resident, division director, and program director. They are not utilized by the Clinical Competence Committee for their semi-annual summatiave evaluations.
Discussion: Implementation of the 360-degree evaluation on our Obstetric Anesthesia rotation has been successful with feedback from physicians and nurses indicating satisfaction and enthusisasm for this evaluation tool. In addition to directly evaluating the competencies of professionalism and interpersonal & communication skills, the residents have been able to use feedback from these evaluations within the self-evaluation and improvement component of their portfolios, thereby also playing a role in the assessment of the practice-based learning & improvement competency. Although the 360-degree evaluation is currently completed on paper, we are attempting to develop a system that will direct evaluators to complete and submit the form on our departmental website while maintaining anonymity and confidentiality.
References: 1. ACGME/ABMS Toolbox of Assessment Methods. Found at www.acgme.org.

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A-55.

OXYTOCIN REQUIREMENTS AT CESAREAN SECTION: AN OPINION-BASED SURVEY OF OBSTETRICIANS

AUTHORS: V. Campitelli, A. J. Butwick, B. Carvalho, E. T. Riley, S. E. Cohen;
AFFILIATION: Stanford University Medical Center, Stanford, CA.

Introduction: Oxytocin is routinely used during Cesarean section (CS) to produce uterine contraction and decrease bleeding following delivery. However few studies have assessed drug efficacy or dosing in this setting.[1,2] The aim of this study was to survey obstetricians at our institution about their preferences regarding the administration of oxytocin and related practices during elective CS.
Methods: After gaining IRB approval and informed consent, 30 attending obstetricians at our institution (>5000 deliveries/year) were invited to complete a written survey. Ten questions elicited information regarding the preferred oxytocin dosing regimens of obstetricians during CS. The questions related to the dose, timing and administration of oxytocin in the peri- and post-operative periods. In addition, we inquired about preferred methods of placental delivery, surgical manipulation of the uterus and subjective assessment of oxytocin effect e.g. uterine tone during CS.
Results: All obstetricians preferred intravenous oxytocin as their first-line uterotonic. Our results showed that 3% normally request oxytocin after delivery of the anterior shoulder, 33% after neonatal delivery, and 63% after placental delivery. Most obstetricians (67%) preferred that oxytocin be given as an infusion, 7% as a bolus, 7% as bolus plus infusion and 7% had no preference. Thirteen percent of obstetricians deferred the decision regarding oxytocin administration to the anesthesiologist. The median stated dose among those who preferred a bolus was 16 IU (range= 10-23 IU), while the median initial concentration of oxytocin for infusion was 20 IU/L (10-30 IU/L). Evaluation of the efficacy of drug effect was by subjective assessment of uterine tone in 62% of subjects, assessment of the degree of bleeding in 3% and both methods in 35%. Uterine exteriorization was routinely performed by 70% of respondents, and uterine massage by 70%. Most obstetricians (93%) used an oxytocin infusion postoperatively. The median duration of infusion prescribed was 8hrs (2-12 hrs). The median maximum dose of oxytocin in 24 hrs post-partum was 80 IU (40-160 IU).
In the presence of uterine atony, 63% of obstetricians would request methylergonovine as their second-line uterotonic (30% Hemabate, 7% misoprostol). All obstetricians recognized the potential side-effects (e.g. hypotension, tachycardia, sodium retention) associated with oxytocin.
Conclusion: The attending obstetricians surveyed at our institution use oxytocin as their first-line uterotonic during CS, however there is marked variation in the preferred timing, dosage and mode of drug administration. It was surprising that 14% of obstetricians said they preferred a bolus dose of 15 IU (median) during CS; this exceeds maximum recommended dosing [5 IU] and is not normally given by obstetric anesthesiologists at our institution. No consensus currently exists regarding oxytocin administration during CS and future studies are needed to determine ideal pharmacological dosing in this setting.
References:
1. Anesth Analg 1997;84:753-6. 2. Obstet Gynecol 2004;104:1005-10

A-56.

COMPARISON OF ROPIVACAINE, BUPIVACAINE AND LEVOBUPIVACAINE INFUSIONS FOR LABOR ANALGESIA

AUTHORS: N. Sah, M. Vallejo, G. Mandell;
AFFILIATION: Magee Womens Hospital, Pittsburgh, PA.

Introduction: The purpose of this study is to compare the analgesic efficacy and motor blocking potency of continuous infusions of clinically relevant concentrations of ropivacaine, bupivacaine and levobupivacaine with fentanyl for labor epidural analgesia.
Methods: In this prospective, randomized, double-blind, IRB approved study, 170 term, primiparous women were randomly assigned to three groups after informed consent.
Bolus medication was 8ml local anesthetic with 100mcg fentanyl and continuous infusion was 12ml/hr local anesthetic with 2mcg/ml fentanyl. Bupivacaine and levobupivacaine were 0.125% for both bolus and infusion. Ropivacaine bolus was 0.2% with infusion of 0.1%.
Recorded data included time to achieve a T10 level, pain visual analog scale (VAS) score, intensity of motor block (Bromage score), and first and second stage labor duration. Interval data was analyzed using Analysis of Variance (ANOVA), nominal data with Chi-square test, and ordinal data with Kruskal-Wallis. A $p < 0.05$ is significant.
Results: Although not statistically significant, the time to achieve a T10 sensory level was shorter in the ropivacaine and levobupivacaine groups compared to the bupivacaine group (Table 1). Bromage score was less in the ropivacaine group after 4 hours of continuous epidural infusion but VAS was also higher (table 2). No difference was noted in stage-1 labor duration (Table 1). However, second stage labor duration was significantly shorter in the bupivacaine group (Table 1).

Table 1	Bupivacaine (1)	Levobupivacaine (2)	Ropivacaine (3)	p
Time to T10 level (mins)	11.9 ± 7.8	9.3 ± 4.9	9.5 ± 4.7	0.06
Pain VAS at 6 hrs	16.25 ± 24.4	4.28 ± 13.4	28.25 ± 35.3	0.06
Bromage score at 4 hrs	3.8 ± 0.5	3.8 ± 0.4	4 ± 0.1	0.04
Stage 1 Duration (mins)	269 ± 150	346 ± 231	288 ± 182	0.16
Stage 2 Duration (mins)	81 ± 63	115 ± 83	121 ± 86	0.04

Discussion: All three drugs provided satisfactory labor analgesia. Comparing MLAC of ropivacaine (0.092%), levobupivacaine (0.077%)[1] and bupivacaine (0.83%)[2]; ropivacaine solution is 20% weaker and this could be the reason for the lesser motor block after 4 hours in the ropivacaine group. The pain VAS scores were also higher after 4 hrs in the ropivacaine group suggesting the analgesic efficacy of 0.1% ropivacaine is less than 0.125% bupivacaine and levobupivacaine. Ropivacaine motor block intensity may be related to potency rather than a motor sparing effect. In our study, stage 2 labor duration was shorter in the bupivacaine group despite the more intense motor block, suggesting that motor block intensity may not be a factor in labor outcome.
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2. Lyons et al, Epidural pain relief in labour: poatencies of levobupivacaine and racemic bupivacaine, BJA 1998 Dec;81(6)899-901

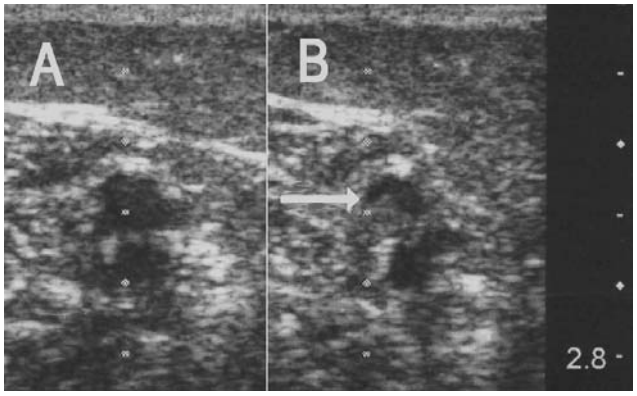
POSTER REVIEW 2

A-57.

PERIPHERAL VENOUS CANNULATION IN PARTURIENTS USING ULTRASOUND GUIDANCE

AUTHORS: D. B. Auyong, A. S. Habib, J. R. Schultz;
AFFILIATION: Duke University Medical Center, Durham, NC.

Introduction: Intravenous (IV) lines are regularly used for parturients admitted to obstetric wards for labor and delivery. If peripheral lines are unobtainable, central venous catheters become a secondary option. Ultrasound guidance for placement of central lines[1-2] and catheterization of upper arm veins[3] have been shown to be effective. Applying the benefits of real-time ultrasound guidance to peripheral IV placement can be a valuable tool for obstetric services.
Methods: An ultrasound (10-5 MHz probe) identifies veins in cross-section as compressible, non-pulsatile, hypoechoic circles [Figure 1]. The operator uses one hand to hold the ultrasound probe and the other to direct the IV needle. The needle is advanced into the vein in the short- or long-axis view.
Figure 1: Peripheral arm vein: (A) prior to cannulation (B) catheter within vein - white arrow



Results: Real-time ultrasound guidance was used to place peripheral IV's in three obstetric cases: 1) An 18-Gauge 48mm IV catheter was placed in a forearm vein for a 39-year-old gravid female (BMI=80.1). 2) 20-gauge 30mm and 18-gauge 48mm IV catheters were placed in the left forearm and right basilic vein, respectively, in a 30-year-old gravid female (BMI=28.0) with history of IV drug abuse. 3) A 31-year-old gravid female (BMI=32.9) presented for repeat Cesarean section. Initial IV access was obtained with an 18-gauge 48mm IV catheter in the right antecubital vein.
Discussion: Real-time ultrasound guidance for placement of peripheral IV's in the obstetric population can decrease utilization of central venous lines. Identification of veins is complicated in parturients by issues including obesity, edema, and drug abuse. Difficult IV placement usually results in placement of central venous lines. Potential complications[4] and discomfort during placement can compromise the birthing experience. Visualization of peripheral veins with ultrasound allows multiple attempts at IV access if initial attempts are unsuccessful. Obstetric wards have portable ultrasound machines available, regularly used by obstetricians, making their utility in assisting IV placement practical. Obtaining peripheral intravenous access with ultrasound guidance has potential to change practice habits in the obstetric population. This advanced technique to obtain peripheral intravenous lines could increase patient satisfaction and improve patient safety for parturients.
1. Anesth Analg 72: 823-6, 1991.
2. Anesth Analg 68: 700-1, 1989.
3. Br J Anaesth 93: 292-4, 2004.
4. Anaesth Intensive Care 21: 664-9, 1993.

A-58.

THE EFFECT OF FORMAL PATIENT EDUCATION ON PATIENT-CONTROLLED EPIDURAL ANALGESIA DURING LABOR

AUTHORS: B. Carvalho, S. Sarna, S. E. Cohen;
AFFILIATION: Stanford University School of Medicine, Stanford, CA.

Introduction: A recent study at our institution showed patient-controlled epidural analgesia (PCEA) techniques provided effective labor analgesia with minimal physician supplemental boluses.[1] The aim of this study was to determine whether formal parturient PCEA education prior to initiation of the technique would further reduce physician-administered boluses and improve labor analgesia, especially during delivery.
Methods: After obtaining IRB approval and informed consent, 60 ASA 1-2 women receiving epidural analgesia during labor (<5 cm dilated) were enrolled in this analgesia maintenance study. The anesthesiologist delivered a pre-designed, standardized, spoken education script and visual demonstration explaining the labor PCEA technique (Gp E, n=60). These patients were compared to a historical control group (Control, n=60) from a recent study at our institution.[1] The control group data were collected under identical study conditions and PCEA settings but patients had received brief non-formalized PCEA education. Primary and secondary endpoints included the numbers of rescue physician-administered boluses and PCEA bolus requests, local anesthetic consumption, labor and delivery pain scores, satisfaction scores, degree of motor block, mode of delivery, neonatal outcome and incidence of adverse events. Appropriate parametric and nonparametric tests were used with $p<0.05$ considered statistically significant.
Results: Demographic and baseline obstetric characteristics were similar between the study groups. We detected no significant improvements in labor analgesia or maternal satisfaction in the patients who received formal PCEA education (Table). However, there was a trend towards fewer physician-administered boluses in Gp E. Motor block, mode of delivery, neonatal outcome and adverse events were similar between the study groups.
Conclusion: Under the conditions of the study, formal standardized labor PCEA education and technique demonstration did not improve maternal outcomes despite a trend towards greater utilization of the device. This may relate to the already high quality analgesia and degree of satisfaction experienced with the technique despite an inferior educational process. Further larger labor PCEA studies are needed to determine the impact of formal patient education on the reduction of physician-administered boluses.
References:
1. Int J Obstet Anesth 2005;14:223-9
2. Int J Obstet Anesth 2003;12:93-7
3. J Adv Nurs 2002;39:459-71
4. J Clin Anesth 2001;13:465-9
Table: Important Outcomes Measures Between Patients Who Received Formal PCEA Education (Gp E) and Those That Did Not (Control)

	Group E (n=60)	Control (n=60)	P value
Pain during labor (VPS 0-10)	1.6 ± 1	1.3 ± 1	0.3
Pain during delivery (VPS 0-10)	3.7 ± 3	4.3 ± 3	0.4
Satisfaction (VAS 0-100)	90 ± 18	90 ± 19	0.7
Total bupivacaine use (mg/h)	10 ± 5	9 ± 3	0.1
PCEA bolus demands per patient*	3 (5)	2 (4)	0.1
Physician-administered rescue boluses (%)	12%	22%	0.1
Success / demand ratio	0.8 ± 0.3	0.8 ± 0.3	0.9

Mean ± SD; *Median (Interquartile Range)

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A-59.

WHAT IS THE BEST SKIN PREPARATION SOLUTION FOR LABOUR EPIDURAL ANALGESIA?A RANDOMIZED PROSPECTIVE TRIAL COMPARING CHLORAPREP(TM), DURAPREP(TM), AND CHLORHEXIDINE 0.5% IN 70% ALCOHOL

AUTHORS: L. Crowley, R. Preston;
AFFILIATION: BC Women's Hospital, Vancouver, BC, Canada.

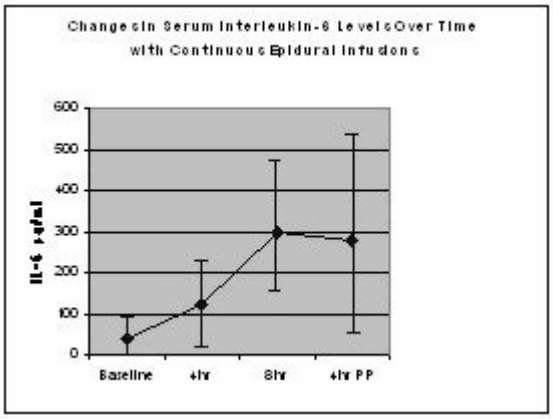
Introduction: Infectious complications of neuraxial anesthesia may be devastating, but are thankfully rare.(1). Contamination of epidural catheters, which is a risk factor for epidural abscess, may occur in at least 2 ways. After initial antisepsis, bacteria re-grow and track along the catheter, thus explaining the relationship between length of time catheter in-situ and contamination. Less commonly, catheters may be contaminated at the time of initial insertion.Colonization rates vary from 5 to 30%, and may occur more frequently in the obstetric setting.(2,3). We hypothesized that the degree and duration of antisepsis using Chloraprep™ (Chlorhexidine 2% in 70% isopropyl alcohol) would be superior to that of Duraprep™ (10% Povidone iodine in 74% isopropyl alcohol) or standard Chlorhexidine 0.5% in 70% isopropyl alcohol.
Methods: Following REB approval and informed consent, 195 patients will be randomized to receive 1 of 3 skin disinfectants. All patients considering labour epidural analgesia (LEA) at our institution will be included. Patients will be excluded for - patient refusal, does not understand English, temperature >38 degrees Celsius before LEA, lumbar site/generalized infection, antibiotics received <24 hours ago, ruptured membranes >24 hours, allergy to test solutions, CSE planned.
Skin swab samples will be taken a) before skin disinfection, b) immediately following skin disinfection, c) immediately prior to catheter removal (after removal of a sterile occlusive dressing). Upon removal, the catheter end will be cultured.
Bacterial count (in colony forming units) will be determined for each sample by a blinded Microbiologist.
Sample size is based on detecting a 25% difference in bacterial count between groups at the time of the 3rd sample.. Power is 80% and alpha is 0.05. Appropriate statistical methods will be used.
Results: The primary outcome measure is skin bacterial count immediately prior to removal of catheter. Other measured variables are - number of epidural attempts, BMI, presence of blood in catheter, presence of blood pool under sterile occlusive dressing, duration catheter in-situ, status of membranes at epidural insertion, maximum temperature, antibiotics given.
Discussion: Results will be available for discussion at the meeting.
References:
1. Anesthesiology 1999; 91:1928-36.
2. Anesthesiology 2003; 98: 164-69.
3. Anesthesiology 2004; 101(1): 143-52.

A-60.

MATERNAL SERUM INTERLEUKIN-6 CHANGES WITH CONTINUOUS VERSUS INTERMITTENT LABOR EPIDURAL ANALGESIA

AUTHORS: V. R. Mantha, V. Ramesh, A. Daftary, M. Vallejo, S. Ramanathan;
AFFILIATION: Magee-Womens Hospital, Pittsburgh, PA.

Introduction: Labor epidural analgesia (LEA) is associated with increase in maternal intrapartum temperature. The mechanism is thought to be physiological. However, there are some reports that pyrogenic cytokines like interleukin-6 (IL-6) are elevated in the maternal serum in association with LEA and intrapartum fever [1]. We studied the effects of LEA on maternal serum IL-6 levels, using two techniques- continuous infusions and intermittent injections, of epidural medications.
Methods: The study was prospective and randomized. IRB approval was obtained. Ninety two healthy parturients in labor were recruited. The randomization was into two groups - continuous epidural group (CLEA, n=46), and intermittent epidural group (ILEA, n = 42). The epidural medications were a mixture of either 0.125% bupivacaine/ 0.0002% fentanyl, or 0.1% ropivacaine and 0.0002% fentanyl. The CLEA group was placed on a continuous infusion pump after initial activation of the catheter. In the ILEA group, intermittent epidural injections were given as necessary at the patient's request, when the block partially regressed. In both groups, maternal peripheral blood was drawn at the time of epidural catheter insertion and activation. After that, blood was again drawn at 4-hourly intervals, until four hours post-partum. Demographic data in the two groups were compared using student's t-test. Temperature comparisons at different time periods within the two groups were evaluated using repeated measures ANOVA. A P value of < 0.05 was considered statistically significant. Post hoc analysis after ANOVA included Fisher's LSD.
Results: Demographic data were comparable between the two groups. Repeated measures ANOVA showed statistically significant elevations in the IL-6 levels in both groups at all time points compared to baseline values. The graph shows the mean IL-6 levels in the CLEA group at various time points. Vertical bars in the graph represent 0.95 confidence intervals. The trend of IL-6 levels in the ILEA group (graph not shown) was essentially similar.



Discussion: Our study shows that maternal serum IL-6 levels are significantly elevated during the peripartum period, with both continuous and intermittent epidural injections. The clinical significance of this increase is not clear. Increases in peripartum IL-6 levels may be in part to physiological triggers of labor, and psychological or physical stress [2].
References: 1. Am J Obstet Gynecol 2002; 187: 834-8
2. Acta Anaesthesiol Scand 1997; 41: 853-60.

POSTER REVIEW 2

A-61.

SCRUBS OR DRESS-UP IN THE PREOPERATIVE CLINIC: DOES IT MATTER?

AUTHORS: K. E. Nelson, P. Pan;
AFFILIATION: Wake Forest University, Winston-Salem, NC.

INTRODUCTION: In some situations, a physician's choice of clothing seems to play a role in the patients' perception of their physicians.[1,2] This observation has led others to suggest the same may be true of anesthesiologists; specifically that it is important to wear dress attire instead of scrubs during the preoperative interview. [3,4] This study is the first to investigate whether this claim is valid for anesthesiologists, using a population of women undergoing gynecologic surgery.
METHODS: After IRB approval for exempt status, 257 women undergoing gynecologic surgery completed both parts of this anonymous survey. Part one consisted of 4 questions (anesthesia concerns, communication, comfort level and behavior) rating the professionalism of the anesthesiologist from a score of 1 to 5, and was administered by the preoperative clinic nurse immediately following the interview with the anesthesiologist. Part 2 asked for a 0-10 verbal anxiety score specifically regarding anesthesia, and was administered by the anesthesia LPN on the patient's arrival to the holding room on the day of surgery. Two male and two female anesthesiologists alternated days in scrubs and dress clothing until at least 30 surveys had been completed in each group for each anesthesiologist.
RESULTS: All 4 measures of professionalism, the individual scores of each question, the cumulative score of all 4 questions and preoperative anxiety scores were not different between scrub (n=128) or dress clothing (n=129) groups. Each anesthesiologist was also compared to themselves in scrubs vs. dress clothing, and then to the other anesthesiologists, all without statistical difference. There was no correlation between professionalism ranking and anxiety scores in either scrub or dress clothing group. Unpaired t-test, Mann-Whitney rank sum test and Pearson Moment correlation test were used as appropriate.
DISCUSSION: This prospective study is the first to examine the effect of an anesthesiologist's attire (scrubs vs. dress clothing) on patients' attitudes regarding professionalism. While in some non-medical professions, and in some medical specialties the dress code might make an important difference, under the circumstances of this study it does not. It can be concluded that during the preoperative interview, neither a woman's perception of her anesthesiologist's professionalism, nor her anxiety level regarding anesthesia for gynecologic surgery are affected by whether the anesthesiologist is in scrubs or in dress clothing for the preoperative interview. Possible explanations for the apparent difference between this and the findings of others[1,2] include different study designs, different settings, and that patients expect anesthesiologists to be wearing scrubs and therefore find it acceptable.
REFERENCES:
1. Kanzler et al. Arch Dermatol. 2002 Apr;138(4):463-6.
2. Keenum et al. South Med J. 2003 Dec;96(12):1190-4.
3. Lema MJ. ASA Newsletter Sept 1998 (62).
4. Bacon DR. ASA Newsletter Oct 2004 (68)

A-62.

MINIMUM LOCAL ANALGESIC DOSE (MLAD) OF 5 ML OF INTRATHECAL LEVOBUPIVACAINE AND ROPIVACAINE, IN SPONTANEOUS LABOURING WOMEN

AUTHORS: R. Parpaglioni, M. Frigo, A. Lemma, G. Barbati, D. Celleno;
AFFILIATION: Fatebenefratelli General Hospital, Rome, Italy.

Introduction. We performed a prospective, randomized, double-blind study in order to establish to minimum local analgesic dose (MLAD) of 5 ml of intrathecal levobupivacaine and ropivacaine, in spontaneous labouring women.
Methods. Seventy-five nulliparous, at term, with cervical dilatation < 5 cm women requesting combined spinal/epidural analgesia, were enrolled. According to our preliminary study[1], the starting dose was 2.5 mg for levobupivacaine and 4 mg for ropivacaine group. Total volume of study solution was 5 ml for both groups and the efficacy was assessed with a visual analogue pain scale (VAPS) at the height of the uterine contraction: we required the test solution to achieve a VAPS of 10 mm or less to be considered effective. The up-down sequences were analyzed using the Dixon and Massey formula.
Results. During the first stage spontaneous labour, the MLAD of intrathecal levobupivacaine and ropivacaine was 1.57 mg (C.I.95% 1.5-1.6) and 3.5 mg (C.I.95% 3.02-3.60), respectively, when administered in a volume of 5 ml. The potency ratio between the two drugs was 2.2.
Discussion. A reduction of the dosages of local anesthetics and the optimal side effect profile can be achieved increasing the intrathecal volume of analgesic solution.
Conclusions. Analgesia can be achieved using lower doses and higher volumes even in subarachnoid space. We should consider the important role of the volume not only in epidural but also in spinal analgesia.
1. Anesthesiology. 103; 1233-1237, 2005.

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POSTER REVIEW 2

A-63.

EPIDURAL ANALGESIA AND THE INCIDENCE OF EPISIOTOMY

AUTHORS: S. K. Taylor, P. Weiss, S. R. Kimmel, C. A. Koller, A. Keller;
AFFILIATION: Lehigh Valley Hospital, Allentown, PA.

Introduction: Although current guidelines recommend judicious use of episiotomy, 30-35% of women in the United States still receive an episiotomy during normal vaginal delivery.[1] Rates for epidural analgesia are quoted at well over 50% and higher still in some areas.[2] Previous studies suggest a correlation between epidural analgesia and perineal lacerations, need for operative vaginal delivery, cesarean section and prolonged second stage of labor (SSL).[3] The purpose of this study is to determine if patients who receive epidural analgesia have an increased incidence of receiving an episiotomy.
Methods: A retrospective chart review from January-June 2001 was conducted of 926 patients, aged 15-45 years. The following were used as inclusion criteria: gestational age 35 weeks, epidural status, episiotomy, vaginal birth after cesarean section (VBAC), and SSL duration. Also considered were height, weight, gravity, parity, and birth weight. Gestational age < 35 weeks, vaginal breech delivery and operative vaginal delivery were excluded. Statistical analysis was performed using Chi-square and t-test.
Results: There was no significant statistical difference (SSD) between age (mean 27.9 years), height (mean 64.6 inches), weight (mean 180.8 pounds), gestational age (mean 39.4 weeks) and birth weight (mean 3404.8 grams). The baseline incidence of episiotomy for all presenting pregnant patients at our institution was 30.3%. A previous study at this same institution noted that primiparous patients were more likely to receive an episiotomy than multiparous patients, 39.9% vs. 19.2%, ($p<.001$).[4] A patient with an epidural was more likely to receive an episiotomy than a patient without epidural analgesia, 29.1% vs. 16.8%, ($p<.001$). However, in multiparous patients receiving an epidural, the episiotomy rate was 20.1%. In multiparous patients not receiving an epidural, the episiotomy rate was 13.6% ($p=.095$). In primiparous patients receiving an epidural, the episiotomy rate was 40.3%. In primiparous patients not receiving an epidural, the episiotomy was 29.3% ($p=.228$). Furthermore, patients with a longer duration of SSL, >120 minutes, were more likely to undergo an episiotomy ($p=.032$).
Discussion: The data indicates that overall, patients with an epidural are more likely to have an episiotomy. The incidence of episiotomy is not based solely on parity. A prolonged SSL also increases the likelihood of an episiotomy. This study suggests a need to counsel patients that epidural analgesia may increase the likelihood of an episiotomy.
References: 1. Hartman K. JAMA 2005; 293:2141-2148. 2.Vincent RD. AAFP 1998;58.8. 3. Alexander JM. ACOG 2002; 100:46-50. 4. Goode K. Oral Presentation at ACOG District III Meeting, 2004 (currently in press, J. Repro. Med).

A-64.

FETAL PH AFTER PHENYLEPHRINE OR EPHEDRINE INFUSION TITRATED TO MAINTAIN SYSTOLIC BLOOD PRESSURE AT CESAREAN SECTION UNDER SPINAL ANESTHESIA

AUTHORS: K. J. Ashpole[1], R. Fernando[1], P. Tamilselvan[1], M. Columb[2];
AFFILIATION: [1]Royal Free Hospital, London, United Kingdom, [2]South Manchester University Hospital NHS Trust, Manchester, United Kingdom.

Introduction: Fetal acidosis may follow reduced placental intervillous blood flow due to reduced systolic blood pressure (SBP) or placental vasoconstriction. Additionally it can follow fetal metabolic rate increases (1) with increased carbon dioxide production and umbilical cord arteriovenous differences ($UAVpCO_2D$). Our primary aim was to evaluate cardiac output (CO) changes following phenylephrine or ephedrine infusions titrated to maintain baseline SBP (bSBP). We now present our fetal secondary outcome data.
Methods: In this randomized double-blind study, women (N=40) scheduled for cesarean section received either phenylephrine 100mcg/min (P) or ephedrine 5mg/min (E) infusions, titrated to maintain bSBP. Baseline hemodynamics (CO, HR, bSBP) were recorded in the left lateral tilt position before fluid preload and recorded every minute after a standard spinal anesthetic until delivery. Umbilical cord blood gases were analyzed within 5 minutes of delivery. Statistical analysis included Mann-Whitney U tests ($P<0.05$).
Results: Maternal characteristics were similar. Good SBP control was attained in both groups with minimal periods (Table) of hypotension (SBP<80%) or hypertension (SBP>120%). CO and heart rate increased over time with E but decreased with P. E was associated with significantly more fetal acidosis with a mixed metabolic and respiratory (two-fold increase in $UAVpCO_2D$) pattern.

N=20 per group	Phenylephrine	Ephedrine
Hypotensive (min)	1 (0, 3)	0 (0, 1)
Hypertensive (min)	1 (0, 3)	2 (1, 3)
Spinal-delivery (min)	39 (37, 42)	41 (37, 45)
Infusion on (min)	21 (19, 25)	12* (9, 14)
Vasopressor (mg)	2.15 (1.9, 2.5)	60* (45, 70)
UApH	7.33 (7.31, 7.34)	7.22* (7.16, 7.27)
UABE (mmol/L)	-0.6 (-2, -0.1)	-4.65* (-6.1, -2.7)
$UAPCO_2$ (kPa)	6.36 (6.16, 6.77)	7.93* (6.82, 8.93)
$UAVPCO_2D$ (kPa)	1.04 (0.83, 1.13)	2.07* (1.68, 2.13)

Data are medians (interquartiles),*$P<0.05$
Conclusion: Despite good bSBP control, and increased CO with E, potentially maintaining intervillous flow, E resulted in lower UApH. Our data suggest that increased fetal metabolism contributes to this acidosis.
Reference:
1. Cooper D, Carpenter M, Mowbray P, et al. Fetal and maternal effects of phenylephrine and ephedrine during spinal anesthesia for cesarean delivery. Anesthesiology 2002; 97:1582-90.

POSTER REVIEW 2

A-65.

PERIPARTUM ANESTHETIC MANAGEMENT OF PATIENTS WITH AORTIC STENOSIS

AUTHORS: A. Ioscovich[1], E. Goldszmidt[2], A. Fadeev[3], S. Halpern[1];
AFFILIATION: [1]SWCH, Toronto, ON, Canada, [2]MS, Toronto, ON, Canada, [3]SZMC, Jerusalem, Israel.

Introduction: Aortic stenosis (AS) in young women is usually the result of a stenotic bicuspid aortic valve, which is the most common cardiac congenital anomaly (2-3% of the population). Severe AS carries a high risk of fetal and maternal morbidity and mortality and requires special attention. The anesthetic management of the parturient with AS has been discussed in several case reports. We presented our experience in peripartum anesthetic management of patients with moderate and severe AS.
Methods: We reviewed the peripartum records of all parturients with the diagnosis of AS who were treated in two university hospitals between the years 1990 and 2005. Demographic data, etiology of AS, NYHA functional class, results of cardiac echography, mode of delivery, anesthetic management, peripartum monitoring, fluids and complication were summarized and presented in tabular form. The severity of AS was classified as moderate (valve area 0.8 to 1.2 cm^2 and peak gradient 35-64 mmHg) and severe (valve area <0.8 cm^2 and peak gradient >64mmHg).(1)
Results: There were six patients with moderate AS and six with severe AS (table). Five of six parturients with moderate AS had regional anesthesia for either vaginal delivery or cesarean section. Three of six parturients with severe AS had regional anesthesia. Four patients with severe AS and 2 with moderate AS had invasive blood pressure monitoring. One patient with critical symptomatic AS had intraoperative transesophageal echocardiography (TEE) under general anesthesia. There were no anesthetic complications (except one failed epidural) or hemodynamic instability.
Discussion: Traditionally, neuraxial anesthesia has been contraindicated in patients with AS because of the fear that a sudden decrease in systemic vascular resistance may precipitate severe hypotension in the face of fixed cardiac output.(2) The anesthetic management of patient with AS focuses on maintaining hemodynamic stability.(3) The use of a slowly titrated epidural or combined spinal-epidural with reduced dose of spinal anesthesia, may provide this stability in all except possibly the most severely affected parturients. The management of some patients with AS may be facilitated by invasive monitoring. Special attention to postoperative analgesia, monitoring and volume status may prevent hemodynamic instability and complications.

	Moderate AS	Severe AS
Number	6	6
Etiology	5 Bicuspid 1 Rheumatic	5 Bicuspid 1 Rheumatic
AVArea	0.9-1.0 cm2	0.5-0.8 cm2
Max gradient	35-62 mmHg	64-130mmHg
NYHA class	I-4; II-2	I-1; II-3; III-2
Monitoring	4-Standard 2- Standard & IBP	2-Standard 3- Standard & IBP 1- Standard, IBP,TEE
Mode of delivery and anesthesia (OD-operative delivery)	2 NVD-epidural 2 OD-CSE and epidural 1 CS-epidural (elective) 1CS -GA after failed epidural (fetal distress)	1 OD- IV sedation 2 OD-epidural 1 CS-epidural 1CS- GA+ intrathecal opioids 1CS- GA (all elective CS)
Peripartum fluids (mL)	CS: 300; 500 OD: 200; 500 NVD: 500; 800	CS: 800; 1000; 1000 OD: 150; 500; 500
Postpartum monitoring	3-ICU (24h) 3-RR (4-6h)	5-ICU (24h) 1-ICU (48h)
Complication	Failed epidural	

1-The American Journal of Cardiology 2003;91;1386-89.
2-Anesthesia and Coexisting Disease. 2002:38-40.
3-Regional Anesthesia and Pain Med. 2004; 29; 496-502

A-66.

SAFE REGIONAL ANESTHESIA IN ITP IN PREGNANCY - A RETROSPECTIVE STUDY

AUTHORS: R. S. Agaram[1], M. J. Douglas[2], S. Fan[2];
AFFILIATION: [1]Glasgow Royal Infirmary, Glasgow, United Kingdom, [2]B C Women's Hospital, Vancouver, BC, Canada.

Introduction: ITP (Idiopathic Thrombocytopenic Purpura) is the cause of thrombocytopenia in 37.5% of parturients with a platelet count of 70 000 mm^{-3} or less at term (1). Thrombocytopenia increases the risk of neuraxial hematomas following regional anesthesia (RA). We reviewed the medical charts of parturients with ITP with the aim of adding to the available evidence regarding safety of RA in ITP.
Methods: This retrospective study was approved by our Ethics and Hospital Committees. 486 charts of parturients coded as thrombocytopenia from the last ten years were reviewed. Parturients were classified as ITP if the diagnosis was made by a Hematologist or if the severity and onset of thrombocytopenia in relation to pregnancy were consistent with ITP. Thrombocytopenia was classified as 'indeterminate' if no clear cause was detected and the lowest recorded platelet count at any time was <100 000 mm^{-3}. Parturients were excluded if they had another cause of thrombocytopenia or where no cause of thrombocytopenia was found and the lowest recorded platelet count was 100 000mm^{-3} or higher. Data about anesthetic and obstetric management, treatment of ITP, and complications of RA were collected.
Results: 228 parturients had a diagnosis of ITP and their lowest recorded platelet count ranged from 3000mm^{-3} to 390 0000mm^{-3}. A total of 178 parturients, including 117 with confirmed ITP, received RA. Of these, 34 (22 with ITP) had a platelet count < 80 000mm^{-3} and 2 (1 ITP) had a platelet count <50 000mm^{-3}at the time of RA (Table1). No hemorrhagic or neurological complications from RA were recorded.
Discussion: Precise estimates of risk of neuraxial hematoma following RA in thrombocytopenic parturients are not available because of the low incidence of neuraxial hematoma. Safe RA has been recorded in parturients with platelet counts from 69 000mm^{-3} to 98 000mm^{-3}(2). In this study we have recorded safe RA in parturients with platelet counts below 80 000mm^{-3}, some as low as 41 000mm^{-3}. Surveys indicate most anesthetists would insert a regional with a platelet count between 80 000 mm^{-3} and 100 000 mm^{-3} (3). The results of this study should add to the available evidence regarding safety of RA in thrombocytopenia, in particular in ITP.

References:
1. Acta Obstet Gynecol Scand. 2000;79: 744- 49
2. Anesth Analg.1997;85(2): 385-388
3. Anesth Analg.1996;83:735-41

Table 1: Platelet count ranges in parturients at the time of receiving Regional Anesthesia

Platelet count at insertion - range (in 1000 mm^{-3})	ITP- total numbers RA	'Indeterminate thrombocytopenia' - total numbers RA	Totals
>100	58	18	76
80 -100	35	28	63
50 - 79	22	12	34
<50	1(41 000mm^{-3} - spinal)	1(48 000mm^{-3} - epidural)	2
No platelet counts available	1	2	3
Total	117(60 spinal, 53 epidurals, 4 CSE	61	178

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A-67.

A COMBINATION OF PHENYLEPHRINE AND EPHEDRINE INFUSION MAINTAINS SYSTEMIC VASCULAR RESISTANCE AND PREVENTS POST-SPINAL HYPOTENSION IN CESAREAN DELIVERY

AUTHORS: L. Reed, R. Garrison, S. Sharma;
AFFILIATION: University of Texas southwestern medical center, Dallas, TX.

Introduction: Hypotension following spinal anesthesia is likely from arteriolar dilation with a drop in systemic vascular resistance (SVR). Ephedrine infusion does not prevent post-spinal hypotension during cesarean section (CS), possibly due to its failure to maintain SVR (1) and therefore an α-agonist like phenylephrine may be more effective. The purpose of this study was to determine if the combination of phenylephrine and ephedrine is superior to ephedrine alone because it better supports SVR.
Methods: Following IRB approval, informed consent was obtained from healthy term women for CS under spinal anesthesia. Patients received 1L lactated Ringer's preload then a 1.6 mL hyperbaric bupivacaine with 20 mcg fentanyl spinal. A rapid LR infusion was also given after intrathecal injection to a maximum of 1 L until delivery. Maternal heart rate and systolic blood pressure (SBP) were recorded, and SVR index was obtained using impedance cardiography (Cardiodynamics, CA). In this double blind study patients were randomized into two groups. Treatment was initiated when SBP dropped 10% from baseline. In the ephedrine group, a 5 mg bolus was followed by infusion of 1 mg/min ephedrine; in the combination group, a bolus of 5 mg ephedrine plus 25 mcg phenylephrine was followed by an infusion of 1 mg/min ephedrine with 5 mcg/min phenylephrine. Hypotension was defined as a decrease in SBP of > 20% and was treated with 5 mg ephedrine increments. A p-value of ≤0.05 is significant.
Results: The incidence of hypotension was significantly lower in the combination group compared to the ephedrine group (20% vs. 42%, P=0.045). More patients had nausea/vomiting in the ephedrine group. The SVR index was significantly higher in the phenylephrine group compared to ephedrine group after spinal anesthesia. There was no significant difference in the neonatal outcome between the two groups (Table).
Discussion: The infusion of phenylephrine and ephedrine reduces the incidence of post-spinal hypotension and nausea/vomiting in patients undergoing CS. A modified prophylactic infusion of vasopressors, initiated after 10% drop in SBP following subarachnoid injection, avoided unnecessary use of vasopressors in about 7% patients in both groups. Further, the use of phenylephrine did not adversely affect neonatal outcome or cause maternal bradycardia. Lower incidence of hypotension with phenylephrine could be attributed to its positive effect on SVR.
References: 1. Anesthesiology 2001;95:668-74.

Table: Data are presented as mean ± SD, or N (%).

	Ephedrine n = 33	Ephedrine + Phenylephrine n = 35Ephedrine + Phenylephrine n = 35	P -value
SBP 10% drop from baseline	31 (93)	33 (94)	0.952
Hypotension >20 drop from baseline	14 (42)	7 (20)	0.045
Heart rate < 50/minute	1 (3)	4 (11)	0.185
Nausea/vomiting	9 (27)	3 (9)	0.043
Ephedrine (mg)	46 ± 19	28 ± 14	< 0.001
Phenylephrine (mcg)		132 ± 63	
Ephedrine boluses	12 (36)	5 (14)	0.036
Umbilical artery blood pH:	7.22 ± 0.06	7.24 ± 0.70	0.182
pCO_2 (mmHg):	62 ± 8	59 ± 12	0.046
Base excess (mEq/L)	-6.3 ± 3	-4.6 ± 9	0.291
SVRI			
Baseline	1925 ± 583	1786 ± 428	0.422
3 minutes post-spinal	1530 ± 356	1784 ± 343	0.044
5 minutes	1533 ± 402	1820 ± 245	0.019
7 minutes	1385 ± 291	1634 ± 294	0.037
10 minutes	1578 ± 251	1631 ± 314	0.838

A-68.

EPIDURAL CATHETER INSERTION DEPTH AND LABOR ANALGESIA: A RETROSPECTIVE ANALYSIS

AUTHORS: W. L. Corbett, A. S. Habib;
AFFILIATION: Duke University Medical Center, Durham, NC.

Introduction: Suboptimal placement of the epidural catheter within the epidural space may result in inadequate pain relief. A previous study recommended threading a multiorifice catheter 5 cm into the epidural space.[1] Another study also reported that the incidence of unilateral analgesia increases with increasing the length of catheter left in the epidural space.[2] In our institution, it is common practice to leave 4 or 5 cm of catheter in the epidural space. No previous study has however directly compared 4 versus 5cm,with regards to success rate and complications rate. The aim of this study was to compare 4 cm versus 5 cm length of catheters threaded in the epidural space for labor analgesia.
Methods: Following IRB approval, we reviewed the database for all parturients who had epidural catheters placed for labor analgesia from November 2003-July 2005. We identified 668 women with 4 cm, and 1417 women with 5 cm of catheter left in the epidural space. We compared the incidence of asymmetric blocks, failed blocks, paresthesias, and intravascular catheters in the two groups. We defined failed epidurals as those catheters that provided inadequate analgesia or required replacement. Statistical analysis included Fisher's exact test and unpaired t test as appropriate. P<0.05 was considered significant.
Results: We found no statistically significant difference in height, but women in the 5 cm subgroup weighed significantly more than those in the 4 cm subgroup (mean weight 82 vs. 79 kg, P<0.0001). There was no difference between the 2 groups in asymmetric analgesia, failed epidurals or intravenous placement. (Table) The 4 cm subgroup had significantly greater paresthesias as compared with the 5 cm group (P = 0.0317).

Frequency of Epidural Complications and Unsatisfactory Analgesia		
Subgroups (cm)	4	5
Number of patients	668	1417
Asymmetric n (%)	51 (7.6)	105 (7.4)
Failed epidural n (%)	30 (4.5)	64 (4.5)
Paresthesias n (%)	222 (33.2*)	405 (28.9)
Intravenous n (%)	20 (3.0)	52 (3.7)

* P<0.05 as compared to 5 cm group.

Discussion: In conclusion, there was no difference in the quality of analgesia, incidence of block failure or risk of intravenous cannulation between catheters placed 4 versus 5 cm in the epidural space in women receiving epidural labor analgesia.
References:
1. Anesth Analg, 1995. 81(2): p. 301-4.
2. Anesthesiology, 1996. 84(1): p. 88-93.

POSTER REVIEW 2

A-69.

A RANDOMIZED DOUBLE-BLIND COMPARISON OF A 5 UNIT INTRAVENOUS OXYTOCIN BOLUS VERSUS PLACEBO AS A STRATEGY TO PREVENT UTERINE ATONY AT CESAREAN SECTION IN WOMEN WHO ARE AT INCREASED RISK OF POST-PARTUM HEMORRHAGE.

AUTHORS: K. J. King, J. Douglas, W. Unger, A. B. Wong;
AFFILIATION: British Columbia Women's Hospital, Vancouver, BC, Canada.

Introduction: Oxytocin is used routinely during cesarean section (C/S) to prevent post-partum hemorrhage (PPH) from uterine hypotonia. Some anesthesiologists and obstetricians believe that a bolus of oxytocin is more effective than infusion. Concern over bolus side-effects has led to recommendations of "5 units by slow intravenous injection" [1]. One study found a high dose oxytocin infusion was effective compared with a low dose infusion in decreasing the need for additional uterotonics after emergent CS [2]. Bolus oxytocin versus placebo has not been previously studied at C/S. This randomized, double-blinded study examines whether a 5u oxytocin bolus reduces the need for additional uterotonics at C/S in women at risk of uterine hypotonia.
Methods: After ethics approval, consenting women at risk of PPH undergoing C/S were assigned to receive either 5 u oxytocin or placebo (normal saline (NS)) over 30 secs after cord clamping. Then both groups received 40u oxytocin in 500 mL NS over 30 minutes, followed by 20 u over 8 hours, ensuring that the placebo group was not disadvantaged. Primary outcome is need for additional uterotonics. Secondary outcomes are uterine tone, estimated blood loss (EBL), side-effects including hypotension, further intervention due to hemorrhage, hemoglobin levels and time for placenta delivery. Power analysis indicated 62 subjects/group.
Results: The code will be broken when study is complete. To date, 17 subjects have been studied (Table). 9 had emergency C/S. 1 subject required additional oxytocin within the first hour, one required ergot, none had hemabate. 29% had hypotension associated with the study drug (>20% drop in SBP). Three (18%) had EBL > 1000mL, none were transfused.
Discussion: This study hopes to determine whether there are advantages in administering a bolus of oxytocin during C/S in women at high risk of uterine hypotonia. The study was designed to ensure that there was no disadvantage to the group given the bolus of saline. If no difference is seen between the groups, women in future may be spared the increased side effects associated with a bolus while retaining the benefits of good uterine contractility.

Inclusion Criteria:	
> 8 Hours oxytocin	7
Twins	6
Macrosomia	2
Chorioamnionitis	1
Posterior Previa	1
Past History PPH	1
Polyhydramnios	0
Parity >5	0
Anesthetic Technique	
Epidural	6
Spinal	6
CSE	2
GA	1
Regional + GA	1

References:
1. Why Mothers Die 1997-1999, 135-7.
2. Obstet Gynecol 2001; 98:386-90.

A-70.

IMMEDIATE POSTOPERATIVE COMPLICATIONS: ELECTIVE VERSUS NON-ELECTIVE C-SECTION

AUTHORS: M. M. Cardoso, A. R. Amaro, E. Lorenz, M. R. Rosa;
AFFILIATION: Hospital e Maternidade Santa Joana, Sao Paulo, Brazil.

INTRODUCTION: The rate of primary and repeat c-section (CS) is increasing, in part, due to maternal demand (1). There are relatively few studies assessing the immediate postoperative complications related to CS.
METHODS: After IRB approval, the medical records of all parturients having a CS from 1st April 2005 to 1st August 2005 were evaluated. HMSJ uses a standardized protocol for the administration of subarachnoid block for CS, (15 mg of hyperbaric bupivacaine and 40 μg of morphine). Complications, such as hypotension, abnormal bleeding, nausea, vomiting and the need of rescue medication for pain relief during the PACU stay were noted. Women were divided into 4 groups: Elective primary CS - healthy parturients, not in labor, having a first CS without any maternal or fetal indication; Elective repeat CS - healthy paturients, not in labor, having a CS without any maternal or fetal indication and having had at least one previous CS; Non elective primary CS: the CS was performed either because of a fetal or maternal indication; Non elective repeat CS: the CS was performed either because of a fetal or maternal indication in a woman having had at least one previous CS. Maternal pressure was maintained with boluses of metaraminol and crystalloids, as needed. At cord clamp, women were given IV cefalotine, oxytocin and IM diclofenac.
RESULTS: The medical records of 3106 parturients were reviewed. The number of women having one prior CS was not significantly different between women having an elective as compared to non-elective repeat CS, 68 and 67 %, respectively. The incidence of complications can be seen on Table 1. The need for rescue pain medication was higher in the primary elective CS group.
DISCUSSION: In our study, there were few immediate post-operative complications after CS. This could be due to short operation times, greater number of healthy and non-obese parturients, and women of relatively low parity in the repeat CS groups in our practice. The reason why women having an elective primary CS required more rescue medication for pain relief may be related to the fact that they had not experienced painful labor or had no frame of reference for post operative pain because they had not had a prior CS.
REFERENCES: 1.BR. Med J. 1987;294:201-2.

Table1. Immediate postoperative complications: elective versus non-elective C-section, * p<0.05

	Elective primary (n=1171)	Non-elective primary (n=441)	Elective repeated (n=1083)	Non-elective repeated (n=411)
Nausea(%)	4,1	3,3	4,1	4,6
Vomiting (%)	2,7	1,8	3,9	3,6
Hypotension (%)	5,4	5,0	3,6	6,0
Abnormal bleeding (%)	0,9	0,4	0,7	0,7
Rescue pain relief (%)	14,4*	12	8,6	9

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A-71.

TWENTY FOUR-HOUR LABOR EPIDURAL ANALGESIA SERVICE DOES NOT SIGNIFICANTLY INCREASE WORKLOAD AT MIDNIGHT

AUTHORS: M. Namba, K. Terui, K. Yokota, N. Kariya, M. Tamura, H. Tsujihara;
AFFILIATION: Saitama Medical Center, Kawagoe, Japan.

INTRODUCTION: Our institution is unique in Japan in that obstetric anesthesiologists provide labor epidural analgesia (LEA) on 24-hour basis. Japanese colleagues are reluctant to adopt this practice for fear of increased workload, especially at midnight. The aim of this study was to reveal workload pattern by providing 24-hour LEA service.
METHODS: We audited LEA for 5 years from 2000 in our institution with the total number of 4350 deliveries. We usually initiate LEA upon parturient's request whether labor is spontaneous or induced. LEA techniques are mostly continuous epidural infusion (CEI) of 0.1% ropivacaine combined with 0.0002% fentanyl, or combined spinal-epidural analgesia (CSEA). We recorded the time at the beginning of LEA, delivery of infant, and the termination of CEI.
RESULTS: The total number of LEA was 285(6.6% of all deliveries). Labor was spontaneous in 74.7% of cases. CEI was provided in 80%, and CSEA in 12.6%. The remaining parturients received single shot spinal analgesia. These interventions and time of day were shown in the figure. The peak of the beginning of LEA was noted at time 1100-1200 (9.5%), and the peak of the termination of CEI at 1600-1700 (9.5%). The majority of deliveries with LEA occurred between 1300 and 2300 (70.9%). The average duration of LEA was 5.8±3.7h (median 4.9h, range 0.6-31.5h). 23.5% of LEA was completed at daytime shift. Modes of delivery were spontaneous vaginal delivery in 55.4%, forceps delivery in 33.3% and cesarean section in 11.2%.
DISCUSSION: The previous reports on obstetric anesthesia workload included both cesarean section and labor analgesia[1, 2]. In this study, we wanted to reveal workload increase by LEA only. Contrary to our clinical impression, LEA workload after midnight was not significant. LEA workload was observed mostly at daytime shift, which probably reflects our high risk patient population and higher rate of induced labor. Considering the relatively low rate of LEA in Japanese parturients, 24-hour LEA service is unlikely to considerably increase obstetric anesthesiologists's workload.
REFERENCES:
1. International Journal of Obstetric Anesthesia, 13, 126-128, 2004
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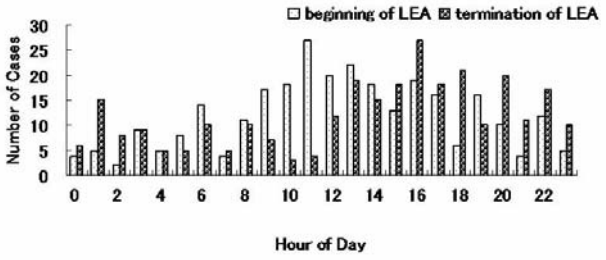


FIGURE- Number of LEA in Saitama Medical Center for 5 years from 2000 by time of day: time of beginning and termination of LEA.

A-72.

VENTILATORY SUPPORT OF PREGNANT PATIENTS WITH RESPIRATORY DISTRESS SYNDROME

AUTHORS: A. Ioscovich, S. Grisaru-Granovsky, M. Hersch, M. Schimmel, A. Samueloff;
AFFILIATION: SZMC, Jerusalem, Israel.

Introduction: Acute lung injury/acute respiratory distress syndrome (ALI/ARDS) in the pregnant patient is a difficult challenge for the critical care and obstetric team. We present our experience with conservative management of pregnant patients with mechanical ventilation secondary to ALI/ARDS, and evaluate the effect of antepartum ventilatory support on the mother and neonate.
Methods: Pregnant women admitted to intensive care units in 1998-2003 and requiring mechanical ventilation for ALI/ARDS were identified. The medical records were reviewed for demographic data, criteria for intubation, APACHE 2 score, mode of ventilation and outcome. All neonates of these patients were followed up for physical examination and motor skills.
Results: Sixty nine gravidas required admission to the intensive care (1998-2003), of which 3 mothers suffered of (ALI/ARDS) and required intubation for ALI/ARDS. Intubated mothers delivered 5 fetuses (two sets of twins and one singleton). Criteria for intubation were based on the physician's concern for failing arterial oxygenation and exhaustion. Mechanical ventilation was initiated within 24-48 hours of admission. All women were otherwise healthy, mean age 30 years (range 29-32). The range of gestational age at the time of endotracheal intubation was 21-28 weeks. The ventilatory indices and the ICU data are shown (TABLE). Analgesia/sedation, antibiotics, vassopressors and betamethasone for fetal lung maturity were used in all cases. None received tocolysis. Despite the distended abdomen ventilatory support was maintained according to accepted guidelines (low tidal volume). FiO2 was maintained below critical levels (0.6) and weaned by at least 30% by the end of the intubation period. The arterial pH was maintained at ≥7.3. All three women were weaned, discharged with normal respiratory function and subsequently delivered healthy term neonates. Two delivered vaginally (one singleton, one pair of twins) and one by cesarean for obstetric indication. The mean birth weight was 2530 grams (range 2060-3230), and 1'/5'Apgars were above 7. All neonates were healthy and the follow up for a mean of 17 months (range 3- 24) was normal.
Conclusions: The outcome of maternal ALI/ARDS is independent of their gravida status and is a function of the underlying cause. Maternal ALI/ARDS is amenable to modern intensive care, thus there is no need to routinely and prematurely terminate pregnancy. One may anticipate that such pregnancies can be safely carried to term.

	Patient 1 Twins (appendicitis and peritonitis)		Patient 2 Twins (ARDS of unknown etiol-ogy)		Patient 3 Singleton (ruptured tubo-ovarian abscess)	
	First 24 h	Last 24 h	First 24 h	Last 24 h	First 24 h	Last 24 h
Gestation age at intu-bation	27		21		28	
Gestational age at delivery	39		37		39	
Mode of ventilation	CMV	SIMV	CMV	SIMV	CMV	SIMV
PaO2/FiO2	120/0.75	85/0.45	80/0.6	90/0.4	75/0.8	106/0.4
Ratio	160	190	133	225	94	265
Tidal Vol (ml)	450	420	420	400	480	450
PEEP (cmH2O)	10	5.2	10	5	7.3	5.2
PAW (cm H2O)	28	28	30	24	39.3	40
Minute ventilation	7.5	8	11.5	8	8.8	9
Arterial pH (mean)	7.3	7.36	7.38	7.42	7.45	7.47
Base Excess (mean)	-7.5	-2	-6	1.8	-0.3	1.7
APACHE II score	16		11		16	
Ventilator days	2.4		8		11	
Total hospital days	10		23		31	

POSTER REVIEW 2

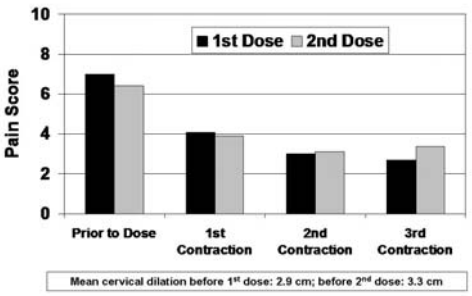
A-73.

REVISITING EPIDURAL DEMEROL FOR LABOR ANALGESIA

AUTHORS: J. M. Davies, B. K. Ross;
AFFILIATION: University of Washington Medical Center, Seattle, WA.

Introduction: There is minimal literature about the use of epidural demerol for labor analgesia.[1,2] The aim of this study was to describe the onset, duration, analgesia and side effect profile of epidural demerol when used for labor analgesia.
Methods: We analysed data from 37 patients (23 primips and 14 multips) who requested and received a "walking" demerol epidural. After placement of the epidural catheter, a test dose of 3mls 0.25% bupivacaine + 1:200,000 epinephrine was given, followed by 25mg demerol in 5 mls saline, as required, to a maximum of 3 doses. Numerical pain scores (0 - no pain, up to 10 - very severe pain) were recorded before each dose and during the 1st, 2nd and 3rd contractions thereafter.
Results: Mean maternal age was 28 yrs (range 16 - 43 yrs) with a mean gestational age of 38 weeks (range 23 - 42 weeks). Numerical pain scores before and after the first two doses of demerol are shown, together with cervical dilatation at time of dosing (fig 1). For each dose, there was a statistically significant difference in pain scores prior to dosing compared with during the third contraction. Cervical dilatation at initiation of local anesthetic was 5.3 cm ± 2.3 cm. There were minimal side effects (nausea in 5 patients, itching in 3 patients, no respiratory depression or hemodynamic instability) and 94% patient satisfaction. All patients were allowed to ambulate but data was only recorded on 17 patients (9 who walked and 8 who did not).

Figure 1: Pain Scores After Epidural Demerol



Discussion: Epidural Demerol is a fast acting, effective analgesic for latent phase labor. At a dose of 25 mg it is associated with hemodynamic stability, minimal side effects and high maternal satisfaction. At a time when "walking" epidurals are popular, epidural demerol offers a safe alternative to low-dose local anesthetics, avoiding possible hypotension and dorsal column dysfunction.[3,4] However, at an average cervical dilatation of 5 cm, i.e. once active labor has started, pain relief provided by demerol is frequently inadequate and local anesthetics are subsequently required for pain control. Further research is needed to determine an optimal dose and volume.
References:

1. Anaesthesia 1980, **35**, 380-2
2. Br J clin Pharmac 1982, **13**, 171-6
3. Br J Anaesth. 1994 Oct; **73**(4), 540-2
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A-74.

ANESTHETIC INTERVENTIONS DURING VAGINAL TWIN DELIVERIES

AUTHORS: B. Carvalho, A. Saxena, A. Butwick, A. Macario;
AFFILIATION: Stanford University School of Medicine, Stanford, CA.

Introduction: Vaginal twin pregnancies are associated with increased perinatal morbidity and mortality (e.g. acute fetal distress, malpresentations), and anesthetic intervention may be necessary to facilitate emergent delivery. A previous survey by our group showed that 69% of California institutions perform vaginal twin deliveries in the operating room (OR), and 54% require an anesthesiologist to be present during vaginal twin deliveries. The aim of this study was to assess the frequency and the type of anesthetic interventions for vaginal twin deliveries performed in the OR.
Methods: Following IRB exemption approval, we conducted a retrospective chart review of all vaginal twin deliveries undertaken between 1/1/2000 and 12/30/2003 at Lucile Packard Children's Hospital, Stanford, California, which averaged 5200 deliveries per year, with a 70% epidural rate, and a 24% cesarean delivery (CS) rate. By department policy, all vaginal twin deliveries were performed in the OR with an anesthesiologist in attendance. We determined the duration of anesthesia care per delivery, and the frequency and type of anesthetic interventions. An economic analysis for the anesthesia coverage was also calculated.
Results: 81 patients underwent attempted vaginal twin delivery over the 36-month study period. 80 patients had epidural blockade in-situ prior to attempted vaginal delivery. The median (range) anesthetic time per delivery was 60 (20-380) minutes. In the OR, 21% of vaginal twin deliveries received an anesthetic intervention: 15 patients received epidural "top-ups" with local anesthetic to augment the preexisting epidural block, 1 patient received intravenous sedation (midazolam 1 mg), and 1 received medication to treat hypotension. Five emergency CS were necessary (6.2% incidence) for non-reassuring fetal heart rates in Twin B. Two of these emergent five CS were performed using the preexisting epidural catheter and three CS required general anesthesia (2 were stat GAs and 1 was an urgent GA after a failed epidural top-up). Assuming a 60 min median case duration, and 4 anesthesia billing units per hour with a mean national reimbursement rate for anesthesia services of 35$/unit, the professional fees for anesthesia coverage are approximately $140/ case.
Conclusion: No consensus currently exists regarding where vaginal twin deliveries should take place (e.g. the OR, the patient's laboring room) and if an anesthesiologist needs to be immediately present. For the 81 patients studied, 27% required anesthetic interventions with 6% needing immediate interventions for urgent and emergent CS. Whether hospitals and anesthesia groups are able to economically justify staffing ORs with anesthesiologists during twin deliveries depends on a variety of factors including the case load and how the obstetric anesthesia service is staffed (e.g., dedicated or shared coverage).
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POSTER REVIEW 2

A-75.

MORE THAN DURAL PUNCTURE? AN ANALYSIS OF CRANIAL SUBDURAL HEMATOMAS IN OBSTETRICAL PATIENTS AFTER EPIDURAL PLACEMENT

AUTHORS: M. J. Danic, D. J. Applefield, M. Brown;
AFFILIATION: Henry Ford Hospital, Detroit, MI.

Introduction: Cranial subdural hematoma (SDH) formation following labor epidural is a rare, yet well documented phenomenon. This potentially catastrophic complication remains an elusive diagnosis as patients present with a wide range of signs and symptoms. Current mechanism suggests low cerebral spinal fluid pressure following dural puncture leading to traction and tearing of dural bridging vessels.[1] We attempt to identify risk factors that may assist in early diagnosis of SDH in the obstetrical patient.
Methods: In an attempt to identify risk factors, we performed a literature review for obstetrical subdural hematoma, labor epidural complications and dural puncture. Case reports with obstetrical patients having SDH were reviewed for age, documented dural puncture, elapsed time to subdural diagnosis, neurological signs and symptoms, preexisting medical conditions, and neuroimaging.
Results: 16 total case reports of obstetrical SDH were identified. 14 cases were associated with epidural insertion, 1 case associated with spinal anesthesia for cesarean section, and 1 case of spontaneous hematoma formation. The average patient age was 27.4 years and dural puncture was documented in 9 cases. Average time to SDH diagnosis was 21.5 days post epidural. Presenting neurological signs and symptoms included postural headache, drowsiness, nausea, vomiting, confusion, focal paresthesia, papillodema, seizure and visual field defects. Preexisting conditions other than dural puncture included previous head injury, brain atrophy, preeclampia, hypertension and thrombocytopenia. Diagnosis was obtained by computerized tomography (CT) in 7 patients, magnetic resonance imaging (MRI) in 5 patients and carotid angiography in 2 patients. 2 patients had false negative CT's which were performed on day 7 and day 17 post epidural. 3 patients underwent epidural blood patch prior to subdural hematoma diagnosis, and 1 patient had an epidural blood patch post neurosurgical decompression.
Discussion: Historically, SDH in obstetrical patients has been attributed to dural puncture. However, 35.7% of case reports did not document dural puncture, therefore, other etiologies must be considered. Previous head injury may lead to bridging vessel vulnerability and brain atrophy may allow for greater brain sagging and traction of bridging vessels secondary to a larger subdural space.[2] Preeclampsia, hypertension, and thrombocytopenia may further contribute to the risk of SDH due to platelet dysfunction and vessel fragility.[3] Obstetrical patients with these predisposing conditions, change in postural component of headache, and reoccurrence of headache after epidural blood patch may warrant early MRI. We suggest using MRI, as false negative CT's have been documented due to the isodense phase of SDH. Awareness of SDH complications following epidural in the obstetrical patient is essential for early diagnosis and further studies are needed to identify precise risk factors in this patient population.
References:
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A-76.

CAFFEINE SIGNIFICANTLY DECREASES THE NEED FOR EPIDURAL BLOOD PATCH AFTER ACCIDENTAL DURAL PUNCTURE

AUTHORS: S. R. Desikan, R. G. Stacey;
AFFILIATION: Kingston Hospital, Kingston upon Thames, United Kingdom.

Introduction: Accidental Dural Puncture (ADP) is a recognised complication of epidural analgesia with an incidence of 0.19 - 3.6%. Post Dural Puncture Headache (PDPH) remains a disabling complication following ADP. Though Epidural Blood Patch (EBP) is the most effective treatment for PDPH, it is not with out complications and needs an experienced operator. Caffeine has been advocated as a first line treatment or alternative to EBP by some[1]. While some investigators reported very good results with intravenous caffeine, others found it to be no better than placebo. We report the analysis of the audit data of our department.
Methods: We analysed the audit data over the 80 months from April 1998 to November 2004 on the obstetric anaesthetic database. Following epidural analgesia women were followed up in the post partum period unless they had already been discharged. A senior obstetric anaesthetist assessed all women with headache and those with a clinical diagnosis of PDPH were started on conservative treatment including oral hydration, regular analgesia and laxatives. Mobilisation was encouraged and if the headache was not improving or mobility was limited caffeine sodium benzoate (CSB) 500mg given intravenously as an infusion over 1 hour was the next line of treatment. Blood patch was used with severe headaches or with persistent symptoms. The notes of the patients with a diagnosis of PDPH were analysed in detail.
Results: 11,891 patients received epidural or combined spinal epidural analgesia over the 80 months. Twenty-four (0.27%) patients complained of typical PDPH in the post partum period. Five patients were managed conservatively with oral fluids and analgesia. Fourteen women received additional caffeine infusion and this was sufficient in 6. All patients who received caffeine found the pain improved but in 8 the benefit was not sustained and they went on to receive EBP. Five others received EBP without a trial of caffeine. One patient needed temporary cessation of caffeine infusion because of tachycardia and one patient needed repeat EBP. There were no complications associated with EBP.
Discussion: The traction of the intracranial structures in the upright posture and vasodilatation are thought to be the mechanisms producing headache following dural puncture. Caffeine is a central nervous system stimulant thought to act through vasoconstriction of dilated cerebral blood vessels[2]. It is simple, safe and easy to administer. Our audit data shows that caffeine 500mg given, as an intravenous infusion was sufficient in 6 out of 14 patients who received it where conservative measures had failed. It thus prevented 43% of EBP that would otherwise have been needed. Though it will not replace EBP it can significantly reduce the need for it.
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POSTER REVIEW 2

A-77.

MANAGEMENT OF A PREGNANT PATIENT WITH STATUS ASTHMATICUS AND HEROIN ABUSE

AUTHORS: M. C. DeAngelis, M. Vallejo;
AFFILIATION: University of Pittsburgh, Pittsburgh, PA.

Introduction: Pregnant patients with status asthmaticus have increased complications due to the physiologic changes associated with pregnancy. Decreased Functional Residual Capacity (FRC) with increased oxygen consumption put these patients at risk for respiratory failure. Heroin abuse is a trigger for status asthmaticus. Moreover, Non-Cardiogenic Pulmonary Edema (NCPE) is associated with heroin use. NCPE can cause symptoms mimicking status asthmaticus. We report a patient with a history of recent and chronic heroin abuse with status asthmaticus.

Case Report: A 24-year-old G1P0 at 38 weeks gestation presented to an outside hospital for acute exacerbation of asthma. She had been using inhaled heroin throughout pregnancy. Bronchodilator treatments and intravenous steroids were administered without improvement. Chest radiographs (CXR) revealed increases in interstitial markings without effusion or consolidation. The patient was transferred to Magee-Womens Hospital, where she was intubated. A cesarean section was performed after a failed attempt at labor induction using oxytocin. A male fetus weighing 2954 grams was delivered with APGAR scores of 4 and 6, respectively. The fetus was intubated and brought to the NICU for observation. Both patients were extubated by the second postoperative day and were discharged home by the 6th postoperative day.

Discussion: Early recognition and aggressive treatment of the parturient experiencing status asthmaticus is of paramount importance. Maintaining maternal oxygenation and avoiding fetal acidosis are the prime treatment goals. The patient's history of heroin abuse caused the ICU team to investigate the possibility of heroin induced NCPE; symptoms such as a SaO2<90% and respiratory rate >12 closely overlap with the presentation of status asthmaticus. Although classically associated with bilateral pulmonary edema on CXR, there has been a report of NCPE, which presented on CXR as "patchy atelectasis" and "nodular interstitial pattern" (1). One case review of patients presenting to an emergency department, demonstrated as many as 2.1% of patients with heroin overdose had symptoms consistent with NCPE (1). However, among fatal overdoses, the incidence was noted to be "almost universal" on post mortem exams (1). The cause of NCPE has not been clearly identified, but analysis of the fluid from patients with the clinical picture of NCPE has shown high protein levels. Researchers believe the cause of the fluid leak in NCPE is due to capillary leakage rather than pump failure as in CHF. Based on the available data on NCPE and status asthmaticus, we advocate an aggressive approach in ensuring maternal and fetal oxygenation and ventilation. After early measures, such as supplemental oxygen and bronchodilators, fail; we advocate early intubation to reduce the chance of hypoxia to both mother and child.

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A-78.

TWO CASES OF INTRACRANIAL VENOUS THROMBOSIS DETECTED AFTER POST-PARTUM EPIDURAL BLOOD PATCH

AUTHORS: E. M. Lockhart, C. L. Baysinger, J. K. Boyle;
AFFILIATION: Vanderbilt University Medical Center, Nashville, TN.

We present 2 cases of intracranial venous thrombosis which were detected after epidural blood patch failed to provide relief.

Patient #1 is 31 year old AA female, G1P0, with a h/o DVT and LLL PA thrombosis. She was maintained on coumadin and had a negative thrombophilia work-up. During her pregnancy she was managed with therapeutic subcutaneous heparin. At 37 weeks she presented in spontaneous labor. When coagulation status was appropriate, an uncomplicated combined spinal-epidural was performed. (18g Tuohy, 27g Pencan®) She had a spontaneous vaginal delivery with good analgesia and was discharged on PPD#2 with a mild headache. She was readmitted on PPD#4 with a severe positional bifrontal headache associated with neck pain and emesis. As the patient was anticoagulated, she was managed with IV hydration and caffeine until coagulation status normalized. An epidural blood patch (EBP) was performed using 20cc of blood. She reported some improvement after procedure, although her symptoms did not resolve. Subsequent MRI revealed a left sigmoid sinus and distal left internal jugular vein thrombosis. The patient continued to experience headaches with shooting pain in right eye, and radiating down her back. These symptoms had resolved by the 3 month mark at which time a repeat MRI was normal.

Patient #2 is a healthy 21yo female, G1P0 who presented with severe pre-eclampsia (proteinuria, HA, hypertension) at 35 weeks. She was induced and had an apparently uncomplicated continuous lumbar epidural with good analgesia for her vaginal delivery. On PPD#1 she complained of a mild positional occipital headache with neck pain. The headache progressed to a severe positional bifrontal HA. At 48 hours an EPB was performed using 28cc of blood with initial improvement. Within 24 hours the symptoms had returned and on PPD#5 she presented with severe HA and associated nausea and vomiting. She was unable to sit upright without severe pain and reported dizziness, but any localizing neurological signs. An MRI revealed a partial left transverse venous sinus thrombosis. She was placed on coumadin for 6 months, repeat MRI is pending. She was found to be homozygous for the MTHFR C677T mutation

Discussion: Intracranial venous thrombosis is a rare but potentially lethal complication of pregnancy. Clinical manifestations are variable, and the spectrum of neurological symptoms relates to the severity and extent of the thrombotic process. Both of these patients presented with a postural HA, very typical for a PDPH. This diagnosis should always be considered, especially in the presence of a postural HA when a PDPH is unlikely, (such as after an apparently uncomplicated epidural or combined spinal/ epidural) or when an EBP fails to provide relief.

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POSTER REVIEW 2

A-79.

ATYPICAL PRESENTATION OF AN EPIDURAL ABSCESS IN A PARTURIENT

AUTHORS: T. L. Palumbo, S. D. Dumas;
AFFILIATION: University Hospitals of Cleveland, Case Western Reserve University, Cleveland, OH.

Introduction: The incidence of epidural abscess, a rare but potentially devastating complication of epidural anesthesia, has been reported to be 0.015% to 0.7%. Onset of epidural abscess ranges from 4 to 10 days after removal of the catheter. Symptoms include severe backache, fever, localized inflammation, radicular pain, and sensory and motor deficits. Often Staphylococcus aureus is the causative organism. MRI diagnosis, prompt surgical drainage, and antibiotics are required. We report an atypical presentation of an epidural abscess in a morbidly obese patient following Caesarean section under epidural anesthesia.
Case Description: A 29 year old female gravida 4 para 2 with morbid obesity, chronic low back pain, and hypothyroidism presented for induction of labor. Epidural placement was complicated by right sided paresthesia resolving after catheter adjustment. A Caesarean section was performed for arrest of fetal descent. The catheter remained in place for post-operative pain management. On postoperative day 2, the sterile epidural dressing was dislodged, and the epidural catheter was removed. The patient was discharged home the next day. Six days later, she complained of low back pain and a "knot" in her back. Neurological exam was normal. A small 5mm subcutaneous nodule was palpated at the epidural site. The patient was afebrile. Anti-inflammatories were prescribed, and if symptoms did not resolve, she was to return. The patient remained in close contact with the anesthesiologist. One week later, symptoms persisted. The patient was given the option to go to the emergency room or obtain a neurology consult as an outpatient. She chose outpatient consultation. The following day, she returned with severe back pain and fever of 39°C. The lesion was erythematous, warm, exquisitely tender, and larger. MRI revealed an epidural abscess at the level of L_2-L_3. The patient was immediately taken to the operating room for abscess drainage. She was discharged on antibiotics without neurological deficits.
Discussion: Epidural abscess is an uncommon, but serious complication of epidural anesthesia. Awareness is important for early detection and treatment. This patient presented with atypical signs, was followed closely, and treated conservatively. When the patient returned with increased pain and fever, prompt surgical treatment was crucial in preventing permanent neurological sequelae.
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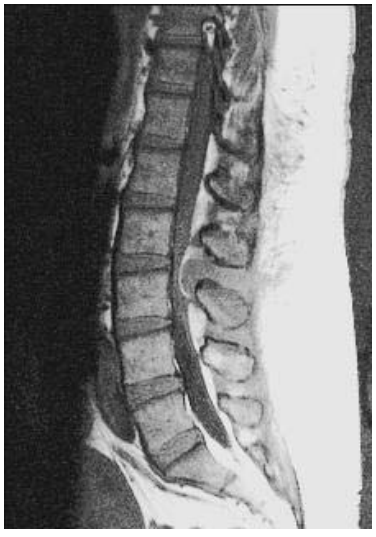

A-80.

EPIDURAL LABOR ANALGESIA IN A PATIENT WITH UNCLASSIFIED VON WILLEBRAND'S DISEASE

AUTHORS: A. J. Haas, B. Lewis;
AFFILIATION: university hospitals of cleveland and case western reserve university, Cleveland, OH.

INTRODUCTION: Von Willebrand Disease (vWD) is the most common inherited bleeding disorder. Different types of vWD can require dramatically different medical therapies. Most notably, for patients with Type I (the most common type), treatment with DDAVP is usually indicated. Administering DDAVP to patients with Type IIb is contraindicated, as it can lead to thrombocytopenia. Differentiating among the vWD types, nevertheless, is difficult. This is particularly true during pregnancy, because of hormonal induction of pro-coagulant synthesis.[1]
CASE REPORT: A 16 year old G1P0 presented during her 3rd trimester. She reported a history of vWD requiring blood product transfusion, but had no old medical records. The consulted hematology service was unable to diagnose the vWD type. She arrived to L&D in active labor, requesting a labor epidural. She denied unusual bleeding or bruising. A CBC and coagulation studies were drawn. The anesthesia service additionally obtained a collagen closure time (CCT) to assess the patient's primary hemostasis. All test results were normal, including a platelet count of 152,000/ml. The patient was considered to be at low risk for spinal hematoma formation. After discussing risks and benefits, the patient agreed to proceed with a labor epidural. At the hematology team's request, the patient received DDAVP prior to an uneventful epidural placement. A repeat platelet count was 96,000/ml, for which the patient received a platelet transfusion. Following first stage arrest, she underwent caesarian section, with an EBL of 500 ml. The epidural was removed on post-op day 2 without complication.
DISCUSSION: The parturient with unclassified vWD requesting a labor epidural poses several challenges. The first is risk stratification. A careful history and physical examination, platelet count, and coagulation studies are essential. Von Willebrand Factor (vWF)-platelet binding should also be assessed. The CCT is very sensitive to even mild defects of primary hemostasis, so normal results are reassuring.[2] The anesthesia team felt that this approach placed the patient at an acceptably low risk of complication for labor epidural placement. Administering DDAVP to this patient was controversial. On the one hand, most patients with vWD have type I, for which DDAVP therapy is low risk and may be beneficial. On the other hand, pregnancy often temporarily "cures" type I disease by increasing vWF synthesis.[1] Additionally, all data regarding this patient indicated that her hemostasis was intact. Moreover, DDAVP can cause thrombocytopenia in Type IIb, as vWF inappropriately binds and clears circulating platelets. This phenomenon may explain the reported platelet count drop. This case provides an approach specific to the parturient with unclassified vWD. It also models a general approach to the patient with poorly defined risk factors for rare but serious anesthetic complications.
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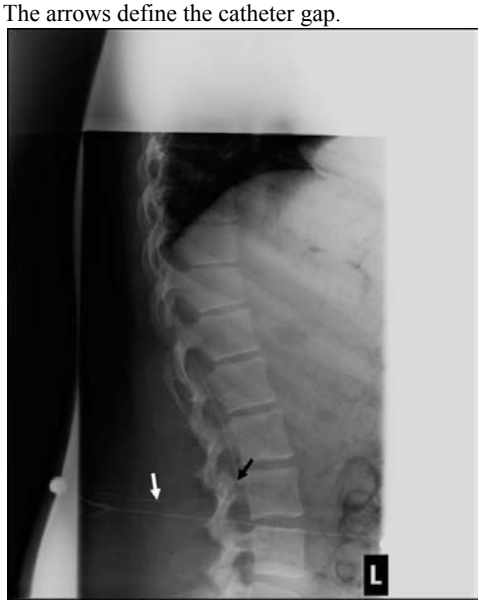
POSTER REVIEW 2

A-81.

WHERE'S THE CATHETER? EPIDURAL LABOR ANALGESIA IN A CHRONIC PAIN PATIENT WITH A PUMP IMPLANTED FOR INTRATHECAL HYDROMORPHONE THERAPY.

AUTHORS: R. M. Truong, N. M. Scaccia, T. A. Davis, B. L. Leighton;
AFFILIATION: Washington University School of Medicine, Saint Louis, MO.

Introduction: Chronic pain patients have poor tolerance for acutely painful events, such as labor or surgery. The presence of intrathecal hardware complicates labor pain management. We report successful analgesia in such a patient.
Case Report: A 5'2, 86 kg 29 yo G1PO parturient (BMI=34.6) presented at 26 wks gestation in preterm labor. She had had chronic pain from pancreatitis for 14 years. She was opioid tolerant, obese, and asthmatic. Previous surgeries included pancreatic abscess drainages, appendectomy, cholecystectomy, colostomy with subsequent take-down, and intrathecal (IT) pump placement at L3-4 three years previously. She received hydromorphone 10 mg/day through this catheter. Her preterm labor stopped but she developed Klebsiella bacteremia requiring IV antibiotics. She remained hospitalized due to her advanced cervical dilation at 3 cm and the 100 mile distance between her home and the hospital. Initially, we planned to place a lumbar epidural catheter under fluoroscopy to maintain the integrity of the IT catheter. However, a lumbar x-ray taken at 36 wks (upon our pain division's recommendation) revealed a ruptured IT catheter with a 5 cm gap between the proximal and distal ends.(figure) This knowledge removed the necessity for fluoroscopic guidance. At 37 wk, labor was induced because the patient developed pre-eclampsia. An epidural catheter was placed at L1-2 after an unsuccessful try at L2-3. Analgesia was satisfactory with a 12ml/hr continuous infusion of 0.125% ropivacaine and 0.5 mcg/ml sufentanil, supplemented with bupivacaine and lidocaine boluses. She had a successful vacuum-assisted vaginal delivery of a live, but opioid-addicted, infant with Apgar scores of 7 and 9.
Discussion: Catheter complications develop in 20-25% of patients with implanted intrathecal catheters.(1) Knowledge of the catheter break dramatically changed our anesthetic plan and our assessment of the patient's opioid needs. Multidisciplinary planning (obstetric anesthesiology, pain, and obstetrics) was essential in caring for this patient.
Reference: 1. Follett KA, Naumann CP. J Pain Symptom Manage 2000;19:209-15.
Figure: The arrows define the catheter gap.



A-82.

LIFE-THREATENING ACUTE PERIPARTUM AORTIC DISSECTION IN A PATIENT WITH MARFAN SYNDROME

AUTHORS: M. Harnett, B. S. Kodali, W. Camann;
AFFILIATION: Brigham and Women's Hospital, Boston, MA.

The Marfan syndrome is an inheritable connective tissue disorder with multisystem involvement and variable expression of symptoms and signs. The prevalence is estimated at 1:5000 in the general population (1). Pregnancy is generally considered contraindicated owing to the increase in body weight and circulating blood volume resulting in an increased risk of arterial dissections.
A 40 y.o. G1P0 presented to our high-risk OB Anesthesia Consult service at 24 weeks with twin gestation. She had a history of Marfan Syndrome but was asymptomatic. Her echocardiogram showed an EF of 65% and an aortic root of 4.2 cm with mild AI. Medications included atenolol 50mg daily to decrease stress to the aortic root. Her history also included Harrington Rod placement from T4 to L4 at age 15. Cesarean delivery was recommended by her cardiologist to avoid valsalva during delivery and at 37 weeks gestation was performed under spinal anesthesia. Intraoperative and postoperative course were uneventful. Echocardiogram on day 2 postpartum showed an EF of 60% with an aortic root measurement of 4.01cm. She was discharged home on day 4 postpartum.
Three days after discharge (day 7 postpartum) she complained of throat and upper back discomfort, prompting a visit to her cardiologist. Echocardiogram revealed a dissection of the ascending aorta with an extension into the left subclavian artery and she underwent emergent aortic valve and proximal aortic root replacement. Recovery was uneventful.
An association exists between pregnancy and arterial dissections. The risk of aortic dissection increases with gestational age. The threat of such catastrophe has prompted some to recommend against pregnancy in patients with Marfan syndrome. Recent recommendations (2) are as follows: Patients with an aortic root size more than 4 cm, or an increase of aortic root size during pregnancy are at high risk for occurrence of aortic dissection, mainly in the third trimester. If possible, surgical repair of the enlarged aortic root should be done prepartum. In patients in whom the diagnosis of an enlarged aortic root is made during pregnancy, a close echocardiographic follow-up (4 to 6 weeks) is mandatory. In patients with an aortic root size more than 4 cm or with increasing size, beta-blocking agents should be prescribed. Aortic root surgery should be performed within the first week after delivery. Hypertension should be avoided and a cesarean section performed under regional anesthesia in all patients at risk. In patients who do not have surgery close monitoring and administration of beta-blocking agents is suggested up to 3 months postpartum, as late dissections may occur in this time period.
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(2) Ann Thorac Surg 2003;76:309-14

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POSTER REVIEW 2

A-83.

CASE REPORT: CESAREAN SECTION IN A PATIENT WITH BECKWITH WIEDEMANN SYNDROME

AUTHORS: E. A. Abou-Hassan, J. B. Schuitemaker R, L. A. López, I. J. Font A, P. Tejada;
AFFILIATION: Hospital Universitario de Caracas, Caracas, Venezuela.

Beckwith-Wiedemann Syndrome consists of macroglossia, omphalocele, visceromegaly, and neonatal hypoglycemia. Macroglossia is the most common feature. Preparations for difficult airway management should be made. Anesthetic choice should be dictated primarily by the surgical procedure1.
We report the anesthetic management for cesarean section of a 29-year-old female at 37 weeks gestation with Beckwith-Wiedemann Syndrome. Her medical history included chronic hypertension; surgical correction of omphalocele at born; obesity and minimal cesarean section for fetus demise with omphalocele. Preoperative evaluation showed a urinary tract infection. Airway examination revealed a Mallampati class III with significant macroglossia. A combined spinal- epidural anesthetic technique was performed in the sitting position at L_2 - L_3 level. We used a 16-gauge Touhy needle, and threaded an epidural catheter. A 25-gauge spinal needle was, then, inserted at the same level and used to inject 6,25 mg of 0,5% bupivacaine with 20 µg fentanyl and 50 µg morphine. A bilateral T_4 sensory level was achieved. Aproximately 45 min after the spinal block, 10 ml of 2% lidocaine with 5 µg/cc fentanyl was administered in fractionated doses via epidural catheter due to a decline in the sensory level. An alive female infant weighing 5.400 Kg was delivered with hepatomphalocele. The anesthetic and surgical courses were uneventful.
Conclusions: Regional anesthesia is a safe and effective technique for the management of parturient women with Beckwith-Wiedemann Syndrome and associated medical problems which may include obesity, hypertension and difficult airway.
1 Anesthesiology 1989; 70: 711 - 12.

A-84.

USE OF NOREPINEPHRINE IN PREGNANCY AFTER CARDIOPULMONARY BYPASS

AUTHORS: L. Cooper, M. Gabay, M. Barron, C. Gallagher;
AFFILIATION: University of Miami Miller School of Medicine, Miami, FL.

Background and Goal of Study: There are no human studies with norepinephrine in pregnancy, and it is indicated only if the risk to maternal survival outweighs the potential harm to the fetus.
Materials and Methods: 28 yo female presented to the ER with worsening chest pain and shortness of breath 2 years after undergoing AVR with a mechanical valve. TTE showed thrombosis of the prosthetic valve with LV distension. Ultrasound showed an active fetus with good beat-to-beat variability at 140-150. Patient was rushed emergently to the OR for redo AVR using CPB. BP was 60/40. Rapid sequence induction was accomplished with 14mg etomidate and 100mg succinylcholine. BP immediately following induction was 64/45. 100mcg epinephrine were given without response. BP fell to 25mmHg and chest compressions were begun. Sternotomy was performed and epinephrine boluses were given. Upon weaning from CPB, BP could not be maintained above 70mmHg. Increase of epinephrine rate caused ventricular dysrhythmias. Norepinephrine 0.05 mcg/kg/min was instituted contrary to recommendation of the obstetrician. BP increased to 110/65. Postoperative ultrasound showed fetus with FHR in the 120's. The patient carried fetus to term and delivered a normal, healthy baby boy.
Results and Discussions: Hemodynamic compromise is a well-known complication in acute valve thrombosis, leading to LV distention and failure, often resulting in death. Fetal survival rate during CPB only approaches 50%. Infusion of phenylephrine, epinephrine, and norepinephrine all decrease uterine blood flow in pregnant sheep. Phenylephrine has been associated with improved umbilical cord gases at bolus doses up to 50 mcg. No studies exist with the use of norepinephrine in pregnancy.
Conclusion: Use of norepinephrine in pregnancy may be indicated in extremely unstable situations. Uterine artery vasoconstriction must be weighed against adequate blood pressure to maintain adequate placental perfusion.
Reference: Parry AJ: Cardiopulmonary bypass during pregnancy. Ann Thorac Surg 61:1865, 1996.

POSTER REVIEW 2

A-85.

ANESTHETIC MANAGEMENT OF A PARTURIENT WITH NEUROFIBROMATOSIS TYPE I VS. TYPE II

AUTHORS: W. T. Lennox, C. A. DeSimone;
AFFILIATION: Albany Medical College, Albany, NY.

Introduction: Neurofibromatosis is a disease resulting in an excessive proliferation of neural crests cells involving virtually every organ system. Neurofibromatosis is divided into two groups; type 1 and type 2. Neurofibromatosis Type 1 (NFT1) is a common autosomal dominant disorder with varied expression. Anesthetic management may be complicated secondary to lesions involving the oropharynx, larynx, lungs and the central nervous system (CNS). Essential hypertension is common. However, severe hypertension may be associated with a pheochromocytoma or renal artery stenosis. Neurofibromatosis Type 2 (NFT2) is genetically rare. It is manifested by bilateral acoustic neuromas and other CNS tumors. (1)

Case 1: A 23 year old G3P2002 with NF1 at 36+ weeks gestation was admitted for repeat cesarean section due to contractions and evidence of severe oligohydramnios. The patient had multiple cutaneous neurofibromas on her abdomen, legs and back. She had no evidence of CNS involvement. Spinal anesthesia was performed with a 24G Gertie Marx needle. 2 mls of 0.75% hyperbaric bupivacaine with 150mcg of morphine and 15mcg of fentanyl was administered. Intraoperative and post-operative courses were uneventful.

Case 2: 37 year old G1P0101 with NF2 at 27+ weeks gestation was admitted with severe chronic hypertension and superimosed preganancy-induced hypertension. She had marked facial abnormalities and was deaf secondary to bilateral acoustic neuroma resection. She had multiple neurofibromas involving cranial nerves resulting in a unilateral vocal cord paralysis as well as CNS involvement. Careful airway assessment was performed including evaluation by otolaryngology using a nasopharyngeal fiberoptic scope. Repeat cesarean section was performed under general anesthesia using a rapid sequence induction with thiopental and succinylcholine. Intraoperative course was complicated by marked hypertension which was treated with multiple doses of labetalol. Work up for pheocromocytoma and renal artery stenosis was initiated prior to discharge.

Discussion: Considerations for the anesthetic management of NF I and II should include airway assessment for oral pharyngeal disease(2), presence of hypertension and the existence of CNS neurofibromas with or without signs of increased intracranial pressure. Successful epidural placement in parturients with both Type I and II disease after proper screening with clinical examination and radiographic study has been reported (3). General anesthesia for cesarean section should be considered in a patient with extensive central and neuraxial involvement of neurofibromatosis II.

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2)Br J of Anesthesia, 2001, Vol. 86, No.4 555-564
3)Int J of Obstetric Anesthesia 2005;14:336-339

A-86.

EVALUATION OF LABOR EPIDURAL INFORMATION ON THE INTERNET

AUTHORS: E. Wayne, M. V. Greenfield, N. Naughton, L. S. Polley;
AFFILIATION: The University of Michigan Health System, Ann Arbor, MI.

Introduction: Patient and provider use of the Internet for medical education and medical decision-making is growing rapidly, especially for popular topics such as labor analgesia (1). The standardized review processes that characterize peer-reviewed medical texts and journals are largely absent on the Internet by its very nature; there are no standards to guide the reader in the evaluation of information (2,3). The aim of this study was to evaluate the quality of Web-based anesthesia information regarding epidural labor analgesia.

Methods: Two experienced obstetric anesthesiologists used four popular search engines (google.com, msn.com, askjeeves.com, and altavista.com) to search the Internet using the term “labor epidural” to generate 402 Web sites. The two raters excluded 285 Web sites from evaluation because they were either irrelevant to the search term, inaccessible, link pages, or duplicated previous Web sites. The remaining 117 Web sites were evaluated for content accuracy using a Microsoft Access rating tool. Web sites were recommended for patient use if labor epidural information was accurate, up-to-date, and relevant. A study of 27 pairs of site evaluations indicated good reliability of the rating tool.

Results: Of 117 evaluable Web sites, 15 sites were peer-reviewed articles, 33 were rated accurate, 33 were rated misleading, and 36 were rated inaccurate. Inaccurate Web sites were more likely to be based on non-scientific sources (such as anecdotes and human interest stories) and were significantly more likely to be authored by special interests or sponsors (P=0.0186). Data from peer-reviewed sources such as medical texts and journals were significantly more likely to be relevant and reliable (P =0.0362). Thirteen labor epidural Web sites (13/117 or 11%) were deemed relevant and acceptable for patient education.

Discussion: Only 13 Web sites were recommended by two experienced obstetric anesthesiologists for use by lay-person patients seeking information about labor epidurals on the Internet. Internet misinformation about labor epidurals could influence parturients to could forego a safe and potentially beneficial option for labor pain management. Obstetricians and obstetric anesthesiologists should direct patients to current Web sites that provide accurate, peer-reviewed information. Providing information on Internet sources of accurate and up-to-date labor epidural information will help obstetric patients to make well-informed decisions about labor pain management options. More importantly, this study highlights the need for unbiased and accurate patient education regarding neuraxial labor analgesia. The development of interdisciplinary, hospital-based antepartum educational programs would help address this need.

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POSTER REVIEW 2

A-87.

EVALUATION OF HAND HYGIENE COMPLIANCE AMONG ANESTHESIOLOGY RESIDENTS ON LABOR AND DELIVERY. CAN OLD HABBITS BE CHANGED?

AUTHORS: M. A. Soens, L. Garcia, J. S. Ranasinghe, D. J. Birnbach;
AFFILIATION: University of Miami, Miami, FL.

Introduction: A 2002 postal survey reported a wide variation in aseptic technique for placement of labor epidurals. [1] Surprisingly, many anesthesiologists in that survey did not wash their hands, although handwashing has been shown to reduce the level of bacteria on the hands [2] and decrease infections [3]. Although there is no 'hard' evidence that handwashing prevents epidural catheter-related infection, according to European guidelines [4] epidural insertion must be performed using an aseptic technique including handwashing. No such guidelines exist in the US and it was our impression that handwashing is not always performed. In this study we evaluated handwashing compliance prior to epidural placement and attempted to determine whether it is possible to change handwashing behavior among anesthesiologists.
Methods: A pilot study to determine the percentage of times in which anesthesiologists washed their hands prior to placing labor epidurals was conducted. Based on these results, this QA study was undertaken to evaluate the effectiveness of an intervention designed to improve compliance with handwashing. Following IRB exemption, residents on their obstetric anesthesia rotation were observed. Two independent observers viewed anesthesiology residents during daylight hours. Data collected during the first two weeks of their rotation were considered as a baseline. On day 14, the residents were instructed on the importance of hand hygiene by their supervising attending and were given a bottle of alcohol-based handrub. In addition, residents were told that they were being observed, but the identity of the observers was not revealed. For the next 2 weeks, random observations continued. Logistic regression for clustered data was performed.
Results: The pilot study demonstrated that only 5.5% (4/72) of observed epidurals were associated with hand hygiene. The baseline rate during the first 2 weeks of the anesthesia resident rotation was found to be 6.7%. Following instruction and availability of small bottles of handrub, the percentage of observed handwashing among the same cohort was significantly increased to 81% (31/38) (OR 2.16, 95%CI 1.95,2.38).
Discussion: Although rare, epidural abscess can be devastating; therefore reasonable precautions should be taken to reduce its risk. This study proves that multifaceted approaches combining education with easier access to hand sanitizers can dramatically improve handwashing compliance. It is possible, however, that these findings were related to the fear factor associated with observations rather than with education. In addition, it is possible that there will be a decay in handwashing compliance over time so that multiple reminders or other approaches may be necessary.
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[2] Am J Inf Control 1999;27:258-61
[3] N Engl J Med 1992;327:88-93
[4] Royal College of Anaesthetists, et al. Good practice in the management of continuous epidural analgesia in the hospital setting. November 2004.
[5] Journal of Hosp Infection 2001;47:173-80.

A-88.

ANESTHESIA FOR CESAREAN SECTION IN A PATIENT WITH HOLT-ORAM SYNDROME

AUTHORS: A. Ioscovich, S. Halpern;
AFFILIATION: SWCH, Toronto, ON, Canada.

Introduction: Holt-Oram syndrome (HOS) is an autosomal dominant condition manifest in 1:100,000 live births and characterized by bilateral forelimb deformities, congenital heart disease or/and cardiac conduction abnormalities. The limb defect may vary in severity from subtle carpal bone defects and triphalangeal thumb to digit aplasia and upper extremity phocomelia. The cardiac abnormalities include atrial and/or ventricular septal defects, anomalies in pulmonary venous return and different types of arrhythmia. We present the first reported case of the anesthetic management of a parturient with HOS.
Case report: A 35y, 59 kg, 155cm G1P0 was admitted for an elective CS. HOS was diagnosed because of typical limb deformities (bilateral absent thumbs, rudimentary right arm and forarm with limitations of extension of her right elbow, hypoplastic right pectoralis major). Her cardiac involvement was minimal and consisted of non-specific ST segment changes in leads II and V6. A 2D echocardiogram was normal. At the time of CS, her blood tests were normal, the blood pressure was 120/60 and pulse was 90 (NSR). In the operating room, we applied the usual monitors, a 5-lead ECG, and NIBP on the left arm. An 18g cannula was inserted into a dorsal vein in her right (almost nonfunctional) arm and 500mL Hartmann's solution given. A CSE was performed in the sitting position using a midline approach to L_{3-4}. One milliliter of 0.75% hyperbaric bupivacaine and 150μg morphine was injected intrathecally and an epidural catheter was inserted. A good bilateral block up to T_6 to pinprick was achieved. During the course of surgery, which lasted 55min, we gave two epidural boluses of 3ml 2% lidocaine. The baby was born with Apgars of 9/9 and weighed 3190gms. Mild hypotension was treated with phenylephrine (total dose of 80μg) and 2L Hartmann's solution was given intra-operatively. She was monitored for 6hrs postoperatively in the recovery room. She received additional acetomeniphen for postoperative analgesia and was discharged home after 5 days.
Discussion: In order to prevent a high sympathetic block (bradycardia, new atrio-ventricular block) or excessive sympathetic stimulation (pain, intubation) we decided to perform a CSE. This technique gave us all advantages of spinal anesthesia with flexibility of epidural catheter. We preferred a sitting position and relative small dose of bupivacaine (7.5 mg) for prevention excessive high sympathetic block and this dose was sufficient, initially, for our patient. We then added epidural local anesthetic as needed. Intrathecal morphine prevented acute postoperative pain and tachycardia. Cardiac monitoring was continued because of the possibility of cardiac arrhythmia.
Conclusion: CSE may be useful in patients in whom precise control of the height of the block is important. This case shows successful use of CSE anesthesia for CS and the importance of titration of analgesia in these patients.

POSTER CASE REPORTS

A-89.

SUBARACHNOID HEMORRHAGE IN A PREVIOUSLY HEALTHY PRE-TERM PARTURIENT

AUTHORS: C. P. Clinkscales, R. L. Dunkailo, K. K. Wilkins, M. V. Greenfield, L. S. Polley;
AFFILIATION: University of Michigan Health System, Ann Arbor, MI.

Introduction: Preeclampsia describes new-onset maternal hypertension and proteinuria after the 20th week of gestation(1,2). Eclampsia describes preeclampsia with seizures(1,2). In both, vascular hyperreactivity results from abnormal prostaglandin metabolism and endothelial dysfunction, contributing to vasoconstriction and platelet activation. Abnormal regulation of free-radical and lipid peroxidation also occurs. Ultimately, multi-organ malperfusion results(3,4). We present a case of a previously healthy parturient who presented with acute subarachnoid hemorrhage and fetal compromise.

Case: A 37-year-old G_9P_8 parturient presented at 29-weeks gestation for emergent cesarean section. She was previously healthy other than a four-day history of worsening headaches. She became progressively confused, developed blurred vision, and was later observed vomiting and having a seizure followed by a fall. Upon hospital presentation, she was hypertensive, postictal, and combative. She was pharmacologically sedated, paralyzed, and intubated. She underwent head CT scanning, which demonstrated acute subarachnoid hemorrhage with intraparenchymal vasogenic edema. She was transferred to our facility, where angiography confirmed the absence of vascular malformation or aneurysm. Chest x-ray showed pulmonary infiltrates. Fetal heart monitoring demonstrated loss of variability and late decelerations. Supportive therapy continued, including mechanical ventilation, pharmacologic treatment with magnesium sulfate, phenytoin, and hydralazine, and ventriculostomy placement. The patient gradually awakened, followed commands, and moved all extremities. Neurosurgical consultation indicated relative stability, while obstetric priorities included prompt delivery of the fetus in consideration of nonreassuring fetal status and probable eclampsia. The patient was sedated again and proceeded to the operating room for cesarean section under a balanced general anesthetic. Central venous and pulmonary artery catheters were placed. Blood pressure was maintained 110-125/70-80 mmHg with heart rate of 110-120 bpm and pulmonary artery pressure of 28/13 mmHg. Intracranial pressure was 12 mmHg. The fetus was delivered promptly (Apgar=3/1 minute, 5/5 minutes) and transferred to neonatal intensive care. The parturient was transferred to neurosurgical intensive care postoperatively. Care included pulmonary and hemodynamic management, including treatment for cardiogenic pulmonary edema. Pathological evaluation demonstrated placental thrombosis and infarction. The patient's neurologic status continued to improve without surgical intervention and she was extubated on postoperative day 6. She and her infant were eventually discharged in good condition.

Discussion: The incidence of spontaneous maternal subarachnoid hemorrhage in the absence of vascular malformation or aneurysm is unknown but thought to be quite rare(5), and reports of this presentation are likewise uncommon. Unique considerations in the management of this patient included maintaining appropriate hemodynamic and intracranial parameters so as not to worsen neurologic outcome. In this specific setting, we advocate using a balanced general anesthetic technique with invasive monitoring, including direct pulmonary artery, intraarterial, and intracranial pressure measurements.

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A-90.

THORACOLUMBAR EPIDURAL ABSCESS AFTER COMBINED SPINAL-EPIDURAL FOR LABOR AND TUBAL LIGATION

AUTHORS: J. Chalasani, T. A. Davis, L. H. Bottros, S. Snow, B. L. Leighton;
AFFILIATION: Washington University School of Medicine, St.Louis, MO.

We report an extensive (C7-L4) epidural abscess in a high-risk patient who had an epidural catheter placed for labor and delayed post-partum tubal ligation.

Case Report: A 35 yo G4P2012 patient presented in labor at 38 weeks gestation. She had idiopathic cirrhosis, current cocaine abuse, and recurrent urinary tract infections, for which she took oral trimethoprim/sulfamethoxazole. The anesthesia provider wore a hat, facemask, and sterile gloves. After the skin was prepped three times with Betadine®, a combined spinal epidural anesthetic was placed uneventfully at the L3-L4 interspace. A large sterile transparent dressing covered the catheter. No intrapartum antibiotics were given. The catheter remained in place for 37 hours for labor, delivery, and a scheduled tubal ligation. On removal, the insertion site showed no evidence of infection. On postpartum day 8, the patient presented with a low-grade fever, chills, worsening back pain radiating to the right leg, and mild right leg weakness. MRI showed an extensive loculated epidural abscess from C7 to L4. Vancomycin and cefepime were started empirically and a multi-level laminectomy was done two days later. Wound culture grew methicillin-resistant Staph. aureus. The patient received 6 weeks of IV vancomycin and recovered with no neurological deficits.

Discussion: We believe this is the most extensive epidural abscess reported after a labor epidural anesthetic. In retrospect, our patient had at least 4 risk factors for epidural abscess: cirrhosis, cocaine use, recurrent urinary tract infections, and prolonged epidural catheterization time. Spontaneous epidural abscesses have been reported in cirrhotic patients.(1) Cocaine users can develop vertebral osteomyelitis and epidural abscesses.(2) Epidural abscess formation is associated with longer-than-average epidural catheterization times.(3) Needles and catheters are contaminated more often after Betadine® than after Duraprep® skin preparation.(4) Our patient did not have tuberculosis or HIV infection, which are associated with extensive abscesses. In summary, we report an extensive epidural abscess in a patient with multiple risk factors but few symptoms presenting one week after an uneventful labor epidural anesthesia.

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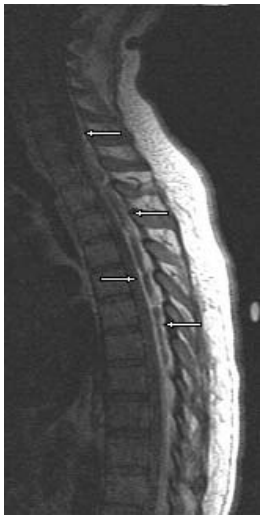

Figure:Arrows show anterior and posterior edges of epidural abscess. Dark central areas are loculated pus pockets.

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A-91.

ANESTHESIA MANAGEMENT OF A PARTURIENT WITH ARRHYTHMOGENIC RIGHT VENTRICULAR DYSPLASIA AND AN IMPLANTABLE CARDIAC DEFIBRILLATOR UNDERGOING CESAREAN DELIVERY

AUTHORS: V. A. Campitelli, B. Carvalho, L. Roland, E. T. Riley;
AFFILIATION: Stanford University Medical Center, Stanford, CA.

Introduction: Arrhythmogenic right ventricular dysplasia (ARVD) is a cardiac disease resulting from idiopathic myocardial necrosis and fibrotic remodeling. The primary clinical manifestations of AVRD are ventricular tachyarrhythmias, cardiac dysfunction and unexpected sudden death. Patients with ARVD are often managed with an implantable cardioverter defibrillator (ICD) and/or anti-arrhythmics to prevent potentially fatal arrythmias. We report the anesthetic management of a parturient with ARVD and an ICD presenting for cesarean delivery.

Case Report: A 42-year-old Gravida 2 Para 0 female presented to our high risk obstetric anesthesia clinic at 35 weeks gestation. She was diagnosed with ARVD at 28 years of age following a cardiac arrest during moderate exercise. She subsequently had an ICD with pacemaker capability inserted. A recent echocardiogram was unremarkable except for morphology consistent with ARVD, and her ECG showed atrial pacing at a rate of 70 beats per minute. An elective cesarean delivery was scheduled in order to assure that she delivered in a controlled setting with all the necessary personnel available.

In the operating room, a cardiac technician suspended the anti-tachycardia function of patient's ICD. A magnet was placed over the ICD to convert the pacer to asynchronous mode. These measures were taken to avoid inappropriate discharge of the device during surgery. An epidural catheter was then inserted at the L3/4 interspace, and slowly titrated with bupivacaine 0.5% in 5 ml increments over a 25 minute period. A T6 level of anesthesia was confirmed following a total bupivacaine dose of 30 ml plus fentanyl 100 mcg. A healthy male neonate was delivered after an uneventful cesarean section. For postoperative analgesia, 4 mg of morphine was administered epidurally prior to closure of the incision. The magnet was removed and the anti-tachycardia function of the ICD was restored following skin closure. The remainder of the patient's hospital stay was unremarkable.

Discussion: To our knowledge this is the first case report of a pregnant patient with ARVD and ICD undergoing cesarean delivery with epidural anesthesia. Our case illustrates that regional anesthesia can be safely employed provided surgical anesthesia is established in a manner which avoids sudden hemodynamic changes. Perioperative catecholamine stimulation may induce tachyarrhythmias in patients with ARVD. Effective intraoperative anesthesia and postoperative analgesia using an epidural technique may reduce these sympathetic-mediated cardiovascular changes. In addition, epinephrine-containing solutions in the epidural space should be avoided and the use of beta-sympathometics restricted for the treatment of hypotension. Parturients with an ICD can be managed safely and optimal outcome can be ensured if early planning is undertaken with ICD technical support.

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3. Eur J Obstet Gynecol Reprod Biol. 2005;Dec 6

A-92.

EXCISION OF A LARGE PHEOCHROMOCYTOMA WITH FETAL PRESERVATION IN A PARTURIENT

AUTHORS: R. L. Dunkailo, C. P. Clinkscales, K. K. Wilkins, M. V. Greenfield, D. W. Healy;
AFFILIATION: University of Michigan Health System, Ann Arbor, MI.

Introduction: Pheochromocytoma in pregnancy has been reported in more than 200 cases. To date, obstetric management supports either surgically excising the tumor before 24 weeks EGA, or conservative management until 34 weeks EGA when elective cesarean section is performed in conjunction with tumor excision(1,2). We describe the first published case of surgical excision of a large adrenal pheochromocytoma in a parturient at 28 weeks EGA with fetal preservation.

Case Report: A 29-year-old G1P0 parturient at 26 weeks EGA presented with increasing episodic hypertension and headaches. A 6x6.5-cm adrenal mass was found incidentally. Her blood pressure worsened over the next two weeks despite maximal doses of multiple alpha- and beta-blockers. Due to tumor size, location, and risk of necrosis, it was decided to proceed with surgery. At 28 weeks EGA she was scheduled for laparoscopic adrenalectomy. Preoperatively, arterial access was established and the patient's blood pressure was 198/104. Labetalol was given, and a magnesium sulfate infusion was started. In the OR, general anesthesia proceeded uneventfully with rapid-sequence induction using thiopental, rocuronium, and remifentanil. Anesthesia was maintained with remifentanil and isoflurane in oxygen/air. Central venous access was established. Continuous fetal heart tones and uterine activity were monitored by the obstetric team. Laparoscopic approach was attempted. During intraperitoneal insufflation, blood pressure increased to 237/118 with a heart rate of 90; this responded to phentolamine and increasing remifentanil and isoflurane concentrations. Both patient and fetus were hemodynamically stable throughout the dissection. Laparoscopic tumor exposure was difficult, and the procedure was converted to open. The patient was acutely hypertensive with tumor manipulation (up to 203/102, heart rate 78), which was again responsive to previous measures. After tumor removal, maternal blood pressure was supported by a phenylephrine infusion. She was extubated in the OR, recovered without incident, and was discharged on the fifth postoperative day. The patient's pregnancy was later complicated by the development of preeclampsia, with the ultimate delivery of a healthy fetus via cesarean section.

Discussion: This case presented unique challenges, specifically maintaining maternal hemodynamic stability while preserving uteroplacental blood flow. Constant communication and preparation for emergent cesarean section were crucial. Remifentanil has been described for use in surgical removal of pheochromocytoma(3,4); however, the use of remifentanil in pregnancy is less well-established(5). Overall, remifentanil may play a role in pheochromocytoma removal during pregnancy. More importantly, vigilance and effective team communication is essential for safe excision of a pheochromocytoma with fetal preservation.

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POSTER CASE REPORTS

A-93.

CAN PUPPP INCREASE THE RISK OF AN EPIDURAL ABSCESS?

AUTHORS: K. C. Cummings, J. A. Dolak;
AFFILIATION: Cleveland Clinic Foundation, Cleveland, OH.

Introduction:
Epidural abscess (EA) is a rare complication of neuraxial analgesia. The presentation may be indolent, and suspicion for the diagnosis must be maintained, especially in immunocompromised patients. We report a case of EA in a parturient with pruritic urticarial papules and plaques of pregnancy (PUPPP) treated with steroids.
Case Report:
A 33 y.o. G_2P_{0010} at 36 weeks gestation presented with irregular contractions, severe pre-eclampsia, and PUPPP. She was started on magnesium prophylaxis, induced with misoprostol and oxytocin, and the anesthesia team was consulted for labor analgesia. She was also receiving a tapered dose of prednisone. Past medical history included depression treated with sertraline.
Physical exam revealed elevated blood pressures and a diffuse papular rash. However, her lower back was free of lesions. Labs were as follows: hemoglobin 12.9 g/dl, WBC 13,800/mm^3, platelets 281,000/mm^3, BUN 18 mg/dl, creatinine 1.1 mg/dl, uric acid was 6.6 mg/dl; with transaminases and bilirubin being normal. An epidural catheter was easily placed at the L_{3-4} level using standard aseptic technique. Aspiration and a test dose (3 ml lidocaine 1.5% + epinephrine 1:200,000) were negative. Bupivacaine 0.25% (10 ml) with 50 µg fentanyl was incrementally injected with good pain relief. An infusion of 0.0625% bupivacaine with 2 µg/ml fentanyl and 1.25 µg/ml epinephrine was instituted. After an uneventful 8 hr labor, a healthy male infant was delivered. Catheter removal occurred 2 hours postpartum.
One week after discharge, she noted increasing back pain radiating to her right leg. She was afebrile, and otherwise asymptomatic. Further evaluation revealed a slightly tender 1 cm nodule without erythema or drainage at the epidural catheter site. Her motor and sensory exams were normal, and she was advised to take analgesics and return if symptoms worsened. She returned within 24 hr; and an infection panel and spinal MRI were ordered. Labs showed: WBC 17,800/mm^3, platelet count 486,000/mm^3, ESR 50 mm/hr, and CRP 8.8 mg/dl. MRI demonstrated a fluid collection posterior to the spinal canal at L_{3-4} causing minimal cord compression. The patient was admitted and underwent an emergent decompressive laminectomy. Cultures revealed methicillin-sensitive Staphylococcus aureus. The patient's pain improved, and she was discharged POD 3 on a 6-week course of IV ceftriaxone.
Discussion:
Common causative organisms for EAs include coagulase-negative Staphylococci, S. aureus, and Gram-negative bacilli. Infection can occur either hematogenously or by direct contamination during catheter placement. Risk factors include prolonged catheterization and immunocompromised states. Skin abnormalities may also increase the risk. With her diffusely pruritic rash, it is reasonable to hypothesize that scratching could lead to colonization of lesions and transient bacteremia. Additionally, this patient's immunosuppression from steroids placed her at higher risk for EA, and likely masked any resulting inflammatory reaction.
Reference:
Int J Obstet Anesth 2005; 14: 183-8.

A-94.

EPIDURAL LABOR ANALGESIA IN A PATIENT WITH PEMPHIGOID GESTATIONIS

AUTHORS: L. Roland, J. Collins, B. Carvalho;
AFFILIATION: Stanford University Medical Center, Stanford, CA.

Introduction: Pemphigoid gestationis (PG) is a rare autoimmune vesiculobullous disease of pregnancy related to the pemphigoid group of blistering skin disorders. We report the anesthetic management of a patient presenting with PG.
Case Report: A 33-year-old gravida 7 para 5 female presented at 32 weeks gestation with periumbilical vesicular lesions that rapidly spread to her face, back and limbs (Fig). Skin biopsies confirmed the diagnosis of PG. When labor was induced at 38 weeks, bullae previously present in lumbar and genital regions had dissipated or dried out following a course of immunoglogulin therapy. She expressed a strong desire to repeat the regional analgesia she had received in her previous labors. Upon request for analgesia, her skin was cleaned with DuraPrep™ surgical solution, prophylactic cephazolin antibiotic administered, and an epidural inserted at the L3/4 interspace. This provided excellent pain relief throughout the rest of her labor and uncomplicated vaginal delivery. The catheter was removed shortly afterwards and no adverse events were reported.
Discussion: While PG presents a number of unique anesthetic and peripartum challenges, it does not contraindicate the use of regional techniques to provide labor analgesia or cesarean anesthesia. The variable lesion distribution may allow an epidural to be inserted into an unaffected area of skin. However, if this is not possible, the non-infectious nature of fresh lesions combined with proper skin preparation[1] +/- prophylactic antibiotic coverage, may still allow needle penetration without the risk of seeding infection to the neuraxial space. Older or healing lesions which are secondarily infected should be avoided, and parenteral opioid-based regimens can be offered as an alternative in such patients for labor analgesia.[2] A regional anesthetic technique may be preferred over general anesthesia for cesarean delivery, as new bullous lesions have been reported in the mouth and trachea following intubation in patients with pemphigoid.[3,4] In addition, all PG patients require extra vigilance with respect to skin care and cautious use of skin adhesives and non-invasive blood pressure monitoring.
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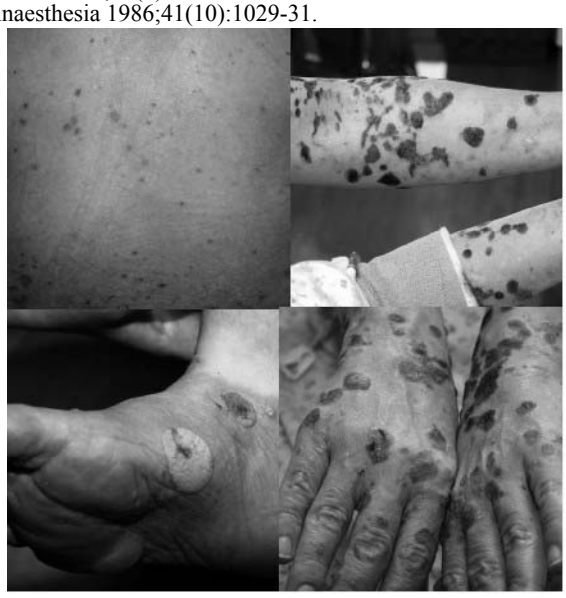

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A-95.

SUCCESSFUL VAGINAL DELIVERY FOLLOWING TOTAL SPINAL ANESTHESIA DURING LABOR

AUTHORS: D. G. Mann, B. E. Groff, J. M. Nicholson, J. G. Hecker, V. A. Arkoosh;
AFFILIATION: University of Pennsylvania, Philadelphia, PA.

Introduction: It is commonly believed that an unintended subarachnoid block following planned epidural analgesia for labor, uniformly results in the patient undergoing emergent Cesarean delivery. This report describes a patient who experienced a total spinal block followed by a vacuum-assisted vaginal delivery.
Case Report: A 24-yr-old G_4P_{0131} with a single, vertex intra-uterine pregnancy at 38 and 5/7 weeks, and no prior medical or surgical history, elected neuraxial analgesia via an epidural catheter at 7 cm dilatation of spontaneous labor. A 20 gauge multi-orifice epidural catheter (Portex, Keene, NH) was inserted 6 cm at the L3-4 interspace using the loss of resistance to air technique. Catheter aspiration was negative for cerebrospinal fluid (CSF) and blood. 3 mLs of 1.5% lidocaine with epinephrine 1:200,000 was administered as a test dose with no indication of subarachnoid or intravascular catheter placement after 5 minutes. The patient received 15 mLs of 0.2% Ropivicaine in three 5 mL aliquots, following a negative aspiration before each 5 mL injection. Approximately 21 minutes later, the patient complained of generalized weakness which progressed to difficulty swallowing. As the patient lost upper extremity grip strength and blink response over the next few minutes we initiated bag-mask ventilation with cricoid pressure. The first attempt at direct laryngoscopy failed due to masseter muscle resistance. The attending Obstetrician administered terbutaline to treat concomitant uterine hyperactivity with moderate variable decelerations on the fetal tocodynamometer. We treated a maternal blood pressure of 84/41 mmHg with ephedrine and transferred the patient to an operating room continuing bag-mask ventilation with cricoid pressure. Following routine monitor placement, and the administration of midazolam 2mg, and succinylcholine 80mg, we easily intubated the patient's trachea. Given the patient's hemodynamic stability and a now reassuring fetal heart tone tracing; the decision was made for expectant obstetric management. Epidural catheter aspiration was positive for frank CSF. Approximately 60 minutes follwoing the initial patient complaint of difficulty swallowing, she was able to move her head, had weak upper extremity grip strength, and responded appropriately to commands. After ninety minutes, she had a sustained head lift for greater than 5 seconds and was extubated to nasal canula. A subsequent vaginal exam revealed a fully dilated cervix. After 150 minutes, with a T5 level to cold, she began pushing for delivery. The baby was delivered in 22 minutes via vacuum-assisted vaginal delivery. The neonatal APGAR scores were 9 at one minute and 9 at five minutes. Both mother and baby were transferred to the post-anesthesia care unit in stable condition.
Conclusion: In a case of intended epidural labor analgesia that results in total spinal anesthesia, if both mother and fetus appear stable, consideration can be given to expectant obstetric management for vaginal delivery.

A-96.

WHEN TRANSFUSION LEADS TO LIFE-THREATENING ANEMIA: HYPERHEMOLYSIS IN A PARTURIENT WITH SICKLE CELL DISEASE

AUTHORS: N. M. Scaccia, B. L. Leighton;
AFFILIATION: Washington University School of Medicine, St. Louis, MO.

Introduction: Hyperhemolysis (delayed hemolytic transfusion reaction, DHTR) is a rare, serious complication seen in multiply-transfused patients with sickle cell disease (SCD). Donor cells, mature recipient cells, and reticulocytes are hemolyzed by complement-mediated activation of macrophages. The final hemoglobin is lower than the initial value with an associated reticulocytopenia.(1) We report a case of life-threatening hyperhemolysis in a parturient with SCD who then developed acute chest syndrome.
Case Report: A 21 y/o G5P0040 with SCD and a history of DHTR presented at 29 wks GA with pain in her legs and back. Six days before admission, her Hgb was 7.1 and she received 2 units of cross-matched packed red blood cells (PRBCs). Admission labs included Hgb 9.4, INR 1.68, PTT 44.3, and a bilirubin of 1.4. She received two units of fresh frozen plasma (FFP) for idiopathic coagulopathy. Five days later, the patient developed acute chest syndrome (ventilatory and high-output congestive heart failure) requiring mechanical ventilation and inhaled prostacyclin to lower elevated pulmonary pressures. Lab values included Hgb 4.0 despite no active bleeding, LDH 1152, bilirubin 2.8, hemoglobinuria, and negative direct and indirect Coombs tests. Recurrent DHTR was diagnosed. Antibiotics, steroids, and IV immunoglobin (IVIG) were started to minimize further hemolysis. The patient was successfully transfused two units of PRBCs. Twenty-four hours later (Hgb 6.1), fetal movement decreased and the patient underwent emergent cesarean delivery in the ICU under general anesthesia. Prior to incision, 2 PRBC units were transfused bringing Hgb to 8.0. The patient received 2 more units PRBCs with no evidence of further hemolysis. She was discharged home with Hgb 10.1.
Discussion: Some degree of DHTR occurs in up to 11% of SCD patients receiving RBCs. FFP does not trigger DHTR. The incidence is higher in pediatric than in adult patients. The exact mechanism of DHTR is not known. The hemolysis is thought to be complement-activated, and not due to recipient antibodies against donor cells; hence the negative Coombs tests. Hemolysis typically occurs 1 week after the transfusion of compatible RBC units in the absence of detectable RBC alloantibodies. IVIG and steroids decrease hemolysis. It is presumed that IVIG and steroids act by blocking the adhesion of sickle cells and reticulocytes to complement-activated macrophages, preventing further contact lysis of the RBCs.(2) Complications of DHTR can include acute chest syndrome, congestive heart failure, pancreatitis, and acute renal failure. Subsequent transfusions may exacerbate the hemolysis, which can become life threatening and fatal.
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POSTER CASE REPORTS

A-97.

EX UTERO INTRAPARTUM TREATMENT PROCEDURE IN A PATIENT WITH ARTHROGRYPOSIS MULTIPLEX CONGENITA VIA CONTINUOUS SPINAL ANESTHETIC AND INTRAVENOUS NITROGLYCERINE FOR UTERINE RELAXATION

AUTHORS: J. G. Benonis, A. S. Habib;
AFFILIATION: Duke University Medical Center, Durham, NC.

Introduction:
The Ex Utero Intrapartum Treatment (EXIT) procedure allows for controlled management of a potentially life-threatening difficult airway in the newborn. General anesthesia has been previously reported for the management of EXIT procedures.[1] We report the use of continuous spinal anesthesia for EXIT procedure in a woman with arthrogryposis multiplex congenita (AMC), a rare syndrome characterized by rigid joints and limb contractures.
Case Report:
A 31-year-old G1P0 with AMC presented at 31 weeks gestation for anesthetic consultation. A CS at an outside hospital two years prior was complicated by failed spinal anesthetic, failed awake fiberoptic intubation, a difficult intubation under direct laryngoscopy and the death of her twins due to inability to secure an airway.
The patient's current pregnancy was significant for vanishing twin syndrome, a risk factor for the development of arthrogryposis. Level II ultrasound showed no apparent anomalies. The patient refused evaluation by amniocentesis or magnetic resonance imaging. The decision was made to proceed with elective repeat cesarean section (CS) with pediatric otolaryngologists present for an EXIT procedure to assess the infant's airway and potentially establish a surgical airway if needed. The patient expressed a strong preference for a regional technique.
After discussing possible options we planned to attempt a combined spinal epidural (CSE) with intravenous nitroglycerine for uterine relaxation during the EXIT procedure. Multiple attempts at CSE were made. On the final attempt the epidural space was located, there was no CSF via spinal needle, and the epidural catheter passed with some resistance and was positive for CSF on aspiration. The subarachnoid catheter was dosed with 150 mcg of preservative free morphine, 10 mcg of fentanyl and 11.25 mg of hyperbaric 0.75% bupivicaine. A T4 level was achieved bilaterally.
After a 2 L fluid bolus, 100 mcg bolus of nitroglycerine was given intravenously prior to uterine incision, followed by a 1 mcg/kg/min infusion to provide uterine relaxation. Uterine relaxation proved to be adequate and the patient's hemodynamics remained stable with a total of 100 mcg of phenylephrine used for hemodynamic support. A pediatric otolaryngologist easily passed and removed a 3.0 uncuffed endotracheal tube under direct laryngoscopy. One minute later the umbilical cord was cut and the infant was delivered. The nitroglycerine infusion was stopped, and 5 U oxytocin bolus was given. The infant had 1 and 5 minute APGAR scores of 4 and 9. The mother and infant had an uneventful, uncomplicated postoperative course and were discharged home on postpartum day 3.
Discussion:
We report the successful use of a continuous spinal anesthetic in conjunction with intravenous nitroglycerine for uterine relaxation in a woman with AMC presenting for an EXIT procedure.
References:
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A-98.

POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME (PRES): A COMPLICATED CASE OF POST-PARTUM HEADACHE

AUTHORS: T. Torrillo, D. J. Bronster, Y. Beilin;
AFFILIATION: Mount Sinai School of Medicine, New York, NY.

Introduction:
Headache is the most common complication of labor epidural analgesia. We report a case of posterior reversible encephalopathy syndrome (PRES) after inadvertent dural puncture during epidural catheter placement in the parturient.
Case Description:
A 32-year-old previously healthy G1P0 presented to the delivery suite at 40 weeks gestation. Her initial and subsequent BPs were in the 140-150/ 85-90 range, accompanied by 2+ proteinuria, and the diagnosis of preeclampsia was made. She was started on magnesium sulfate and labor was induced with oxytocin. One hour later, a lumbar epidural catheter was placed using the loss of resistance to air technique. Unintentional dural puncture occurred and the epidural procedure was repeated without complication.
The patient required a cesarean delivery about 10 hours later secondary to failure of the fetal head to descend. The procedure was uneventful. The next day the patient complained of a postural frontal headache accompanied by photophobia and "buzzing" in her ears with BP 140/70. A presumptive diagnosis of a postdural puncture headache (PDPH) was made. The patient was managed conservatively.
On postoperative day 2, the patient continued to complain of a worsening headache that was no longer postural. BP had increased to 160/90. Because of these symptoms, a neurology consult was requested. Neurological exam was non-focal. Brain MRI was significant for air in the frontal horns, which was attributed to be the cause of her headache. With conservative management, by postoperative day 4 the headache had resolved, BP had normalized, and she was discharged to home.
Several hours after discharge, the patient suffered two tonic-clonic seizures. She was readmitted to the hospital afebrile with BP 140/90. She did not report headache and neurological exam was non-focal. Magnesium infusion was immediately started. Repeat MRI revealed subcortical and deep parasagittal patchy hyperintensities of both cerebral hemispheres in watershed distribution. The vermis and cerebellar hemispheres were also involved. The patient was started on levetiracetam. She remained hospitalized for four days during which her highest BP was 151/94 but normalized to 110/70. Repeat MRI two weeks later demonstrated clearing of all previously seen lesions.
Discussion:
The most common clinical signs of PRES include headache, visual changes, seizures, and altered sensorium with radiologic findings principally of white matter changes predominantly affecting the posterior hemispheres. Correct diagnosis is paramount to prevent irreversibility. PRES is usually associated with patients who have acute onset of hypertension especially when accompanied by large swings in BP. In our case diagnosis was confounded by the history of preeclampsia and the inadvertent spinal tap. Epidural blood patch may have been detrimental in this patient who had elevated ICP from both preeclampsia and PRES. This case illustrates the need to carefully diagnosis the etiology of postpartum headache.

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POSTER CASE REPORTS

A-99.

TRANSIENT PARAPLEGIA AFTER NEURAXIAL LABOR ANALGESIA: A CASE REPORT

AUTHORS: T. A. Wafa, C. A. Wong;
AFFILIATION: Northwestern University, Chicago, IL.

Introduction: Paraplegia is a rare and catastrophic complication of neuraxial anesthesia. We report a case of transient paraplegia with spontaneous resolution after neuraxial labor analgesia.
Case: A healthy 26 year old G6P3 presented in spontaneous labor for vaginal trial of labor after previous Cesarean delivery. Her history was significant for several hospitalizations relating to depression and suicidal ideation. Combined spinal-epidural analgesia was initiated uneventfully at L3/4. Bupivacaine 0.06% and fentanyl 2 mcg/mL were infused during labor. She was hemodynamically stable throughout labor and delivery and delivered a viable 3260 g male after 5 hours of labor and 10 minutes of pushing. The following day the patient complained of lower extremity numbness and inability to ambulate. On physical examination she was unable to move against gravity (2/5) in all major muscle groups of the lower extremity bilaterally and had decreased pinprick and temperature sensation below L2. Her reflexes were intact; she had normal tone and intact proprioception. No incontinence was reported. She reported tenderness to palpation in her lumbar region.
An emergency MRI and neurology consultation were ordered. The MRI was negative for hematoma or abscess or other pathology and her examination remained unchanged over 48 h. In the presence of intact proprioception, paraplegia and decreased sensation the neurologist diagnosed anterior spinal artery syndrome. The patient was seen by the rehabilitation service and on post-partum day five she was scheduled for a transfer to an inpatient rehabilitation facility. Her symptoms suddenly resolved completely on the morning of her transfer and she regained full strength and sensation throughout her lower extremities. Six month later she continues to have normal function. A diagnosis of hysterical paraplegia was made.
Discussion: Anterior spinal artery syndrome has been described in parturients with severe hypotension secondary to post-partum hemorrhage and those with collagen vascular diseases and systemic lupus erythematosus (1). There are several case reports of hysterical paraplegia after general anesthesia and one case report after epidural anesthesia (2). Hysterical paraplegia is a diagnosis of exclusion after other causes of paraplegia have been ruled out. Typical patients are young, female, and have a prior psychiatric history (3). They tend to have dependent personalities and have non-anatomic distribution of deficits, normal tone and preservation of reflexes. Recovery can be sudden or gradual and can take 24 h to 6 months. Motor and somatosensory evoked potential examination can be used to exclude interruption of motor or sensory pathways.
References:
1) Anesth Analg 1991;73:90-91
2) Anesth Analg 1996;83:876-877
3) Paraplegia 1982;20:154-157

A-100.

UTERINE INVERSION AND POSTPARTUM HEMORRHAGE TREATED WITH RECOMBINANT FACTOR VIIA

AUTHORS: A. J. Butwick, M. L. Kolz, E. Riley;
AFFILIATION: Stanford University School of Medicine, Stanford, CA.

Introduction: Uterine inversion is a rare event (1 in 6,400 deliveries)[1] and can cause life-threatening postpartum hemorrhage (PPH). Early fluid resuscitation and manual replacement of the uterus (MRU) are essential.[2] In addition, the use of recombinant Factor VIIa (rVIIa) for obstetric hemorrhage has been described.[3] We report a case of uterine inversion with massive PPH requiring general anesthesia and treatment with rVIIa.
Case: A 21-year-old healthy female G2P1 presented at 39 weeks in labor. Her labor was precipitous, and she had an uneventful vaginal delivery. Anesthesia was not consulted prior to her delivery. She developed profuse vaginal bleeding after the 3rd stage and, on examination, was diagnosed with uterine inversion. Her HR was 130 and BP was 90/40. Immediate resuscitation was commenced with oxygen and iv fluids. Her initial HCt was 27% and packed red blood cells (PRBC) were ordered. Initial MRU attempts were unsuccessful following sublingual nitroglycerin (800 µg). The patient was transferred to the operating room for general anesthesia. Anesthesia was induced with ketamine and succinycholine, an arterial line was placed and fluid resuscitation continued (HR 135 and BP 90/35). Under general anesthesia, MRU was successful and subsequently a pitocin infusion was commenced. An unexpected delay in the transfer of PRBC occurred and, prior to transfusion, the patient's Hct was 4.9% with transient ST depression observed on the electrocardiogram. In the operating room, the patient received 8 units PRBC, 12 liters crystalloid, 1500 mL colloid. Following surgery, she was extubated uneventfully, and transferred to the PACU hemodynamically stable with a post-transfusion Hct 33.9%.
In PACU, the vaginal bleeding continued and a further transfusion was given (2 units PRBC, 8 units fresh frozen plasma and 10 units cryoprecipitate). Due to persistent bleeding, 2 doses of rVIIa (Novoseven®) were given intravenously (50 and 25 mcg/kg) with good effect. The patient was admitted to intensive care and no further hemorrhage or complications occurred.
Discussion: If uterine inversion is diagnosed, MRU is required at the earliest opportunity and aggressive fluid resuscitation is advised. MRU can usually be performed following tocolytic therapy. Early recourse to general anesthesia is necessary if initial attempts to revert the uterus prove unsuccessful. PPH is common and may continue after successful MRU due to atony, requiring uterotonic agents (oxytocin) which also prevent uterine re-inversion. rVIIa has been successfully used in >30 cases of severe PPH, with doses between 60-120 µg/kg (maximum of 2 doses). We advocate the use of rVIIa for treating PPH refractory to transfusion with PRBC and blood products, which may obviate the need for further surgical intervention.
References:
1. Anesthesiol Clin N Am 2003; 21: 111-25. 2. Obstet Gynecol Clin North Am 1995; 22: 261-74.3. BJOG 2004; 111: 284-7.

POSTER CASE REPORTS

A-101.

ANAESTHESIA FOR CAESAREAN SECTION IN A CASE OF SPINA BIFIDA AND PIERRE-ROBIN SEQUENCE

AUTHORS: G. Mc Dermott, R. O'Donoghue, C. Mc Caul, C. A. Daly;
AFFILIATION: Waterford Regional Hospital, Waterford, Ireland.

A 24 yo was listed for elective caesarean section for breech presentation. She had a history of spina bifida 'occulta'and Pierre Robin sequence. Previously she had been refused epidural analgesia.

Examination revealed a skin dimple at L2. She had no neurological signs or symptoms. She had micrognathia, prominent overbite and a high arched palate. Interdental distance was limited as was the ability to prognathe. Mallampati score was 4.

Surgery was deferred pending MRI which showed normal bony alignment. The conus medullaris and spinal cord ended above the lumbar dimple. Ligamentum flavum was absent at L2. No intrathecal lipoma or cord tethering was noted. Thecal sac volume was noted to be 'capacious'. Images of the interspaces above or below the level of the dimple were not available.

This case presented a clinical dilemma. There is no nomogram for accurately assessing CSF volume. Predicting safe and effective dose for single shot spinal anaesthetic is difficult. The absence of Ligamentum flavum would preclude epidural or continuous spinal techniques and could lead to difficulty in dealing with any subsequent complications.

After risk-benefit analysis and taking into account patient wishes, the patient underwent an awake fibre-optic intubation followed by uneventful general anaesthesia. A healthy male infant was delivered.

This case illustrates the value and limitations of imaging of the spinal cord in patients with spina bifida.

A-102.

RIGHT VENTRICULAR THROMBUS IN A PATIENT WITH SEVERE PRE-ECLAMPSIA

AUTHORS: P. Agudelo-Suarez, J. N. Pulido, J. N. Bakkum, C. H. Rose, G. M. Vasdev;
AFFILIATION: Mayo Clinic College of Medicine, Rochester, MN.

Introduction: Thromboembolic and hypertensive disorders cause significant maternal mortality.[1] We present a parturient with a right intraventricular thrombus in the setting of severe pre-eclampsia and describe our multidisciplinary approach to a favorable outcome.

Case Report: A 22-year-old G_1P_0, 29-week-gestation was transferred to or institution with worsening pre-eclampsia over the previous week. Past medical history was significant for blunt chest trauma in 2001, pulmonary embolus (PE) in 2003, and excision of an old right ventricular (RV) calcified mass. She discontinued warfarin in 2004 after a negative thrombophilia workup and normal transthoracic echocardiogram (TTE). At 21-weeks, she developed new onset chest pain. Her spiral CT scan revealed a PE and RV mass which was treated with enoxaparin. On arrival her vitals were: wt. 95 kg, BP 165/112, HR 65 bpm, 97% O2 saturation on room air, 9.1g/24hour proteinuria and hyperreflexia. FHR was 160 bpm with good variability. A TTE demonstrated a 2x3 cm thrombus in the RV apex, moderate TR, and pulmonary hypertension with RV systolic pressure of 62 mm Hg and normal LV. Heparin and magnesium sulfate ($MgSO_4$) infusions were titrated according to serial APPT and serum Mg levels. As her preeclampsia was worsening, a cesarean section (LTCS) with cardiopulmonary bypass (CPB) standby and intraoperative TEE was performed. Induction of labor was not an option because of the RV thrombus and an unfavorable cervix. Heparin infusion was stopped 6 hours prior to the LTCS. An awake right radial arterial catheter was placed. A conventional LTCS general anesthetic with SBE prophylaxis was performed. Intra-op TEE showed a non-obstructing mobile RV thrombus. A 1500 gm newborn was transferred to the NICU in stable condition. At the conclusion of the procedure, persistent hypertension was treated with intravenous labetalol infusion. The patient was extubated and transferred to the ICU. Labetalol and $MgSO_4$ infusion were required for the next 24 hours. Heparin infusion was restarted 12 hours post LTCS and the patient was dismissed day-6 on oral labetalol, warfarin and enoxaparin. Serial TTE studies were planned to dictate future therapy of the cardiac thrombus. Neonatal outcome was complicated by a grade III germinal matrix hemorrhage on day-4, from which he has recovered well.

Discussion: Options for conservative treatment of RV thrombus with moderate pulmonary hypertension was further complicated by severe pre-eclampsia and the need for urgent delivery. Untreated, RV thrombus poses a great risk for massive peripartum PE thus rapid access to CPB may be necessary.[2] Though she had her original RV thrombus resected and had enough time on anticoagulants, hypercoagulability of pregnancy promoted fresh thrombus formation. Our patient highlights the need for higher vigilance of antepartum anticoagulation in patients with a history of PE.

References:1) M&M Weekly Report: Surveil Summ.52:1-8,2003
2) J of Perinatal Med.32:181-3,2004

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POSTER CASE REPORTS

A-103.

PULMONARY ARTERY HYPERTENSION DURING PREGNANCY

AUTHORS: K. E. Stack, C. L. Sullivan, R. Y. Gershon;
AFFILIATION: Emory University School of Medicine, Atlanta, GA.

Introduction: Pulmonary artery hypertension (PAH) during pregnancy is associated with significant maternal mortality. Treatment currently includes pulmonary artery vasodilators: inhaled nitric oxide (iNO), intravenous (epoprostenol) and inhaled (iloprost) prostacyclin, as well as oral (sildenafil) and intravenous (milrinone) phosphodiesterase inhibitors. We present the case of a parturient with severe PAH.
Case Report: A 26-year-old 52 kg G2P1 Hispanic parturient, with lupus and severe PAH, presented at 28 weeks gestation with shortness of breath. The patient had been counseled against pregnancy, refused termination, and was noncompliant with anticoagulation. A transthoracic echocardiogram (TTE) at 14 weeks showed cor pulmonale, right ventricular dilation and global hypokinesis. Left ventricular function was normal. At 16 weeks, right heart catheterization revealed a systolic pulmonary artery pressure (PAP) of 70 mm Hg with no response to adenosine challenge. After admission at 28 weeks, the antenatal plan included hospitalization, bedrest, steroid therapy, anticoagulation with intravenous heparin, and a trial of sildenafil. After a 5-day course of sildenafil, TTE revealed no reduction in PAPs and sildenafil was discontinued. At 32 weeks the patient presented for elective cesarean section. Preoperatively, an arterial line and pulmonary artery catheter were inserted, and intravenous epoprostenol initiated two hours prior to induction. Systolic PAP remained 75-80 mm Hg and systolic systemic arterial pressure (SAP) was 110-120 mm Hg. A modified rapid sequence induction with fentanyl, etomidate, and succinylcholine was performed. Intubation and delivery proceeded uneventfully, but systolic PAP increased to 95 mm Hg post-delivery. Inhaled NO and intravenous milrinone were initiated, and the dose of epoprostenol increased. An intraoperative transesophageal echocardiogram (TEE) confirmed markedly elevated PAPs, hypokinetic right ventricle, and poor left ventricular filling. Aggressive volume resuscitation continued with packed red cells and crystalloid. Low-dose intravenous nitroglycerin was added. Postoperatively, the patient remained intubated, sedated, and fully relaxed on controlled mechanical ventilation. Anticoagulation was reestablished and pulmonary artery vasodilator therapy maximized: iNO at 80 ppm (maximum methemoglobin 4.7%), epoprostenol at 50-200 ng/kg/min, milrinone at 0.25-0.75 mcg/kg/min. Despite aggressive volume resuscitation, digoxin, and SAP support with phenylephrine and norepinephrine, serial postoperative TEEs revealed deteriorating right ventricular function and an empty left ventricle. Early on the first postpartum day, PAPs exceeded SAPs. Due to the significant volume requirements, large pleural effusions developed and impaired oxygenation. Vasopressin was initiated on postpartum day 2, but reversal of systemic and pulmonary artery pressures persisted, and the patient expired on postpartum day 3.
Discussion: PAH remains a significant cause of maternal mortality, despite the efficacy of pulmonary artery vasodilators. The combination of dose-dependent systemic vasodilation and progressive right ventricular failure make tissue perfusion unsustainable. Multi-organ system failure rapidly ensues. Extracorporeal membrane oxygenation (ECMO), heart transplantation, and a right ventricular assist device (RVAD) were considered, but none deemed a plausible, emergent intervention.

A-104.

NITROUS OXIDE AS A CAUSE OF INTERNAL ILIAC ARTERY OCCLUSION BALLOON RUPTURE

AUTHORS: K. M. Kuczkowski, U. B. Eisenmann;
AFFILIATION: University of California, San Diego, San Diego, CA.

Introduction: The predominant constituent in closed gas/air-containing spaces in human body is nitrogen, the blood solubility of which is approximately 30 times less than solubility of nitrous oxide. Subsequently closed air-containing spaces such as pneumothorax, air embolus or pnuemocephalus markedly expand as more nitrous oxide diffuses into these spaces than nitrogen diffuses out of them under nitrous-based general anesthesia (1). Nitrous oxide also diffuses into the cuff of an endotracheal tube and may lead to a marked increase in cuff pressure, which could result in significant airway management complications (e.g., high cuff pressure-related ischemia of the tracheal mucosa) (1, 2). It is therefore reasonable to speculate that other air-filled medical devices (e.g., endovascular occlusion balloons) may malfunction (e.g., rupture) when exposed to nitrous-based general anesthesia.
Report of case: Indeed, we recently encountered a 27-year-old otherwise healthy parturient with the diagnosis of placenta percreta at 37 weeks gestation who required elective Cesarean hysterectomy under nitrous oxide (60%)-based general anesthesia. Internal iliac (hypogastric) artery occlusion balloons (Cook Inc, Bloomington, IN, USA) were placed preoperatively as per our routine protocol (3) through the femoral arteries for selective catheterization of the anterior division of the internal iliac arteries bilaterally. The balloons were inflated with 3 ml of air each intraoperatively to control the bleeding. Because of the emergent need for arterial occlusion nitrous oxide was discontinued only 2-3 minutes prior to balloon inflation. Nevertheless, following the surgery and anesthesia the right internal iliac occlusion balloon was found ruptured (as confirmed by the interventional radiologist). Discussion: The most likely etiology of an internal iliac artery occlusion balloon rupture described in our report was nitrous oxide. To the best of our knowledge, this complication has not been previously reported. In conclusion, it might be prudent to avoid administration of nitrous oxide in pregnant patients with internal iliac artery occlusion balloons in situ undergoing Cesarean hysterectomy under general anesthesia.
References:
1. Acta Anaesthesiol Scand 2004; 48: 1180-1184.
2. Anaesthesia 2003; 58: 291.
3. Arch Gynecol Obstet 2005; 9: 1-3.

POSTER CASE REPORTS

A-105.

MODIFIED RAPID DESENSITIZATION IN OBSTETRIC PATIENT WITH NEEDLE PHOBIA

AUTHORS: A. Briskin, A. Ioscovich, S. Halpern;
AFFILIATION: SWCH, Toronto, ON, Canada.

Introduction: Needle phobia is a common specific phobias characterized by an excessive and persistent fear of needles resulting in anxiety, panic attacks, and/or vasovagal symptoms (1). Often patients try to avoid medical treatment because of NPh, compromising their care. We present our experience with successful modified rapid desensitization in a parturient with NPh who presented for elective Cesarean Section (CS).

Case presentation: A 34 year-old G3P2 at 39 weeks gestation presented for elective CS. She has a history of NPh since the age of 5. Two previous CS were performed under GA after the woman had been forcefully restrained until intravenous access was established. On admission to the induction room, the patient experienced severe anxiety and nausea. With the patient's permission, and with her husband's support, we performed a modified rapid desensitization, described below. 1/2 hr before induction, we applied EMLA cream to the IV site and administered 5 mg of intranasal midazolam. When her anxiety symptoms were relieved, we applied non-invasive monitors. We attempted desensitization using progressive stimuli: a capped needle, then an uncapped needle (27g). We then applied topical ethyl chloride and touched her with the needle. Although this was painless, she developed severe anxiety, tachypnea, nausea and pallor without hypotension or bradycardia. After several minutes we were able to persuade her to allow an injection of lidocaine/ bicaronate followed by IV insertion. A rapid sequence induction of general anesthesia followed and the rest of the CS was unremarkable. (Apgar score 9/9 after 1 and 5 min)

Discussion: Treatment of NPh varies with types of phobic response and urgency of the medical intervention. Where possible, preoperative anesthetic consultation should be arranged and the plan discussed with the patient. Distraction techniques may be used for less severe cases. Inhalation induction with sevoflurane(2) and intramuscular ketamine injection(3) have been described. Both these methods of induction of general anesthesia may increase the risk of aspiration in the parturient and should be used as a last resort. Rapid desensitization or modified rapid desensitization takes about 20 minutes to perform and is therefore suitable for most patients with NPh. In the emergency situation, the risks of delay need to be weighed against the potential benefits of a non-traumatic induction of anesthesia.

Conclusion: NPh can severely interfere with optimum medical care. A strategy for dealing with this problem should be developed for the operating room and on the labor floor. It may be helpful to have a designated tray with appropriated drugs and equipment available. Finally, medical personnel need to understand the implications of NPh and should be trained to deal with such patients.

1. DSM IV TR 2000. pg 443-50.
2. IJOA 2002;11;296-300.
3. BJA 2001; 86; 891-3.

A-106.

ANESTHETIC MANAGEMENT OF LABOR AND DELIVERY IN CONGENITALLY CORRECTED TRANSPOSITION OF THE GREAT ARTERIES

AUTHORS: K. W. Arendt, W. J. Watson, H. M. Connolly, M. O. Kinney, J. R. Hebl, P. A. Craigo;
AFFILIATION: Mayo Clinic, Rochester, MN.

Introduction: Congenitally corrected transposition of the great arteries (CCTGA) is an uncommon heart defect[i] characterized by inversion of the ventricles. Though pregnancy outcomes among adult survivors of CCTGA have been described,[ii,iii] only two case reports of the obstetric anesthetic management of CCTGA exist.[iv,v] We describe the anesthetic management of a parturient with CCTGA.

Case Report: A 31 year old woman, gravida 1, para 0, presented at 35 6/7 weeks gestation for induction of labor. She had been diagnosed at birth with CCTGA, and had three cardiac catheterization procedures for diagnoses, but no related surgeries. Pregnancy had been uncomplicated with no symptoms of heart failure, and her only medication was a vitamin supplement. Echocardiography showed severe systemic AV valve regurgitation with thickened leaflets and shortened chordae, systemic ventricular enlargement with severely reduced systolic function and severe valvular and subvalvular pulmonary stenosis with moderate regurgitation. Ventricular systolic function to the pulmonary circulation was normal.

Monitors included pulse oximetry, noninvasive blood pressure monitoring and a central venous line, as well as fetal heart rate monitoring and tocodynamometry. A lumbar epidural catheter was placed. When uterine contractions became regular though not painful, an epidural infusion of 0.125% bupivacaine with 2 mcg/ml of fentanyl was begun at 6mL/hour. The epidural infusion was titrated between 6 and 14mL/hr, with one 10mL bolus for mild discomfort. After complete cervical dilation, the patient was allowed to continue to labor without pushing to descend the fetal head while limiting Valsalva maneuvers. Low Luikart forceps were applied with gentle traction and the patient pushed with every other contraction, delivering the baby on the third push. Apgar scores were 7 and 8. The patient was comfortable and hemodynamically stable throughout. Transient uterine atony resolved with oxytocin and massage. She was discharged from the hospital on postpartum day three.

Discussion: The management of patients with CCTGA depends largely on the degree of systemic ventricular failure. Because the thin-walled "right" ventricle is pumping the systemic circulation, it may dilate and fail, resulting in congestive heart failure and even death. Other cardiac abnormalities often complicate management: our patient had dextrocardia, atrial and ventricular septal defects, and pulmonary stenosis. Fluid shifts, catecholamine surges, and the cardiovascular changes of labor and delivery as well as anesthetic technique affect heart rate, contractility, preload and afterload. Considering the patient's multiple competing cardiac abnormalities, physiologic effects were not entirely predictable, and labor and delivery without adequate regional analgesia risked decompensation. Meticulous anesthetic management of our patient resulted in a successful outcome.

i. Pediatric Cardiology 18: 396, 1997
ii. Journal of American College of Cardiology 33:1692, 1999
iii. American Journal of Cardiology 84:820, 1999
iv. American Journal of Obstetrics and Gynecology 161:1001, 1989
v. Masui. 52(2):187, 2003

Best Paper Presentations • SOAP 38th Annual Meeting

Saturday, April 29, 2006 • 1:00 – 2:30 pm

SOAP A-20 MATERNAL PNEUMOPERITONEUM WITH CARBON DIOXIDE DOES NOT DEPRESS NEAR-TERM FETAL SHEEP CEREBRAL OXYGENATION

Author(s): M. B. Moeller[1], K. Shimazutsu[1], D. J. McClaine[1], M. C. Jones[1], S. Eubanks[2], J. S. Stamler[1], **J. D. Reynolds[1]**

Affiliation(s): [1]Duke, Durham, NC, [2]Univeristy of Missouri, Columbia, MO

SOAP A-21 3 HOLES ARE NOT BETTER THAN 1: A RANDOMIZED, PROSPECTIVE COMPARISON OF 2 WIRE-REINFORCED EPIDURAL CATHETERS FOR LABOR ANALGESIA

Author(s): **J. E. Spiegel**, M. Chahal, A. Vasudevan, Y. Li, P. Hess

Affiliation(s): Beth Israel Deaconess Medical Center, Boston, MA

SOAP A-22 NEUROPATHIC INJURY TO THE LEVATOR ANI OCCURS IN 1 IN 4 PRIMIPAROUS WOMEN

Author(s): A. C. Weidner, V. Branham, M. M. South, K. L. McKiernan-Borawski, M. G. Jamison, **H. A. Muir**

Affiliation(s): Duke University Medical Center, Durham, NC

SOAP A-23 TOCOLYTIC DESENSITIZATION: PLASMALEMMAL SODIUM CALCIUM EXCHANGER (NCX) ACTIVITY AND FUNCTION IN MYOMETRIAL CYTOSOLIC FREE CALCIUM CONCENTRATION ([Ca2+]cvt) OSCILLATIONS AND RELAXATION

Author(s): **M. K. Slodzinski**

Affiliation(s): Johns Hopkins University, Baltimore, MD

SOAP A-24 MRI FOLLOWING NEURAXIAL ANALGESIA. CAN A RADIOLOGIST DETERMINE WHAT IS PATHOLOGIC?

Author(s): **E. M. Davidson,** L. Garcia, E. M. Sklar, R. G. Bhatia, I. M. Hernandez, J. Frohock, D. J. Birnbach

Affiliation(s): Miller School of Medicine, University of Miami, Miami, FL

SOAP A-25 THROMBOEMBOLISM RISK ASSESSMENT: GUIDELINES ALONE WILL NOT CHANGE PRACTICE!

Author(s): **R. Ledger,** R. Sashidharan

Affiliation(s): The Royal London Hospital, London, United Kingdom

Best Paper Presentations • SOAP 38th Annual Meeting

Saturday, April 29, 2006 • 1:00 – 2:30 pm

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Affiliation(s): [1]Duke, Durham, NC, [2]Univeristy of Missouri, Columbia, MO

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Author(s): **J. E. Spiegel**, M. Chahal, A. Vasudevan, Y. Li, P. Hess

Affiliation(s): Beth Israel Deaconess Medical Center, Boston, MA

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Affiliation(s): Duke University Medical Center, Durham, NC

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Affiliation(s): Miller School of Medicine, University of Miami, Miami, FL

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Author(s): **R. Ledger,** R. Sashidharan

Affiliation(s): The Royal London Hospital, London, United Kingdom

Anesthesiology

The Journal of the American Society of Anesthesiologists

Annual Journal Symposium

The American Society of Anesthesiologists (ASA) and its journal *Anesthesiology* announce the 15th annual "Journal Symposium" to be held at the Annual Meeting of the ASA in October 2006, in Chicago, Illinois. The Journal Symposium highlights emerging and important concepts in anesthesia research and clinical practice.

This year's Journal Symposium is entitled:
"Postoperative Cognitive Dysfunction"

and will take place Tuesday, October 17, 2006, from 9:00am-12:30pm in Chicago (exact location to be announced later).

The Symposium format will be a poster-discussion session in conjunction with formal lectures by four invited international experts. Abstracts for inclusion in the Journal Symposium will be chosen from among those submitted for presentation at the ASA's Annual Meeting. The selections will be made by the Symposium organizers, Dr. Michael M. Todd of the University of Iowa Hospitals and Clinics, Iowa City, Iowa (Editor-in-Chief, *Anesthesiology*) and Dr. Mervyn Maze of Imperial College School of Medicine, London, England (Editor, *Anesthesiology*).

Investigators from around the world with an interest in this subject are encouraged to submit their work to the ASA for the Annual Meeting. Abstracts from both basic and clinical sciences are encouraged. Studies examining or evaluating neurocognitive testing methodology, intraoperative factors influencing postoperative cognitive dysfunction, imaging studies, interventional trials, or epidemiology, as well as basic laboratory studies concerning the broad subject of perioperative neurobiology or mechanisms of nonischemic injury, are encouraged. Abstracts should be submitted online through the ASA or Journal Web site:
www.ASAhq.org
www.anesthesiology.org

Interested individuals should be sure to check the Journal Symposium box on the abstract submission form to be considered for inclusion in this special session.

The authors of abstracts which are selected for the Symposium will also be offered an opportunity to submit their work to *Anesthesiology*, for inclusion in the special Symposium issue to be published in March 2007.

Journal/ASCCA Oral Presentation Session

***Anesthesiology*, in conjunction with the American Society of Critical Care Anesthesiologists (ASCCA), is pleased to announce a special session at the 2006 American Society of Anesthesiologists (ASA) Annual Meeting in Chicago, Illinois.**

This forum will serve two purposes. The first is to highlight new and innovative research in Critical Care Medicine. Of even greater importance is our desire to promote the value of mentored research training. To this end, the session will feature (with posters) oral presentations by junior investigators (i.e., those with a rank of Assistant Professor or below and less than 7 yr in rank) whose work has direct bearing on the art and science of Critical Care. Each investigator's talk will be followed by a short presentation by his or her mentor. The mentor's talk will highlight how the presented work fits into the overall scheme of investigation in the mentor's laboratory and how it will contribute to our understanding of any aspect of Critical Care Medicine. Participation by the audience will be encouraged.

Investigators involved in all types of research, including but not limited to basic science, clinical investigations, outcomes-based studies, epidemiology, and safety-oriented investigations, are invited to submit their best work for consideration. A committee consisting of Journal Editors and representatives of the ASCCA will select the abstracts and presenters for this session. Our goal is to gather a large number of individuals with an interest in Critical Care and its importance to the practice of Anesthesiology.

Abstracts should be submitted online through the ASA or Journal Web site:
www.ASAhq.org
www.anesthesiology.org

Select Critical Care as the major subject area to be considered for inclusion in this special session. In addition, authors should notify the *Anesthesiology* Editorial Office via e-mail (anesthesiology@uiowa.edu) regarding interest in being considered for this session. The authors of selected abstracts will also be offered an opportunity to submit their work to *Anesthesiology*, for inclusion in a special issue to be published in 2007.

Journal/SOAP Oral Presentation Session

***Anesthesiology* and the Society for Obstetric Anesthesia and Perinatology (SOAP) are extremely interested in highlighting new and innovative research in the field of Obstetric Anesthesia. We are therefore jointly organizing a special session during the ASA's Annual Meeting, October 14-18, 2006, in Chicago, Illinois.**

The Journal/SOAP special session will include oral presentations (without posters). A committee consisting of Journal Editors and representatives of SOAP will select the abstracts and presenters for this session. Authors will then be invited to prepare a formal 10-minute oral presentation of their work. Experts in the appropriate areas will be invited to participate in the discussion of each presentation. Our goal is to gather as many individuals with an interest in Obstetric Anesthesia as possible to participate in this session and to present the most innovative laboratory and clinical research available today.

Abstracts should be submitted online through the ASA or Journal Web site:
www.ASAhq.org
www.anesthesiology.org

Select Obstetric Anesthesia as the major subject area to be considered for inclusion in this special session. In addition, authors should notify the *Anesthesiology* Editorial Office via e-mail (anesthesiology@uiowa.edu) regarding interest in being considered for this session. The authors of selected abstracts will also be offered an opportunity to submit their work to *Anesthesiology*, for inclusion in a special issue to be published in 2007.

The abstract deadline for the above events is April 1, 2006

We look forward to seeing many of our fellow researchers and clinicians at these three valuable and interesting sessions. An announcement regarding abstracts and speakers, as well as the location, date, and time, will appear in the September 2006 issue of *Anesthesiology*.

Society for Obstetric Anesthesia and Perinatology

Future Meetings

SOAP 39th Annual Meeting
Fairmont Banff Springs
"Castle in the Rockies"
Alberta, Canada
May 16-19, 2007

SOAP 40th Annual Meeting
Renaissance Chicago Hotel
Chicago, Illinois
April 30 - May 4, 2008

SOAP 41st Annual Meeting
Renaissance Washington DC Hotel
Washington, District of Columbia
April 29 - May 3, 2009

Appendix 4

Other Obstetric Anesthesia Meetings

North American Specialty Meetings

1. SOAP Annual Meeting
2. Sol Shnider MD Obstetrical Anesthesia Meeting
3. Virginia Apgar Seminar
4. Texas Anesthesia Conference for Obstetrics (TACO)
5. Johns Hopkins Update on OB Anesthesia
6. Annual OB Anesthesia Meeting, Mt. Sinai Hospital, Toronto

North American Meetings with Significant Obstetric Anesthesia Content

1. American Society of Anesthesiologists
2. California Society of Anesthesiologists
3. International Anesthesia Research Society
4. American Society for Regional Anesthesia and Pain Management

International Meetings

1. Obstetric Anesthetists' Association (OAA) has 4 annual meetings: OAA Annual Meeting, 3 Day Course, Controversies, Refresher Day
2. Australia New Zealand College of Anaesthetists (ANZCA) Annual meeting of the Obstetric Anesthesia Special Interest Group
3. Israeli Association of Obstetric Anesthesia meets 2 yrs out of 3, has an annual refresher course
4. International Conference on Obstetric Anesthesia at Santa Joana-Pro Matre, Sao Paulo, Brazil
5. Joint OAA-SOAP Obstetric Anesthesia Meeting, Dublin, EK August 2006.

Appendix 5

Guidelines, Practice Parameters, Optimal Goals on Obstetric Anesthesia

Practice Guidelines for Obstetric Anesthesia (currently under revision by Task Force on Obstetric Anesthesia)

ASA-ACOG Statement on Pain Relief During Labor

ASA Guidelines for Regional Anesthesia in Obstetrics

ASA-ACOG Optimal Goals for Anesthesia Care in Obstetrics

Practice Guidelines for Obstetrical Anesthesia
A Report by the American Society of Anesthesiologists

Developed by the Task Force on Obstetrical Anesthesia

Joy L. Hawkins, M.D. (Chair)
Denver, Colorado

James F. Arens, M.D.
Galveston, Texas

Brenda A. Bucklin, M.D.
Omaha, Nebraska

Robert A. Caplan, M.D.
Seattle, Washington

David H. Chestnut, M.D.
Birmingham, Alabama

Richard T. Connis, Ph.D.
Woodinville, Washington

Patricia A. Dailey, M.D.
Hillsborough, California

Larry C. Gilstrap, M.D.
Houston, Texas

Stephen C. Grice, M.D.
Alpharetta, Georgia

Nancy E. Oriol, M.D.
Boston, Masachusetts

Kathryn J. Zuspan, M.D.
Edina, Minnesota

The guidelines are available in pdf format.

Click here to download them.

In order to read this document you must have the free utility, Adobe Acrobat Reader. Click here if you need to obtain a copy of the Reader.

Introduction

Practice guidelines are systematically developed recommendations that assist the practitioner and patient in making decisions about health care. These recommendations may be adopted, modified, or rejected according to clinical needs and constraints.

Practice guidelines are not intended as standards or absolute requirements. The use of practice guidelines cannot guarantee any specific outcome. Practice guidelines are subject to periodic revision as warranted by the evolution of medical knowledge, technology, and practice. The guidelines provide basic recommendations that are supported by analysis of the current literature and by a synthesis of expert opinion, open forum commentary, and clinical feasibility data *(Appendix).*

Purposes of the Guidelines

The purposes of these Guidelines are to enhance the quality of anesthesia care for obstetric patients, reduce the incidence and severity of anesthesia related complications, and increase patient satisfaction.

Focus of the Guidelines

The Guidelines focus on the anesthetic management of pregnant patients during labor, non-operative delivery, operative delivery, and selected aspects of postpartum care. The intended patient population includes, but is not limited to intrapartum and postpartum patients with uncomplicated pregnancies or with common obstetric problems. The Guidelines do not apply to patients undergoing surgery during pregnancy, gynecological patients or parturients with chronic medical disease (e.g., severe heart, renal or neurological disease).

Application of the Guidelines

The Guidelines are intended for use by anesthesiologists. They also may serve as a resource for other anesthesia providers and health care professionals who advise or care for patients who will receive anesthesia care during labor, delivery and the immediate postpartum period.

Task Force Members and Consultants

The ASA appointed a Task Force of 11 members to review the published evidence and obtain consultant opinion from a representative body of anesthesiologists and obstetricians. The Task Force members consisted of anesthesiologists in both private and academic practices from various geographic areas of the

United States.

The Task Force met its objective in a fivestep process. First, original published research studies relevant to these issues were reviewed and analyzed. Second, Consultants from various geographic areas of the United States who practice or work in various settings (e.g., academic and private practice) were asked to participate in opinion surveys and review and comment on drafts of the Guidelines. Third, the Task Force held two open forums at major national meetings to solicit input from attendees on its draft recommendations. Fourth, all available information was used by the Task Force in developing the Guideline recommendations. Finally, the Consultants were surveyed to assess their opinions on the feasibility of implementing the Guidelines.

Availability and Strength of Evidence

Evidencebased guidelines are developed by a rigorous analytic process. To assist the reader, the Guidelines make use of several descriptive terms that are easier to understand than the technical terms and data that are used in the actual analyses. These descriptive terms are defined below:

The following terms describe the availability of scientific evidence in the literature.

Insufficient: There are too few published studies to investigate a relationship between a clinical intervention and clinical outcome.

Inconclusive: Published studies are available, but they cannot be used to assess the relationship between a clinical intervention and a clinical outcome because the studies either do not meet predefined criteria for content as defined in the "Focus of the Guidelines," or do not meet research design or analytic standards.

Silent: There are no available studies in the literature that address a relationship of interest.

The following terms describe the strength of scientific data.

Supportive: There is sufficient quantitative information from adequately designed studies to describe a statistically significant relationship ($p < 0.01$) between a clinical intervention and a clinical outcome, using the technique of metaanalysis.

Suggestive: There is enough information from case reports and descriptive studies to provide a directional assessment of the relationship between a clinical intervention and a clinical outcome. This type of qualitative information does not permit a statistical assessment of significance.

Equivocal: Qualitative data have not provided a clear direction for clinical outcomes related to a clinical intervention and (1) there is insufficient quantitative information or (2) aggregated comparative studies have found no quantitatively significant differences among groups or conditions.

The following terms describe survey responses from Consultants for any specified issue. Responses are weighted as agree = +1, undecided = 0 or disagree = 1.

Agree: The average weighted responses must be equal to or greater than +0.30 (on a scale of 1 to 1) to indicate agreement.

Equivocal: The average weighted responses must be between 0.30 and +0.30 (on a scale of 1 to 1) to indicate an equivocal response.

Disagree: The average weighted responses must be equal to or less than 0.30 (on a scale of 1 to 1) to indicate disagreement.

GUIDELINES

I. Perianesthetic Evaluation.

1. History and Physical Examination

The literature is silent regarding the relationship between anesthesiarelated obstetric outcomes and the performance of a focused history and physical examination. However, there is suggestive data that a patient's medical history and/or findings from a physical exam may be related to anesthetic outcomes. The Consultants and Task Force agree that a focused history and physical examination may be associated with reduced maternal, fetal and neonatal complications. The Task Force agrees that the obstetric patient benefits from communication between the anesthesiologist and the obstetrician.

Recommendations:

The anesthesiologist should do a focused history and physical examination when consulted to deliver anesthesia care. This should include a maternal health history, an anesthesia-related obstetric history, an airway examination, and a baseline blood pressure measurement. When a regional anesthetic is planned, the back should be examined. Recognition of significant anesthetic risk factors should encourage consultation with the obstetrician.

2. Intrapartum Platelet Count

A platelet count may indicate the severity of a patient's pregnancyinduced hypertension. However, the literature is insufficient to assess the predictive value of a platelet count for anesthesiarelated complications in either uncomplicated parturients or those with pregnancyinduced hypertension. The Consultants and Task Force both agree that a routine platelet count in the healthy parturient is not necessary. However, in the patient with pregnancy-induced hypertension, the Consultants and Task Force both agree that the use of a platelet count may reduce the risk of anesthesiarelated complications.

Recommendations:

A specific platelet count predictive of regional anesthetic complications has not been determined. The anesthesiologist's decision to order or require a platelet count should be individualized and based upon a patient's history, physical examination and clinical signs of a coagulopathy.

3 Blood Type & Screen

The literature is silent regarding whether obtaining a blood type and screen is associated with fewer maternal anesthetic complications. The Consultants and Task Force are equivocal regarding the routine use of a blood type and screen to reduce the risk of anesthesiarelated complications.

Recommendations:

The anesthesiologist's decision to order or require a blood type and screen or cross-match should be individualized and based on anticipated hemorrhagic complications (e.g., placenta previa in a patient with previous uterine surgery).

4. Perianesthetic Recording of the Fetal Heart Rate.

The literature suggests that analgesic/anesthetic agents may influence the fetal heart rate pattern. There is insufficient literature to demonstrate that perianesthetic recording of the fetal heart rate prevents fetal complications. However, both the Task Force and Consultants agree that perianesthetic recording of the fetal heart rate reduces fetal and neonatal complications.

Recommendations:

The fetal heart rate should be monitored by a qualified individual before and after administration of regional analgesia for labor. The Task Force recognizes that *continuous* electronic recording of the fetal heart rate may not be necessary in every clinical setting [1] and may not be possible during placement of a regional anesthetic.

II. Fasting in the Obstetric Patient.

1. Clear Liquids

Published evidence is insufficient regarding the relationship between fasting times for clear liquids and the risk of emesis/reflux or pulmonary aspiration during labor. The Task Force and Consultants agree that oral intake of clear liquids during labor improves maternal comfort and satisfaction. The Task Force and Consultants are equivocal whether oral intake of clear liquids increases maternal risk of pulmonary aspiration.

Recommendations:

The oral intake of modest amounts of clear liquids may be allowed for uncomplicated laboring patients.

Examples of clear liquids include, but are not limited to, water, fruit juices without pulp, carbonated beverages, clear tea, and black coffee. The volume of liquid ingested is less important than the type of liquid ingested. However, patients with additional risk factors of aspiration (e.g., morbidly obese, diabetic, difficult airway), or patients at increased risk for operative delivery (e.g., non reassuring fetal heart rate pattern) may have further restrictions of oral intake, determined on a casebycase basis.

2. Solids

A specific fasting time for solids that is predictive of maternal anesthetic complications has not been determined. There is insufficient published evidence to address the safety of *any* particular fasting period for solids for obstetric patients. The Consultants agree that a fasting period for solids of 8 hours or more is preferable for uncomplicated parturients undergoing *elective* cesarean delivery. The Task Force recognizes that in laboring patients the timing of delivery is uncertain; therefore compliance with a predetermined fasting period is not always possible. The Task Force supports a fasting period of at least 6 hours prior to elective cesarean delivery.

Recommendations:

Solid foods should be avoided in laboring patients. The patient undergoing elective cesarean delivery should have a fasting period for solids consistent with the hospital's policy for non-obstetric patients undergoing elective surgery. Both the amount and type of food ingested must be considered when determining the timing of surgery.

III. Anesthesia Care for Labor and Vaginal Delivery.

A. Overview of Recommendations.

Anesthesia care is not necessary for all women for labor and/or delivery. For women who request pain relief for labor and/or delivery, there are many effective analgesic techniques available. Maternal request represents sufficient justification for pain relief, but the selected analgesia technique depends on the medical status of the patient, the progress of the labor, and the resources of the facility. When sufficient resources (e.g., anesthesia and nursing staff) are available, epidural catheter techniques should be one of the analgesic options offered. The primary goal is to provide adequate maternal analgesia with as little motor block as possible when regional analgesia is used for uncomplicated labor and/or vaginal delivery. This can be achieved by the administration of local anesthetic at low concentrations. The concentration of the local anesthetic may be further reduced by the addition of narcotics and still provide adequate analgesia.

B. Specific Recommendations.

1. Epidural anesthetics

a. Epidural local anesthetics. The literature supports the use of single-bolus epidural local anesthetics for providing greater quality of analgesia compared to *parenteral opioids*. However, the literature indicates a reduced incidence of spontaneous vaginal delivery associated with single-bolus epidural local anesthetics. The literature is insufficient to indicate causation. Compared to *single-injection spinal opioids* the literature is equivocal regarding the analgesic efficacy of single-bolus epidural local anesthetics. The literature suggests that epidural local anesthetics compared to spinal opioids are associated with a lower incidence of pruritus. The literature is insufficient to compare the incidence of other side-effects.

b. The addition of opioids to epidural local anesthetics. The literature supports that the use of epidural local anesthetics with opioids, when compared with *equal* concentrations of epidural local anesthetics without opioids, provides greater quality and duration of analgesia. The former is associated with reduced motor block and an increased likelihood of spontaneous delivery, possibly as a result of a reduced total dose of local anesthetic administered over time.*

The literature is equivocal regarding the analgesic efficacy of *low* concentrations of epidural local anesthetics with opioids compared to *higher* concentrations of epidural local anesthetics without opioids. The literature indicates that low concentrations of epidural local anesthetics with opioids compared to higher concentrations of epidural local anesthetics are associated with reduced motor block.

No differences in the incidence of nausea, hypotension, duration of labor, or neonatal outcomes are found when epidural local anesthetics with opioids were compared to epidural local anesthetics without opioids.

However, the literature indicates that the addition of opioids to epidural local anesthetics results in a higher incidence of pruritus. The literature is insufficient to determine the effects of epidural local anesthetics with opioids on other maternal outcomes (e.g., respiratory depression, urinary retention).

The Task Force and majority of Consultants are supportive of the case-by-case selection of an an algesic technique for labor. The subgroup of Consultants reporting a preferred technique, when all choices are available, selected an epidural local anesthetic technique

When a low concentration of epidural local anesthetic is used, the Consultants and Task Force agree that the addition of an opioid(s) improves analgesia and maternal satisfaction without increasing maternal, fetal or neonatal complications.

Recommendations:

The selected analgesic/anesthetic technique should reflect patient needs and preferences, practitioner preferences or skills, and available resources. When an epidural local anesthetic is selected for labor and delivery, the addition of an opioid may allow the use of a lower concentration of local anesthetic and prolong the duration of analgesia. Appropriate resources for the treatment of complications related to epidural local anesthetics (e.g., hypotension, systemic toxicity, high spinal anesthesia) should be available. If opioids are added, treatments for related complications (e.g., pruritus, nausea, respiratory depression) should be available.

c. Continuous infusion epidural techniques (CIE)

The literature indicates that effective analgesia can be maintained with a low concentration of local anesthetic with an epidural infusion technique. In addition, when an opioid is added to a local anesthetic infusion, an even lower concentration of local anesthetic provides effective analgesia. For example, comparable analgesia is found, with a reduced incidence of motor block, using bupivacaine infusion concentrations of *less than* 0.125% with an opioid compared to bupivacaine concentrations *equal to* 0.125% without an opioid.** No comparative differences are noted for incidence of instrumental delivery.

The literature is equivocal regarding the relationship between different local anesthetic infusion regimens and the incidence of nausea or neonatal outcome. However, the literature suggests that local anesthetic infusions with opioids are associated with a higher incidence of pruritus.

The Task Force and Consultants agree that infusions using low concentrations of local anesthetics with or without opioids provide equivalent analgesia, reduced motor block, and improved maternal satisfaction when compared to higher concentrations of local anesthetic

Recommendations:

Adequate analgesia for uncomplicated labor and delivery should be provided with the secondary goal of producing as little motor block as possible. The lowest concentration of local anesthetic infusion that provides adequate maternal analgesia and satisfaction should be used. For example, an infusion concentration of bupivacaine equal to or greater than 0.25% is unnecessary for labor analgesia for most patients. The addition of an opioid(s) to a low concentration of local anesthetic may improve analgesia and minimize motor block. Resources for the treatment of potential complications should be available.

2. Spinal Opioids with or without Local Anesthetics

The literature suggests that spinal opioids with or without local anesthetics provide effective labor analgesia without significantly altering the incidence of neonatal complications. There is insufficient literature to compare spinal opioids with parenteral opioids. However, the Consultants and Task Force agree that spinal opioids provide improved maternal analgesia compared to parenteral opioids.

The literature is equivocal regarding analgesic efficacy of spinal opioids compared to epidural local anesthetics. The Consultants and Task Force agree that spinal opioids provide equivalent analgesia compared to epidural local anesthetics. The Task Force agrees that the rapid onset of analgesia provided by single-injection spinal techniques may be advantageous for selected patients (e.g., advanced labor).

Recommendations:

Spinal opioids with or without local anesthetics may be used to provide effective, though time-limited, analgesia for labor. Resources for the treatment of potential complications (e.g., pruritus, nausea, hypotension, respiratory depression) should be available.

3. Combined spinal-epidural techniques

Although the literature suggests that combined spinal-epidural techniques (CSE) provide effective analgesia, the literature is insufficient to evaluate the analgesic efficacy of CSE compared to epidural local anesthetics. The literature indicates that use of CSE techniques with opioids when compared to epidural local anesthetics with or without opioids results in a higher incidence of pruritus and nausea. The Task Force and Consultants are equivocal regarding improved analgesia or maternal benefit of CSE versus epidural techniques. Although the literature is insufficient to evaluate fetal and neonatal outcomes of CSE techniques, the Task Force and Consultants agree that CSE does not increase the risk of fetal or neonatal complications.

Recommendations:

Combined spinal-epidural techniques may be used to provide rapid and effective analgesia for labor. Resources for the treatment of potential complications (e.g., pruritus, nausea, hypotension, respiratory depression) should be available.

4. Regional Analgesia and Progress of Labor.

There is insufficient literature to indicate whether timing of analgesia related to cervical dilation affects labor and delivery outcomes. Both the Task Force and Consultants agree that cervical dilation at the time of epidural analgesia administration does not impact the outcome of labor.

The literature indicates that epidural anesthesia may be used in a trial of labor for previous cesarean section patients without adversely affecting the incidence of vaginal delivery. However, randomized comparisons of epidural versus other specific anesthetic techniques were not found, and comparison groups were often confounded.

Recommendations:

Cervical dilation is not a reliable means of determining when regional analgesia should be initiated. Regional analgesia should be administered on an individualized basis.

5. Monitored or Stand-by Anesthesia Care for Complicated Vaginal Delivery.

Monitored anesthesia care refers to instances in which an anesthesiologist has been called upon to provide specific anesthesia services to a particular patient undergoing a planned procedure.[2] For these Guidelines, stand-by anesthesia care refers to the availability of the anesthesiologist in the facility, in the event of obstetric complications. The literature is silent regarding the subject of monitored or stand-by anesthesia care in obstetrics. However, the Task Force and Consultants agree that monitored or stand-by anesthesia care for complicated vaginal delivery reduces maternal, fetal, and neonatal complications.

Recommendations:

Either monitored or stand-by anesthesia care, determined on a case-by-case basis for complicated vaginal delivery (e.g., breech presentation, twins, and trial of instrumental delivery), should be made available when requested by the obstetrician.

IV. Removal of Retained Placenta.

1. Anesthetic Choices

The literature is insufficient to indicate whether a particular type of anesthetic is more effective than another for removal of retained placenta. The literature is also insufficient to assess the relationship between a particular type of anesthetic and maternal complications. The Task Force and Consultants agree that spinal or epidural anesthesia (i.e., regional anesthesia) is associated with reduced maternal complications and improved satisfaction when compared to general anesthesia or sedation/analgesia. The Task Force recognizes that circumstances may occur when general anesthesia or sedation/analgesia may be the more

appropriate anesthetic choice (e.g., significant hemorrhage).

Recommendations:

Regional anesthesia, general endotracheal anesthesia, or sedation/analgesia may be used for removal of retained placenta. Hemodynamic status should be assessed before giving regional anesthesia to a parturient who has experienced significant bleeding. In cases involving significant maternal hemorrhage, a general anesthetic may be preferable to initiating regional anesthesia. Sedation/analgesia should be titrated carefully due to the potential risk of pulmonary aspiration in the recently delivered parturient with an unprotected airway.

2. Nitroglycerin for Uterine Relaxation

The literature suggests and the Task Force and Consultants agree that the administration of nitroglycerin is effective for uterine relaxation during removal of retained placental tissue.

Recommendations:

Nitroglycerin is an alternative to terbutaline sulfate or general endotracheal anesthesia with halogenated agents for uterine relaxation during removal of retained placental tissue. Initiating treatment with a low dose of nitroglycerin may relax the uterus sufficiently while minimizing potential complications (e.g., hypotension).

V. Anesthetic Choices for Cesarean Delivery.

The literature suggests that spinal, epidural or CSE anesthetic techniques can be used effectively for cesarean delivery. When compared to regional techniques, the literature indicates that general anesthetics can be administered with shorter inductiontodelivery times. The literature is insufficient to determine the relative risk of maternal death associated with general anesthesia compared to other anesthetic techniques. However, the literature suggests that a greater number of maternal deaths occur when general anesthesia is administered. The literature indicates that a larger proportion of neonates in the general anesthesia groups, compared to those in the regional anesthesia groups, are assigned Apgar scores of less than 7 at one and five minutes. However, few studies have utilized randomized comparisons of general versus regional anesthesia, resulting in potential selection bias in the reporting of outcomes.

The literature suggests that maternal side effects associated with regional techniques may include hypotension, nausea, vomiting, pruritus and postdural puncture headache. The literature is insufficient to examine the comparative merits of various regional anesthetic techniques.

The Consultants agree that regional anesthesia can be administered with fewer maternal and neonatal complications and improved maternal satisfaction when compared to general anesthesia. The consultants are equivocal about the possibility of increased maternal complications when comparing spinal or epidural anesthesia with CSE techniques. They agree that neonatal complications are not increased.

Recommendations:

The decision to use a particular anesthetic technique should be individualized based on several factors. These include anesthetic, obstetric and/or fetal risk factors (e.g., elective versus emergency) and the preferences of the patient and anesthesiologist. Resources for the treatment of potential complications (e.g., airway management, inadequate analgesia, hypotension, pruritus, nausea) should be available

VI. Postpartum Tubal Ligation.

There is insufficient literature to evaluate the comparative benefits of local, spinal, epidural or general anesthesia for postpartum tubal ligation. Both the Task Force and Consultants agree that epidural, spinal and general anesthesia can be effectively provided without affecting maternal complications. Neither the Task Force nor the Consultants agree that local techniques provide effective anesthesia, and they are equivocal regarding the impact of local anesthesia on maternal complications. Although the literature is insufficient, the Task Force and Consultants agree that a postpartum tubal ligation can be performed safely within eight hours of delivery in many patients.

Recommendations:

Evaluation of the patient for postpartum tubal ligation should include assessment of hemodynamic status

(e.g., blood loss) and consideration of anesthetic risks. The patient planning to have an elective postpartum tubal ligation within 8 hours of delivery should have no oral intake of solid foods during labor and postpartum until the time of surgery. Both the timing of the procedure and the decision to use a particular anesthetic technique (i.e., regional versus general) should be individualized, based on anesthetic and/or obstetric risk factors and patient preferences. The anesthesiologist should be aware that an epidural catheter placed for labor may be more likely to fail with longer post-delivery time intervals. If a postpartum tubal ligation is to be done before the patient is discharged from the hospital, the procedure should not be attempted at a time when it might compromise other aspects of patient care in the labor and delivery area.

VII. Management of Complications.

1. Resources for Management of Hemorrhagic Emergencies

The literature suggests that the availability of resources for hemorrhagic emergencies is associated with reduced maternal complications. The Task Force and Consultants agree that the availability of resources for managing hemorrhagic emergencies is associated with reduced maternal, fetal and neonatal complications.

Recommendations:

Institutions providing obstetric care should have resources available to manage hemorrhagic emergencies *(Table 1)*. In an emergency, the use of type-specific or O negative blood is acceptable in the parturient.

2. Equipment for Management of Airway Emergencies

The literature suggests, and the Task Force and Consultants agree that the availability of equipment for the management of airway emergencies is associated with reduced maternal complications.

Recommendations:

Labor and delivery units should have equipment and personnel readily available to manage airway emergencies. Basic airway management equipment should be immediately available during the initial provision of regional analgesia *(Table 2)*. In addition, portable equipment for difficult airway management should be readily available in the operative area of labor and delivery units *(Table 3)*.

3. Central Invasive Hemodynamic Monitoring

There is insufficient literature to indicate whether pulmonary artery catheterization is associated with improved maternal, fetal or neonatal outcomes in patients with pregnancyrelated hypertensive disorders. The literature is silent regarding the management of obstetric patients with central venous catheterization alone. The literature suggests that pulmonary artery catheterization has been used safely in obstetric patients; however, the literature is insufficient to examine specific obstetric outcomes. The Task Force and Consultants agree that it is not necessary to routinely use central invasive hemodynamic monitoring for severe preeclamptic parturients.

Recommendations:

The decision to perform invasive hemodynamic monitoring should be individualized and based on clinical indications that include the patient's medical history and cardiovascular risk factors. The Task Force recognizes that not all practitioners have access to resources for utilization of central venous or pulmonary artery catheters in obstetric units.

4. Cardiopulmonary Resuscitation

The literature is insufficient to evaluate the efficacy of CPR in the obstetric patient during labor and delivery. The Task Force is supportive of the immediate availability of basic and advanced life-support equipment in the operative area of labor and delivery units.

Recommendations:

Basic and advanced life-support equipment should be immediately available in the operative area of labor and delivery units. If cardiac arrest occurs during labor and delivery, standard resuscitative measures and procedures, including left uterine displacement, should be taken. In cases of cardiac arrest, the American Heart Association has stated the following: "Several authors now recommend that the decision to perform a

perimortem cesarean section should be made rapidly, with delivery effected within 4 to 5 minutes of the arrest."[3]

References:

1. Guidelines for Perinatal Care, 4th Edition. American Academy of Pediatrics and American College of Obstetricians and Gynecologists, 1997, p 100-102.

2. Position on monitored anesthesia care. In ASA Standards, Guidelines and Statements; American Society of Anesthesiologists Publication: 20-21, October, 1997

3. Guidelines for cardiopulmonary resuscitation and emergency cardiac care: Recommendations of the 1992 national conference. JAMA 268(16):2249, 1992.

Table 1. Suggested Resources for Obstetric Hemorrhagic Emergencies*

- Large bore IV catheters.
- Fluid warmer.
- Forced air body warmer.
- Availability of blood bank resources.
- Equipment for infusing IV fluids and/or blood products rapidly. Examples include (but are not limited to) hand squeezed fluid chambers, hand inflated pressure bags, and automatic infusion devices.

* **IMPORTANT**: The items listed in this table represent suggestions. The items should be customized to meet the specific needs, preferences, and skills of the practitioner and health-care facility.

Table 2. Suggested Resources for Airway Management During Initial Provision of Regional Anesthesia*

- Laryngoscope and assorted blades.
- Endotracheal tubes, with stylets.
- Oxygen source.
- Suction source with tubing and catheters.
- Self inflating bag and mask for positive pressure ventilation.
- Medications for blood pressure support, muscle relaxation, and hypnosis.

* **IMPORTANT**: The items listed in this table represent suggestions. The items should be customized to meet the specific needs, preferences, and skills of the practitioner and health-care facility.

Table 3. Suggested Contents of a Portable Unit for Difficult Airway Management for Cesarean Section Rooms[1,2]

- Rigid laryngoscope blades and handles of alternate design and size from those routinely used.[3]
- Endotracheal tubes of assorted size.
- Laryngeal mask airways of assorted sizes
- At least one device suitable for emergency nonsurgical airway ventilation. Examples include (but are not limited to), retrograde intubation equipment, a hollow jet ventilation stylet or cricothyrotomy kit with or without a transtracheal jet ventilator, and the esophageal-tracheal combitube.

- Endotracheal tube guides. Examples include (but are not limited to) semirigid stylets with or without a hollow core for jet ventilation, light wands, and forceps designed to manipulate the distal portion of the endotracheal tube.

- Equipment suitable for emergency surgical airway access.

- Topical anesthetics and vasoconstrictors.

[1] **IMPORTANT**: The items listed in this table represent suggestions. The items should be customized to meet the specific needs, preferences, and skills of the practitioner and health-care facility.

[2] Adapted from "*Practice Guidelines for Management of the Difficult Airway: A Report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway*. Anesthesiology 78:597-602, 1993."

[3] The Task Force believes fiberoptic intubation equipment should be readily available.

Appendix**: Methods and Analyses.**

The scientific assessment of these Guidelines was based on the following statements, or evidence linkages. These linkages represent directional statements about relationships between obstetrical anesthetic interventions and clinical outcomes.

I. Perianesthetic Evaluation

1. A directed history and physical examination reduces maternal, fetal & neonatal complications.

2a. A routine intrapartum platelet count reduces maternal anesthetic complications.

2b. For pregnancy-induced hypertension, an intrapartum platelet count reduces maternal anesthetic complications.

3. For all parturients, an intrapartum blood type & screen reduces maternal, fetal & neonatal complications.

4. Perianesthetic recording of the fetal heart rate reduces fetal & neonatal complications.

II. Fasting for Labor and Delivery

5a. Oral intake of clear liquids during labor improves patient comfort and satisfaction, and does not increase maternal complications.

5b. Oral intake of solids during labor increases maternal complications.

III. Anesthetic Choices for Labor and Delivery

6a. Epidural techniques versus parenteral opioids: (a) improve maternal analgesia, (b) decrease maternal anesthetic complications, and (c) decrease fetal and neonatal complications.

6b. Epidural techniques versus spinal techniques: (a) improve maternal analgesia and (b) decrease maternal anesthetic complications.

6c. Epidural local anesthetics with opioids versus equal concentrations of epidural local anesthetics without opioids: (a) improves maternal analgesia, but (b) increases maternal, fetal & neonatal anesthetic complications.

6d. Epidural local anesthetics with opioids versus higher concentrations of epidural local anesthetics without opioids: (a) improves maternal analgesia, and (b) reduces maternal, fetal & neonatal anesthetic complications.

6e. Epidural infusion of lower concentrations of local anesthetics with opioids (i.e., bupivacaine concentrations less than 0.125% with opioids versus concentrations equal to 0.125%): (a) provides equivalent maternal analgesia, (b) reduces maternal motor block, but (c) increases opioid-related maternal anesthetic complications.

6f. Epidural infusion of lower concentrations of local anesthetics with opioids (i.e., bupivacaine concentrations less than 0.25% with opioids versus bupivacaine equal to or greater than 0.25%): (a) provides equivalent maternal analgesia, (b) reduces maternal motor block, but (c) increases opioid-related maternal anesthetic complications.

6g. Spinal opioids (with or without local anesthetic) versus parenteral opioids: (a) improve maternal analgesia, (b) reduce maternal, fetal & neonatal anesthetic complications, and (c) improve maternal satisfaction.

6h. Combined spinal-epidural techniques versus epidural local anesthetics: (a) improve maternal analgesia, but (b) increase maternal, fetal & neonatal anesthetic complications.

6i. Administering epidural analgesia at cervical dilatations of 3 to 5 centimeters (versus <3 cm) (a) improves maternal analgesia, (b) reduces maternal, fetal & neonatal obstetric complications, and (c) improves maternal satisfaction.

6j. Administering epidural analgesia at cervical dilatations of 3 to 5 centimeters (versus >5 cm) (a) improves maternal analgesia, (b) reduces maternal, fetal & neonatal anesthetic complications, and (c) improves maternal satisfaction.

6k. Epidural techniques for trial of labor patients: (a) reduces the incidence of cesarean delivery, and (b) reduces maternal, fetal & neonatal obstetric complications, and (c) improves maternal satisfaction.

6l. Monitored/Stand-by anesthesia care for complicated vaginal delivery reduces maternal, fetal & neonatal complications.

IV. Removal of Retained Placenta

7 Regional anesthesia [versus general anesthesia or sedation] for pain management during removal of retained placenta reduces maternal anesthetic complications and improves patient satisfaction.

8 Administration of nitroglycerin for uterine relaxation improves success at removing retained placenta.

V. Anesthetic Choices for Cesarean Delivery

9a. Spinal anesthesia for cesarean section provides maternal comfort & satisfaction without clinically significant maternal, fetal & neonatal anesthetic complications.

9b. Epidural anesthesia for cesarean section provides maternal comfort & satisfaction without clinically significant maternal, fetal & neonatal anesthetic complications.

9c. General anesthesia for cesarean section provides maternal comfort & satisfaction without clinically significant maternal, fetal & neonatal anesthetic complications.

9d. Combined spinal-epidural techniques versus epidural or spinal techniques alone for cesarean section provide maternal comfort & satisfaction without clinically significant maternal, fetal & neonatal anesthetic complications.

VI. Postpartum Tubal Ligation

10a. Local anesthesia for postpartum tubal ligation without preexisting anesthesia (a) improves maternal analgesia, (b) reduces maternal anesthetic complications, and (c) improves maternal satisfaction.

10b. Spinal anesthesia for postpartum tubal ligation without preexisting anesthesia (a) improves maternal analgesia, (b) reduces maternal anesthetic complications, and (c) improves maternal satisfaction.

10c. Epidural anesthesia for postpartum tubal ligation without preexisting anesthesia (a) improves maternal analgesia, (b) reduces maternal anesthetic complications, and (c) improves maternal satisfaction.

10d. General anesthesia for postpartum tubal ligation without preexisting anesthesia (a) improves maternal analgesia, (b) reduces maternal anesthetic complications, and (c) improves maternal satisfaction.

11. A postpartum tubal ligation [i.e., within 8 hours of delivery]: (a) does not increase maternal anesthetic complications, (b) improves patient satisfaction, and (c) improves cost/efficiency.

VII. Management of Complications

12. Availability of resources for management of hemorrhagic emergencies reduces maternal, fetal & neonatal anesthetic complications.

13. Availability of equipment for management of airway emergencies reduces maternal, fetal & neonatal anesthetic complications.

14. Peripartum invasive hemodynamic monitoring for preeclamptic patients reduces maternal, fetal & neonatal anesthetic and obstetric complications.

15. Immediate availability of basic and advanced life-support equipment in the operative area of labor and delivery units reduces maternal, fetal & neonatal complications.

Scientific evidence was derived from aggregated human research literature with meta-analyses utilized when appropriate, and from surveys, open presentations and other consensus-oriented activities. For purposes of literature aggregation, potentially relevant clinical studies were identified via electronic and manual searches of the literature. The electronic search covered a 33-year period from 1966 through 1998. The manual search covered a 59-year period of time from 1940 through 1998. Over 4000 citations were initially identified, yielding a total of 2347 nonoverlapping articles that addressed topics related to the 33 evidence linkages. Following review of the articles, 1819 studies did not provide direct evidence, and were subsequently eliminated. A total of 528 articles (from 57 journals) contained direct linkage-related evidence.

A directional result for each study was initially determined by classifying the outcome as either supporting a linkage, refuting a linkage, or neutral. The results were then summarized to obtain a directional assessment of support for each linkage. The literature relating to 8 evidence linkages contained enough studies with well-defined experimental designs and statistical information to conduct formal meta-analyses. These eight linkages were: linkage 6a [epidural versus parenteral techniques for labor], 6b [epidural versus single-shot spinal techniques for labor], 6c [epidural local anesthetics with opioids versus equal dosages of local anesthetics without opioids], 6d [epidural local anesthetics with opioids versus higher concentrations of local anesthetics without opioids], 6e [epidural infusion of local anesthetic (bupivacaine) concentrations of less than 0.125% versus concentrations equal to 0.125%], 6h [combined spinal-epidural techniques versus epidural local anesthetics for labor], 6k [epidural anesthesia for trial of labor], and 9c [general anesthesia versus epidural or spinal anesthesia for cesarean delivery].

Combined probability tests were applied to continuous data, and an odds-ratio procedure was applied to dichotomous study results. Two combined probability tests were employed as follows: (1) The Fisher Combined Test, producing chi-square values based on logarithmic transformations of the reported p-values from the independent studies, and (2) the Stouffer Combined Test, providing weighted representation of the studies by weighting each of the standard normal deviates by the size of the sample. An odds-ratio procedure based on the Mantel-Haenszel method for combining study results using 2 X 2 tables was used with outcome frequency information. An acceptable significance level was set at $p < 0.01$ (one-tailed) and effect size estimates were calculated. Interobserver agreement was established through assessment of interrater reliability testing. Tests for heterogeneity of the independent samples were conducted to assure consistency among the study results. To control for potential publishing bias, a "fail-safe N" value was calculated for each combined probability test. No search for unpublished studies was conducted, and no reliability tests for locating research results were done.

Meta-analytic results are reported in Table 4. To be considered acceptable evidence, both the Fisher and weighted Stouffer combined test results must agree. Significant combined test values were found for: (1) analgesic efficacy - linkages 6a (epidural versus parenteral techniques for labor) and 6c (epidural local anesthetics with opioids versus equal dosages of local anesthetics without opioids); (2) duration of analgesia - linkage 6c (epidural local anesthetics with versus without opioids), and (3) incision-to-delivery time - linkage 9c (general anesthesia versus epidural or spinal anesthesia for cesarean delivery). Weighted effect size values for these linkages ranged from $r = 0.13$ to $r = 0.41$, representing small-to-moderate effect size estimates.

To be considered acceptable evidence, combined test results must agree with Mantel-Haenszel odds-ratios when both types of data are assessed. Odds ratios were significant for the following outcomes: (1) analgesic efficacy - linkage 6c (epidural local anesthetics with opioids versus equal dosages of local anesthetics without opioids); (2) mode of delivery - linkage 6a (epidural versus parenteral techniques for labor); (3) motor block; linkage 6c (epidural local anesthetics with opioids versus equal dosages of local anesthetics without opioids), 6d (epidural local anesthetics with opioids versus higher concentrations of local anesthetics without

opioids), and 6e (epidural infusion of local anesthetic concentrations of less than 0.125% versus concentrations equal to 0.125%); (4) pruritus - linkage 6c (epidural local anesthetics with opioids versus equal dosages of local anesthetics without opioids), 6d (epidural local anesthetics with opioids versus higher concentrations of local anesthetics without opioids) and 6h (combined spinal-epidural techniques versus epidural local anesthetics for labor); (5) nausea - 6h (combined spinal-epidural techniques versus epidural local anesthetics for labor; (6) Apgar scores at 1-minute - linkage 6a (epidural versus parenteral techniques for labor), and linkage 9c (general anesthesia versus epidural or spinal anesthesia for cesarean delivery), and (7) Apgar scores at 5-minutes - linkage 9c (general anesthesia versus epidural or spinal anesthesia for cesarean delivery).

For the findings noted above, tests for heterogeneity of statistical tests and effect size were *nonsignificant* for the following outcomes and linkages: (1) analgesic efficacy - linkage 6c; (2) mode of delivery - linkage 6a; (3) motor block linkages 6c, 6d, and 6e; (4) pruritus linkages 6c and 6d; (5) nausea linkage 6h; (6) Apgar scores at 1-minute linkage 6a; and (7) Apgar scores at 5-minutes linkage 9c. These findings indicate that the pooled studies provided common estimates of significance and population effect sizes.

For the findings noted above, tests for heterogeneity of *statistical tests* were significant for the following outcomes and linkages: (1) analgesic efficacy - linkage 6a; (2) Apgar scores at 1-minute linkage 9c; (3) Apgar scores at 5-minutes - linkage 9c, and (4) incision-to-delivery time linkage 9c. Tests for heterogeneity of *effect size* were significant for the following outcomes and linkages: (1) analgesic efficacy - linkage 6a; (2) duration of analgesia - linkage 6c; (3) pruritus linkage 6h; (3) Apgar scores at 1-minute linkage 9c; and (4) incision-to-delivery time linkage 9c. For analgesic efficacy, the heterogeneous findings for linkage 6a may reflect the differential influence of the various statistical tests combined with a small number of studies used in the analysis. For pruritus, variability in the reported odds ratios may reflect the varying use of opioids in the epidural local anesthetic groups, in contrast with consistent opioid use in the CSE groups, and further analysis may need to control for opioid use in both groups. For incision-to-delivery times and Apgar scores at 1-minute, variability in statistical tests and effect sizes may be the result of nonrandomized comparisons in these meta-analyses. Due to the small number of studies included in these meta-analyses, examination of the analyses for moderator variables could not be conducted.

Agreement among Task Force members and two methodologists was established by interrater reliability testing. Agreement levels using a Kappa statistic for two-rater agreement pairs were as follows: (1) type of study design, k = 0.79 to 0.83; (2) type of analysis, k = 0.57 to 0.73; (3) evidence linkage assignment, k = 0.65 to 0.93; and (4) literature inclusion for database, k = 0.54 to 1.00. Three-rater chance-corrected agreement values were: (1) design, Sav = 0.80, Var (Sav) = 0.004; (2) analysis, Sav = 0.64, Var (Sav) = 0.008; (3) linkage identification, Sav = 0.76, Var (Sav) = 0.004; (4) literature database inclusion, Sav = 0.65, Var (Sav) = 0.040. These values represent moderate to high levels of agreement.

The findings of the literature analyses were supplemented by the opinions of Task Force members as well as by surveys of the opinions of a panel of Consultants as described in the text of the Guidelines. The rate of return was 78% (N = 114/147). The percentage of Consultants supporting each linkage is reported in Table 5. Consultants were supportive (i.e., they agreed that the specified linkage improved analgesia, reduced the risk of adverse outcomes or improved maternal satisfaction) of the following linkages: linkage 1 (history and physical exam), linkage 4 (recording of fetal heart rate), linkage 6c/d (epidural local anesthetics with versus without opioids), linkage 6l (monitored/stand-by anesthesia care), linkage 7 (regional anesthesia for retained placenta), linkage 8 (nitroglycerin for retained placenta), linkage 9a (spinal anesthesia for cesarean delivery), linkage 9b (epidural anesthesia for cesarean delivery), linkage 10b (spinal anesthesia for PPTL), linkage 10c (epidural anesthesia for PPTL), linkage 11 (immediate postpartum tubal ligation), linkage 12 (availability of hemorrhagic resources), and linkage 13 (availability of airway resources). Consultants were not supportive of linkage 9c (general anesthesia for cesarean delivery), linkage10a (local anesthesia for PPTL), 10d (general anesthesia for PPTL), and linkage 14 (invasive hemodynamic monitoring). Consultants believed that all of the linkages were important issues for the Guidelines to address.

Seventy-six percent of the responding Consultants indicated that fasting times for solids should be determined either on a case-by-case basis or by institutional protocol. Fifty-six percent reported a safe fasting time (for solids) for uncomplicated vaginal delivery of no less than 8 hours. Seventy-seven percent indicated a safe fasting time (for solids) for elective cesarean delivery of no less than 8 hours.

The Consultants were asked to indicate which, if any, of the evidence linkages would change their clinical practices if the Guidelines were instituted. The rate of return was 56% (N = 83/147). The percent of responding Consultants expecting *no change* associated with each linkage were as follows: history and physical exam - 98%; routine platelet count - 96%; blood type and screen - 96%; fetal heart rate recording -

98%; oral intake of liquids - 91%; oral intake of solids - 95%; epidural local anesthetics for labor - 100%; epidural infusion for labor - 100%, spinal opioids for labor - 98%, CSE for labor - 98%, cervical dilation 98%, monitored/stand-by anesthesia care 100%, retained placenta analgesia 99%, nitroglycerin for retained placenta 95%, cesarean anesthetic choices 100%, tubal ligation 96%, hemorrhagic emergencies 99%, airway emergencies 98%, hemodynamic monitoring 99%, and CPR 99%. Ninety-eight percent of the respondents indicated that the Guidelines would have *no effect* on the amount of time spent on a typical case.

Readers with special interest in the statistical analyses used in establishing these Guidelines can receive further information by writing to the American Society of Anesthesiologists: 520 North Northwest Highway, Park Ridge, Illinois 60068-2573.

* No differences in the likelihood of spontaneous delivery were found when studies using morphine or meperidine were added to studies using only fentanyl or sufentanil.

** References to bupivacaine are included for illustrative purposes only, and because bupivacaine is the most extensively studied local anesthetic for CIE. The Task Force recognizes that other local anesthetic agents are equally appropriate for CIE.

Statement on Pain Relief During Labor

(Approved by the House of Delegates on October 13, 1999)

Labor results in severe pain for many women. There is no circumstance where it is considered acceptable for a person to experience untreated severe pain, amenable to safe intervention, while under a physician's care. In the absence of a medical contraindication, maternal request is a sufficient medical indication for pain relief during labor. Pain management should be provided whenever medically indicated.

Nonetheless, ASA and ACOG have received reports that some third-party payers have denied reimbursement for regional analgesia/anesthesia during labor unless a physician has documented the presence of a "medical indication" for regional analgesia/anesthesia. Of the various pharmacologic methods used for pain relief during labor and delivery, regional analgesia techniques, epidural, spinal and combined spinal epidural are the most flexible, effective and least depressing to the central nervous system, allowing for an alert, participating mother and alert neonate. It is the position of ACOG and ASA that third-party payers who provide reimbursement for obstetric services should not deny reimbursement for regional analgesia/anesthesia because of an absence of other "medical indications."

Guidelines for Regional Anesthesia in Obstetrics

(Approved by House of Delegates on October 12, 1988
and last amended on October 18, 2000)

These guidelines apply to the use of regional anesthesia or analgesia in which local anesthetics are administered to the parturient during labor and delivery. They are intended to encourage quality patient care but cannot guarantee any specific patient outcome. Because the availability of anesthesia resources may vary, members are responsible for interpreting and establishing the guidelines for their own institutions and practices. These guidelines are subject to revision from time to time as warranted by the evolution of technology and practice.

GUIDELINE I

REGIONAL ANESTHESIA SHOULD BE INITIATED AND MAINTAINED ONLY IN LOCATIONS IN WHICH APPROPRIATE RESUSCITATION EQUIPMENT AND DRUGS ARE IMMEDIATELY AVAILABLE TO MANAGE PROCEDURALLY RELATED PROBLEMS.

Resuscitation equipment should include, but is not limited to: sources of oxygen and suction, equipment to maintain an airway and perform endotracheal intubation, a means to provide positive pressure ventilation, and drugs and equipment for cardiopulmonary resuscitation.

GUIDELINE II

REGIONAL ANESTHESIA SHOULD BE INITIATED BY A PHYSICIAN WITH APPROPRIATE PRIVILEGES AND MAINTAINED BY OR UNDER THE MEDICAL DIRECTION[1] OF SUCH AN INDIVIDUAL.

Physicians should be approved through the institutional credentialing process to initiate and direct the maintenance of obstetric anesthesia and to manage procedurally related complications.

GUIDELINE III

REGIONAL ANESTHESIA SHOULD NOT BE ADMINISTERED UNTIL: 1.) THE PATIENT HAS BEEN EXAMINED BY A QUALIFIED INDIVIDUAL[2]; AND 2) A PHYSICIAN WITH OBSTETRICAL PRIVILEGES TO PERFORM OPERATIVE VAGINAL OR CESAREAN DELIVERY, WHO HAS KNOWLEDGE OF THE MATERNAL AND FETAL STATUS AND THE PROGRESS OF LABOR AND WHO APPROVES THE INITIATION OF LABOR ANESTHESIA, IS READILY AVAILABLE TO SUPERVISE THE LABOR AND MANAGE ANY OBSTETRIC COMPLICATIONS THAT MAY ARISE.

Under circumstances defined by department protocol, qualified personnel may perform the initial pelvic examination. The physician responsible for the patient's obstetrical care should be informed of her status so that a decision can be made regarding present risk and further management.[2]

GUIDELINE IV

AN INTRAVENOUS INFUSION SHOULD BE ESTABLISHED BEFORE THE INITIATION OF REGIONAL ANESTHESIA AND MAINTAINED THROUGHOUT THE DURATION OF THE REGIONAL ANESTHETIC.

GUIDELINE V

REGIONAL ANESTHESIA FOR LABOR AND/OR VAGINAL DELIVERY REQUIRES THAT THE PARTURIENT'S VITAL SIGNS AND THE FETAL HEART RATE BE MONITORED AND DOCUMENTED BY A QUALIFIED INDIVIDUAL. ADDITIONAL MONITORING APPROPRIATE TO THE CLINICAL CONDITION OF THE PARTURIENT AND THE FETUS SHOULD BE EMPLOYED WHEN INDICATED. WHEN EXTENSIVE REGIONAL BLOCKADE IS ADMINISTERED FOR COMPLICATED VAGINAL DELIVERY, THE STANDARDS FOR BASIC ANESTHETIC

MONITORING [3] SHOULD BE APPLIED.

GUIDELINE VI

REGIONAL ANESTHESIA FOR CESAREAN DELIVERY REQUIRES THAT THE STANDARDS FOR BASIC ANESTHETIC MONITORING [3] BE APPLIED AND THAT A PHYSICIAN WITH PRIVILEGES IN OBSTETRICS BE IMMEDIATELY AVAILABLE.

GUIDELINE VII

QUALIFIED PERSONNEL, OTHER THAN THE ANESTHESIOLOGIST ATTENDING THE MOTHER, SHOULD BE IMMEDIATELY AVAILABLE TO ASSUME RESPONSIBILITY FOR RESUSCITATION OF THE NEWBORN. [3]

The primary responsibility of the anesthesiologist is to provide care to the mother. If the anesthesiologist is also requested to provide brief assistance in the care of the newborn, the benefit to the child must be compared to the risk to the mother.

GUIDELINE VIII

A PHYSICIAN WITH APPROPRIATE PRIVILEGES SHOULD REMAIN READILY AVAILABLE DURING THE REGIONAL ANESTHETIC TO MANAGE ANESTHETIC COMPLICATIONS UNTIL THE PATIENT'S POSTANESTHESIA CONDITION IS SATISFACTORY AND STABLE.

GUIDELINE IX

ALL PATIENTS RECOVERING FROM REGIONAL ANESTHESIA SHOULD RECEIVE APPROPRIATE POSTANESTHESIA CARE. FOLLOWING CESAREAN DELIVERY AND/OR EXTENSIVE REGIONAL BLOCKADE, THE STANDARDS FOR POST-ANESTHESIA CARE [4] SHOULD BE APPLIED.

- A postanesthesia care unit (PACU) should be available to receive patients. The design, equipment and staffing should meet requirements of the facility's accrediting and licensing bodies.

- When a site other than the PACU is used, equivalent postanesthesia care should be provided.

GUIDELINE X

THERE SHOULD BE A POLICY TO ASSURE THE AVAILABILITY IN THE FACILITY OF A PHYSICIAN TO MANAGE COMPLICATIONS AND TO PROVIDE CARDIOPULMONARY RESUSCITATION FOR PATIENTS RECEIVING POSTANESTHESIA CARE.

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1. The Anesthesia Care Team (Approved by ASA House of Delegates 10/26/82 and last amended 10/17/01).

2. for Perinatal Care (American Academy of Pediatrics and American College of Obstetricians and Gynecologists, 1988).

3.Standards for Basic Anesthetic Monitoring (Approved by ASA House of Delegates 10/21/86 and last amended 10/21/98).

4. Standards for Postanesthesia Care (Approved by ASA House of Delegates 10/12/88 and last amended 10/19/94

Optimal Goals for Anesthesia Care in Obstetrics

(Approved by the ASA House of Delegates on October 18, 2000)

This joint statement from the American Society of Anesthesiologists (ASA) and the American College of Obstetricians and Gynecologists (ACOG) has been designed to address issues of concern to both specialties. Good obstetric care requires the availability of qualified personnel and equipment to administer general or regional anesthesia both electively and emergently. The extent and degree to which anesthesia services are available varies widely among hospitals. However, for any hospital providing obstetric care, certain optimal anesthesia goals should be sought. These include:

I. Availability of a licensed practitioner who is credentialed to administer an appropriate anesthetic whenever necessary. For many women, regional anesthesia (epidural, spinal or combined spinal epidural) will be the most appropriate anesthetic.

II. Availability of a licensed practitioner who is credentialed to maintain support of vital functions in any obstetric emergency.

III. Availability of anesthesia and surgical personnel to permit the start of a cesarean delivery within 30 minutes of the decision to perform the procedure; in cases of VBAC, appropriate facilities and personnel, including obstetric anesthesia, nursing personnel, and a physician capable of monitoring labor and performing cesarean delivery, immediately available during active labor to perform emergency cesarean delivery (ACOG 1999). The definition of immediate availability of personnel and facilities remains a local decision, based on each institution's available resources and geographic location.

IV. Appointment of a qualified anesthesiologist to be responsible for all anesthetics administered. There are obstetric units where obstetricians or obstetrician-supervised nurse anesthetists administer anesthetics. The administration of general or regional anesthesia requires both medical judgment and technical skills. Thus, a physician with privileges in anesthesiology should be readily available.

Persons administering or supervising obstetric anesthesia should be qualified to manage the infrequent but occasionally life-threatening complications of major regional anesthesia such as respiratory and cardiovascular failure, toxic local anesthetic convulsions, or vomiting and aspiration. Mastering and retaining the skills and knowledge necessary to manage these complications require adequate training and frequent application.

To ensure the safest and most effective anesthesia for obstetric patients, the director of anesthesia services, with the approval of the medical staff, should develop and enforce written policies regarding provision of obstetric anesthesia. These include:

I. Availability of a qualified physician with obstetrical privileges to perform operative vaginal or cesarean delivery during administration of anesthesia. Regional and/or general anesthesia should not be administered until the patient has been examined and the fetal status and progress of labor evaluated by a qualified individual. A physician with obstetrical privileges who has knowledge of the maternal and fetal status and the progress of labor, and who approves the initiation of labor anesthesia, should be readily available to deal with any obstetric complications that may arise.

II. Availability of equipment, facilities, and support personnel equal to that provided in the surgical suite. This should include the availability of a properly equipped and staffed recovery room capable of receiving and caring for all patients recovering from major regional or general anesthesia. Birthing facilities, when used for analgesia or anesthesia, must be appropriately equipped to provide safe anesthetic care during labor and delivery or post-anesthesia recovery care.

Personnel other than the surgical team should be immediately available to assume responsibility for resuscitation of the depressed newborn. The surgeon and anesthesiologist are responsible for the mother and may not be able to leave her care for the newborn even when a regional anesthetic is functioning adequately. Individuals qualified to perform neonatal resuscitation should demonstrate:

A. Proficiency in rapid and accurate evaluation of the newborn condition including Apgar scoring.

B. Knowledge of the pathogenesis of a depressed newborn (acidosis, drugs, hypovolemia, trauma, anomalies and infection), as well as specific indications for resuscitation.

C. Proficiency in newborn airway management, laryngoscopy, endotracheal intubations, suctioning of airways, artificial ventilation, cardiac massage and maintenance of thermal stability.

In larger maternity units and those functioning as high-risk centers, 24-hour in-house anesthesia, obstetric and neonatal specialists are usually necessary. Preferably, the obstetric anesthesia services should be directed by an anesthesiologist with special training or experience in obstetric anesthesia. These units will also frequently require the availability of more sophisticated monitoring equipment and specially trained nursing personnel.

A survey jointly sponsored by the ASA and ACOG found that many hospitals in the United States have not yet achieved the above goals. Deficiencies were most evident in smaller delivery units. Some small delivery units are necessary because of geographic considerations. Currently, approximately 50 percent of hospitals providing obstetric care have fewer than 500 deliveries per year. Providing comprehensive care for obstetric patients in these small units is extremely inefficient, not cost-effective and frequently impossible. Thus, the following recommendations are made:

1. Whenever possible, small units should consolidate.

2. When geographic factors require the existence of smaller units, these units should be part of a well-established regional perinatal system.

The availability of the appropriate personnel to assist in the management of a variety of obstetric problems is a necessary feature of good obstetric care. The presence of a pediatrician or other trained physician at a high-risk cesarean delivery to care for the newborn or the availability of an anesthesiologist during active labor and delivery when vaginal birth after cesarean delivery (VBAC) is attempted, and at a breech or twin delivery are examples. Frequently, these professionals spend a considerable amount of time standing by for the possibility that their services may be needed emergently but may ultimately not be required to perform the tasks for which they are present. Reasonable compensation for these standby services is justifiable and necessary.

A variety of other mechanisms have been suggested to increase the availability and quality of anesthesia services in obstetrics. Improved hospital design to place labor and delivery suites closer to the operating rooms would allow for more efficient supervision of nurse anesthetists. Anesthesia equipment in the labor and delivery area must be comparable to that in the operating room.

Finally, good interpersonal relations between obstetricians and anesthesiologists are important. Joint meetings between the two departments should be encouraged. Anesthesiologists should recognize the special needs and concerns of the obstetrician and obstetricians should recognize the anesthesiologist as a consultant in the management of pain and life-support measures. Both should recognize the need to provide high quality care for all patients.

Reference:

American College of Obstetricians and Gynecologists. Vaginal birth after previous cesarean delivery. ACOG Practice Bulletin. Washington, DC: ACOG, 1999

Bibliography:

Committee on Perinatal Health, Toward Improving the Outcome of Pregnancy: The 90s and Beyond. White Plains, New York: March of Dimes Birth Defects Foundation, 1993

Appendix 6

SOAP Newsletters

Society for Obstetric Anesthesia and Perinatology

SOAP 2006 Pre-Meeting Newsletter 38th Annual Meeting April 26-30, 2006

The Westin Diplomat Resort & Spa Hollywood, Florida

Society for Obstetric Anesthesia and Perinatology
Phone: 216-447-7863 • Fax: 216-642-1127
Email: soaphq@soap.org • Web: www.soap.org

Pre-registration is available through March 27, 2006.

Scientific Program

WEDNESDAY, APRIL 26, 2006

1:00 - 5:00 pm **Critical Care Obstetric Anesthesia Workshop**
(By Ticket Only – Limited Registration)
Gurinder M. S. Vasdev, MD; et al.

6:00 - 8:00 pm **SOAP Opening Reception**

THURSDAY, APRIL 27, 2006

7:00 - 7:45 am **Breakfast with Exhibitors; Posters**

7:45 - 8:00 am **Opening Remarks and Welcome**
William R. Camann, MD; David J. Wlody, MD; David J. Birnbach, MD; Jose Carvalho, MD, PhD, FRCPC

8:00 - 9:30 am **Gertie Marx Symposium (6)**
Moderator: G. M. Bassell, MD
Judges: Stephen Halpern, MD; Philip Hess, MD; Alan Santos, MD, MPH; Jonathan Waters, MD; Jess Weiss, MD

9:30 - 9:45 am **Distinguished Service Award**
Awarded to Felicity Reynolds, MD
Presenter: William R. Camann, MD

9:45 - 10:15 am **Coffee with Exhibitors; Posters**

10:15 - 11:30 am **Oral Presentations (5)**
Moderator: Linda S. Polley, MD

11:30 - 12:30 pm **PRO/CON Debate:** A Non-Particulate Antacid Should be Used Routinely in All Patients Undergoing Cesarean Section
Moderator: David J. Wlody, MD
Pro: Yaakov Beilin, MD
Con: Jose Carvalho, MD, PhD, FRCPC

12:30 - 1:30 pm **Lunch with Exhibitors; Posters**

1:30 - 2:30 pm **What's New in Obstetrics?**
Introduction: David J. Wlody, MD
Howard Minkoff, MD

2:30 - 3:30 pm **Zuspan Award Symposium (4)**
Moderator: M. Joanne Douglas, MD, FRCP
Judges: Samuel Hughes, MD; Barbara Leighton, MD; Howard Minkoff, MD; Shiv Sharma, MD

3:30 - 4:00 pm **Coffee Break with Exhibitors; Posters**

4:00 - 6:00 pm **SOAP Business Meeting – Awards Presentations**
Moderator: William R. Camann, MD

FRIDAY, APRIL 28, 2006

6:00 - 7:00 am **Fun Run/Walk**

7:00 - 8:00 am **Breakfast with Exhibitors; Posters**

8:00 - 9:00 am **Oral Presentations (4)**
Moderator: Barbara Scavone, MD

9:00 - 10:00 am **Obstetric Medicine Update: Endocrine Disease in Pregnancy**
Introduction: Joy L. Hawkins, MD
Erin Joanne Keely, MD, FRCPC

10:00 - 10:30 am **Coffee with Exhibitors; Posters**

10:30 - 11:30 am **Poster Review #1 –** Moderator: Cynthia Wong, MD

11:30 - 1:00 pm **Panel: Team Training in Obstetrics**
Moderator: Stephen Pratt, MD
Panelists: Paul Preston, MD; Benjamin Sachs, MD; TBD

1:30 pm **SOAP Golf and Tennis Activities**

SATURAY, APRIL 29, 2006

7:00 - 8:00 am **Breakfast with the Experts**
Moderator: Robert Gaiser, MD
Experts: Jodie Buxbaum, MD; Jose Carvalho, MD, PhD, FRCPC (Portuguese); Helene Finegold, MD; Regina Fragneto, MD; David Hepner, MD (Spanish); Bupesh Kaul, MD; Gordon Lyons, FRCA; Edward McGonigal, MD; Mary McHugh, MD; Deborah Qualey, MD; Jayanthie Ranasinghe, MD; Edward Riley, MD; Gurinder M. S. Vasdev, MD; Lela Weems, MD

7:00 - 8:00 am **Continental Breakfast; Posters**

8:15 - 9:15 am **Gerard W. Ostheimer Lecture: What's New in OB Anesthesia?**
Introduction: Brenda Bucklin, MD
Roshan Fernando, FRCA

9:15 - 9:45 am **Coffee Break; Posters**

9:45 - 10:45 am **Poster Review #2 –** Moderator: Edward Riley, MD

10:45 - 11:45 am **Fred Hehre Lecture: Lessons Learned from Obstetric Anesthesia**
Introduction: William R. Camann, MD
David Chestnut, MD

11:45 - 1:00 pm **Lunch (On Your Own)**

1:00 - 2:30 pm **Best Paper Presentations (6)**
Moderator: Gordon Lyons, MD
Judges: William R. Camann, MD; Prof. Warwick Ngan Kee; Kiki Palacios, MD; Richard Smiley, MD, PhD

2:30 - 4:00 pm **Panel: Obstetric Anesthesia and Coexisting Diseases**
Moderator: Richard Wissler, MD, PhD
Panelists: Brendan Carvalho, MB, BCh; Manuel Vallejo, DMD, MD; Richard Wissler, MD, PhD

4:00 - 5:00 pm **Open Forum: Proposed Revisions to the ASA Practice Guidelines on Obstetric Anesthesia**

6:00 -11:00 pm **SOAP Banquet**

SUNDAY, APRIL 30, 2006

7:00 - 7:30 am **Continental Breakfast**

7:30 - 8:30 am **Panel: Tort Reform**
Moderator: Donald Penning, MD, MSC, FRCPC
Panelists: Patricia Dailey, MD; Andrew Harris, MD, MHS; A. Terry Walman, MD, JD

8:30 - 9:30 am **PRO/CON Debate: Supplemental Oxygen Should Be Used Routinely During Cesarean Section**
Moderator: David J. Birnbach, MD
Pro: Scott Segal, MD
Con: Prof. Warwick Ngan Kee

9:30 - 10:30 am **Poster Case Reports: You did What? The Best Case Reports of the Year!**
Moderator: Robert McKay, MD

10:30 am **Adjournment**

SOAP Newsletter

Society for Obstetric Anesthesia and Perinatology
www.soap.org

Spring 2006

President's Message

William R. Camann, MD

Greetings to all!

I hope by now all of us in the north have seen the last flakes of snow, and for everyone else in more temperate climes, I hope it's been a great winter. I'm looking forward to seeing everyone in the friendliest climate of all – Hollywood, Florida at the next annual SOAP meeting, April 26-30. We have a terrific program planned, and this should be yet one more memorable annual meeting of our great society.

The Practice Guidelines for Obstetric Anesthesia are one of the most important documents the ASA produces for our specialty. We, as SOAP members, should feel a strong connection to this document; for all practical purposes, we are creating it.

One event that is planned for the annual meeting will be an open forum to discuss the revision of the ASA Practice Guidelines for Obstetric Anesthesia. This will take place during the Research Hour on Saturday afternoon, April 29. This document, first published in 1999 (Anesthesiology 1999;90: 600-11), and sponsored by the American Society of Anesthesiologists, is one of the most important documents the ASA produces for our specialty. This is the collective wisdom of our opinion leaders on what constitutes reasonable practice of obstetric anesthesia. Although officially an ASA document, the task force is comprised of SOAP members and the input of SOAP is vital. We, as SOAP members, should feel a strong connection to this document; for all practical purposes, we are creating it. This collaboration between ASA and SOAP underscores the strong bond between our respective societies. The goal of the task force preparing this is to make as many of the recommendations as "evidence-based" as possible. Where evidence is lacking or conflicting, the recommendations will be based to a great extent on expert opinion and open forum commentary. This is where your input is crucial! Please take a look at the current guidelines, (a draft version will also be available at the SOAP meeting) and think about what you might like added or changed. Come to the open forum and express your opinion. Member input is essential, and we rely on the insight of our members to make this as inclusive a document as possible. These guidelines are meant to be applicable to all practices; private and academic, rural and urban, large and small – one size fits all is part of the challenge of this exercise. The task force hopes to have the document in a final form for consideration for full approval of the ASA House of Delegates at the 2006 ASA annual meeting in Chicago.

I'll give a few examples of some of the proposed additions that our hard-working task force has already considered. a) A strong recommendation to consider early epidural placement in certain high risk-obstetric patients, b) A recommendation to utilize pencil point needles whenever possible for spinal anesthesia in pregnant patients (we are mostly doing this now anyway, right?), c) An endorsement to use the laryngeal mask airway as a critical and early modality in the setting of a difficult or failed airway in obstetrics, and d) A statement that the use of concentrations of bupivacaine greater than 0.125% for labor analgesia is unnecessary. And more to come – give us your thoughts!

One of the more challenging issues we all face as physicians is the advent of "pay for performance", also known as P4P. How would P4P be implemented in obstetric anesthesia? What practices in obstetric anesthesia should be incentivized to improve the specialty? What performance measures would be appropriate to utilize as benchmarks of our practice, particularly if payment were on the line? Can and should

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INSIDE

PRESIDENT'S MESSAGE *continued from page 3*

P4P be linked to the ASA Practice Guidelines for Obstetric Anesthesia? Think about this, because we will all have to deal with this in the coming years.

*I love the interpersonal interactions so unique to the world of childbirth. I love the largely unscheduled nature of obstetrics. I love the privilege of being involved in a meaningful way in the one of the greatest events in a woman's life. So, what do **YOU** love about obstetric anesthesia?*

On another topic, I'd like to take this opportunity to pose a few questions to the membership. I was intrigued a few days ago when a colleague of mine and I were chatting; he was lamenting the incredible "performance pressure" he noted when working in the main operating room. The pressure to go faster, to turn over rooms faster, to do more and more in less and less time was, in his opinion, and I concur, placing undue emotional and physical demands on him, and possibly even affecting patient safety. Then he asked me an interesting question – do we see this same kind of pressure in obstetric anesthesia? My answer (and I preface this by saying this is my own personal experience at my own hospital, and as they say – your mileage may vary!) was no. Certainly, we are incredibly busy on the obstetric unit. We sometimes are so busy we feel like it's a bit of a controlled, or even uncontrolled, chaos. But is it the same kind of "performance" pressure we experience in the general operating room? In my opinion, it's very different. The pressure to turn over rooms, to just get the next case done, the seemingly endless list of "add-ons", the deification of the "schedule" and the endless explaining if a case is "delayed" – these are not the same kinds of pressures we are used to in the obstetric arena. We certainly have our own set of pressures when working on the labor & delivery unit. But for most of us, I would venture to say that we love these pressures. This is what makes us obstetric anesthesiologists. Speaking for myself, I love the interpersonal interactions so unique to the world of childbirth. I love the largely unscheduled nature of obstetrics. I love the privilege of being involved in a meaningful way in the one of the greatest events in a woman's life.

So, what do you love about obstetric anesthesia? Why do you enjoy the work on the L&D unit more than the general operating room? Why do you attend SOAP meetings? We all may have unique perspectives and thoughts on this, but in the end, I think the answers to these questions will have a common theme for most of the membership of SOAP. It's what makes this specialty so much fun, so unique and so special. It's been a pleasure and an honor to serve as your president for this past year, and I look forward to many more years of service to this society and specialty.

Best wishes to all,

William Camann, MD

Treasurer's Report

As most of you know, SOAP's fiscal year ends on October 31st. Although it is a couple months past that date, audits take time and our firm has not completed its audit at the time of this writing. Therefore, my report will not give specific figures but rather approximates. I doubt there will be much variance in the bottom line when all is said. However, at our annual business meeting I will present our finances using the audited figures as well as project on our financial health. I will publish that report in the summer post-meeting newsletter.

OPERATIONS: Although we came in under budget in administrative income, we also came in under budget in all our operating and societal expenses so that the net effect was a gain of about $10,000. Our major loss of income was at the membership level. We grossed about $13,000 less in dues income than was budgeted. This was partially offset by a significant increase in the OAPEF contributions. On the expense side, we saw the most significant reduction in the newsletter expenses, largely because of improved technology. However, membership expenses, board and committee expenses as well as administrative expenses all came in well under budget.

ANNUAL MEETING: Once again, we did well at this year's annual meeting. Although our income was about $9000 under budget, our expenses were about $29,000 under budget, giving us a net gain of about $20,000. Registration came in at about what was expected. Our revenue losers were in the food and entertainment category. As for expenses, the cost for our online abstract process was cut in half, giving us a $10,000 break, and syllabus, printing and postage were also significantly reduced.

INVESTMENTS: Our total investment income (i.e., investment gains plus dividend income) gained about $51,000. As we had budgeted for a gain of only $25,000, this is significant. Also, this does not include the interest revenue we will be receiving from Dr. Marx's estate. That will be reflected in the current fiscal year, and I will remark on that at the business meeting.

SUMMARY: Our bottom line is that we saw a significant gain of about $9000 over our budgeted revenue this year and an approximate reduction of about $48,000 in budgeted expenses. Before you get all excited, remember that a significant portion of that gain is paper, but our net worth has increased by about 10%.

I look forward to reporting the specifics at the business meeting in Miami in April and to responding to any questions you may have.

Respectfully submitted,
Cally Hoyt, MD, MBA

The Research Committee of SOAP presents this column in an effort to assist members in conducting and evaluating research, stimulating ideas and conversations, and expanding the scope of obstetric anesthesia. If you have ideas, suggestions, or questions for future topics, please write, phone, fax, or E-mail me:

Philip Hess, MD
Coordinator, SOAP Research Column
Dept. of Anesthesiology
Beth Israel Deaconess Medical Center
330 Brookline Ave. East Campus/St-308
Boston, MA 02215
Phone: (617) 667-3112 • Fax: (617) 667-7849
E-mail: phess@bidmc.harvard.edu

The CONSORT Checklist

Stephen Halpern MD, MSc FRCPC
Department of Anaesthesia
Sunnybrook and Women's College Health Sciences Centre and the University of Toronto
76 Grenville St.
Toronto, Ontario Canada M5S 1B2.
E-mail: stephen.halpern@sw.ca

Properly designed randomized controlled trials (RCT's) are an essential component of clinical research. Unfortunately, poorly designed trials can lead to biased conclusions and may lead to poor treatment choices. Further, if key information about the study design is missing, electronic databases such as MEDLINE and EMBASE will fail to correctly index the study. It is therefore important to report key aspects of the study design and implementation so that clinicians can access the trial and judge its quality. The Consolidated Standards for Reporting of Trials (CONSORT) group met to determine which aspects were important in these respects. Their first report appeared in 1996[1] and was revised in 2001[2].

The group designed a checklist with 22 items. The complete checklist can be found at:

http://www.consort-statement.org/newene.htm#checklist

In addition to the actual items, this site explains the rationale for each item and contains examples of how it is properly used. For the purposes of this article, I will concentrate on a few of the more important aspects of the checklist.

The Checklist

Title and Abstract: The words "random allocation" or "randomized" must appear in the title or abstract. This is to ensure that the article is properly indexed under randomized controlled trials in MEDLINE.

Methods: The methods section must contain a description of the participants that allows clinicians to compare those in the study to their own patients. This includes description of the important demographic features and the setting (e.g. primary vs. tertiary care, when the study was performed).

The method of randomization must be fully explained. The description should include how the random sequence was generated. Restrictions such as block randomization or stratification should be included.

There is a separate item for blinding of allocation. This describes how the person who recruits the participants is blinded to treatment group (opaque envelopes, telephone randomization etc). It is important to blind allocation to avoid recruitment bias. Some methods used to blind allocation are more easily circumvented (sealed envelopes) than others (telephone randomization). Blinding allocation is different from blinding, or masking, the treatment itself (which should also be done if possible). If one considers a clinical trial that compares epidural analgesia to parenteral opioid, it is possible to conceal allocation of treatment until the patient requests analgesia. Once the analgesic has been assigned, the treatment is no longer blinded. This hypothetical trial can be randomized, the allocation can be concealed, but the trial cannot be blinded. Conversely, if epidural ropivacaine is compared to epidural bupivacaine for labor analgesia, it is possible to maintain blinding of allocation to group as well as the treatment received until after the trial is over. The terms 'single blind', 'double blind' and even 'triple blind' have been used to describe clinical trials. Practically, it is best to explicitly state who was blinded (patient, nurse, pediatrician, statistician, etc.) rather than use the terms above.

The methods should include a detailed description of the statistical methodology. This includes a full description of the sample size estimate, a statement of the primary and secondary outcomes, and a description of special considerations such as pre-planned subgroup analyses and adjusted analyses.

Results: One of the main features of the consort checklist is a description of the flow of participants from the beginning to the end of the trial. This includes the number of patients who were eligible, randomized, treated, followed and analyzed. Often, the most effective way of showing this is with a flow diagram. Figure 1 illustrates a hypothetical flow diagram with most of the important elements. As shown, it is important to state how many patients were analyzed for each outcome. In addition, the diagram shows whether or not the patients were analyzed on an "intent to treat" basis.

In this section, the statistical analysis is reported. These include the baseline demographics in order for the reader to determine how similar the groups were at the time of recruitment. For each primary and secondary outcome, there should be a summary of the results for each group (e.g. a mean or median) and an estimate of precision (a 95% confidence interval). The difference in means should be reported in the same way (mean difference and 95% confidence interval for the difference). This helps the clinician put the numbers into the perspective of a significant clinical difference. A p value reports the statistical significance. If there are multiple outcomes, the use of an adjustment should be reported. Finally, the incidence of adverse events is described in the results section, whether or not they were anticipated in the methods.

Discussion: Three main elements should be present in the discussion. There should be an interpretation of the results, taking into account the potential weaknesses in the study design and opportunities for bias. There can be some speculation about the generalization to the population in general. In particular, the authors might mention a group of patients that would not be expected to behave in a similar manner to the study population. Finally, the current study should be discussed in the context of the available evidence.

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THE CONSORT CHECKLIST *continued from page 5*

Currently, over 100 medical journals make use of the CONSORT checklist in their instructions to authors:
http://www.consort-statement.org/Endorsements/Journals/journals.html

These include Anesthesiology, Canadian Journal of Anesthesia and the European Journal of Anaesthesiology. Since both researchers and clinicians find the checklist useful, it is likely that more journals will expect randomized trials to be reported in this format.

References:

1. Begg C, Cho M, Eastwood S, et al. Improving the quality of reporting of randomized controlled trials. The CONSORT statement. JAMA 1996; 276: 637-639.
2. Moher D, Schulz KF, Altman DG, CONSORT Group (Consolidated Standards of Reporting Trials). The CONSORT statement: revised recommendations for improving the quality of reports of parallel-group randomized trials. Ann Intern Med 2001; 134: 657-662.

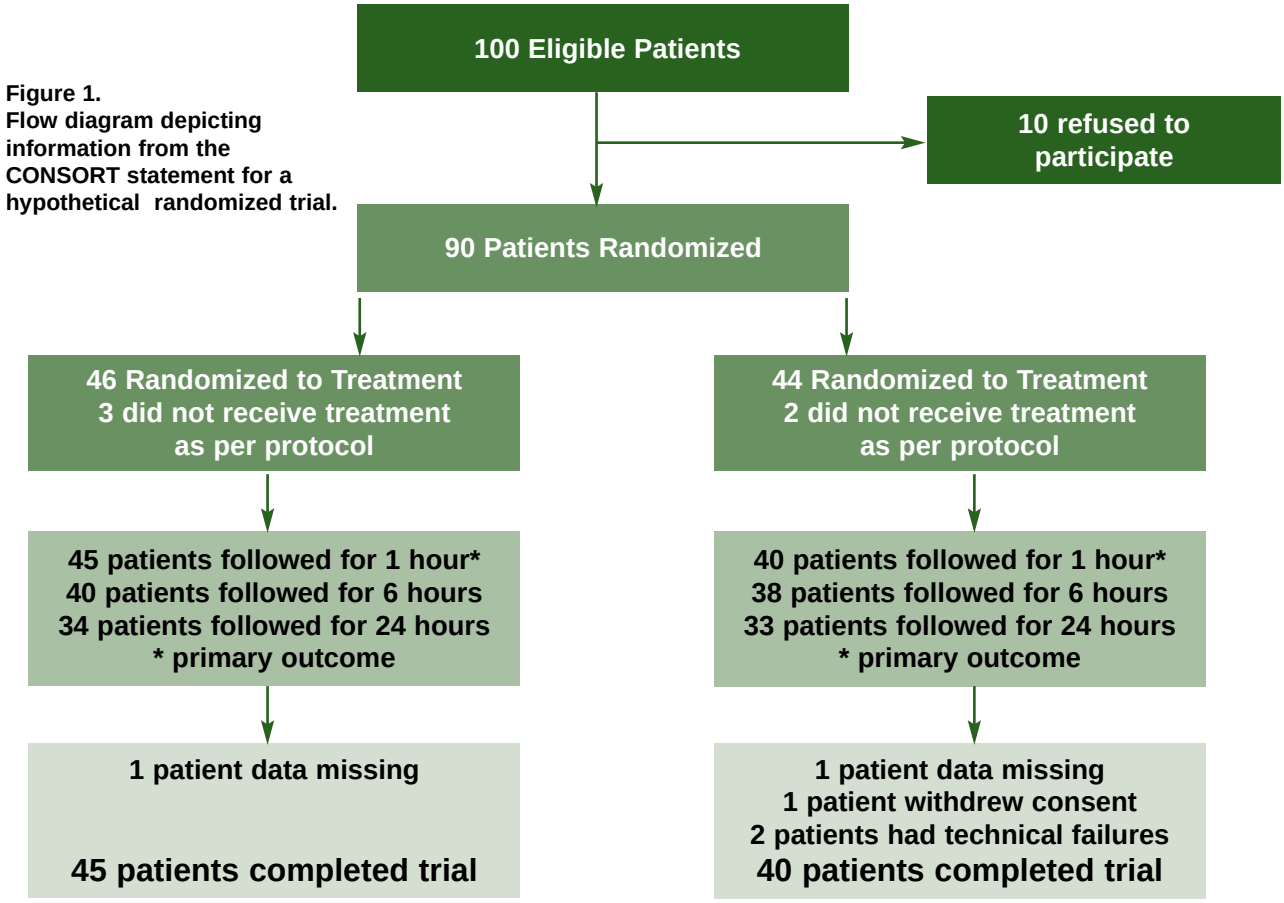

Figure 1.
Flow diagram depicting information from the CONSORT statement for a hypothetical randomized trial.

Proposed Bylaws Changes

Proposed bylaws changes to be voted on at the annual business meeting on, Thursday, April 27, 2006.

Addition for Disbursement Committee
10.10.1: **Disbursement Committee.** Chair is appointed by the president with approval of the Board for a three year term. Other members are the Treasurer, Chair of the Education Committee, Chair of the Research Committee, and three (3) active members appointed by the president who have a history of significant service to the Society and are approved by the Board.
10.10.2: **Duties.** To review research and education applications for funding and disburse monies to those projects with merit. The amount available for disbursement shall be determined by the Finance Committee and noted in the annual budget. This committee shall not exceed the budgeted amount without approval from 75% of the Board.

CALL FOR NOMINATIONS

The following SOAP Director positions will be elected during the Business Meeting Thursday, April 27, 2006.

★Second Vice President ★Secretary

If you are interested in running for one of these positions or would like to nominate a candidate, please email soaphq@soap.org and we will provide more details.

Tocolytic Agents in the Management of Preterm Labor

Joanne C. Hudson, MD
Associate Professor, Director of Obstetric Anesthesia
Virginia Commonwealth University Health Systems
Richmond, VA

Preterm birth is birth before 37 weeks. Preterm delivery accounts for 12% deliveries, 60 to 80 % infant deaths excluding congenital malformations and is associated with devastating morbidity and disability: respiratory distress syndrome (RDS), bronchopulmonary dysplasia, intraventricular hemorrhage (IVH), necrotizing enterocolitis (NEC), sepsis, cerebral palsy1. Survival at 24 weeks is 50%, at 26 weeks 80%, about 34 weeks 99%. Neurological and sensorial deficits are especially high in newborns <31-32 weeks. Lecithin/sphingomyelin ratio at 31-32 weeks is 1.0., and at 35 weeks it is often >2.0 (minimal risk or RDS). Tocolysis is intended to inhibit labor, extend gestation and increase birth weight, improving infant morbidity and mortality. It can also be used when labor is initiated by a self limited etiology (cerclage, pyelonephritis or abdominal surgery). Diagnostic criteria are four uterine contractions in 20 minutes with cervical change 2 cm. or 80% effacement. Contraindications to tocolysis include chorioamnionitis, severe preeclampsia/ eclampsia, maternal instability from hemorrhage or if delivery is imminent such as the cervix > 4 cm. The fetus with intrauterine death, lethal anomaly, severe intrauterine growth restriction or a nonreassuring fetal assessment should be delivered. If preterm premature rupture of membranes occurs, tocolysis is not effective in delaying labor2.

General treatment for preterm labor includes hydration, bed rest, and tocolytics. Neither bed rest nor hydration is effective. The mainstay of therapy is tocolytics. There are 5 classes of tocolytics (Table). Uterine muscle contraction is mediated through adenosine triphosphate (ATP) dependent binding process. Free intracellular calcium (Ca^{++}) is required. Myosin light chain kinase (MLK) promotes myosin binding to actin. MLK is increased by calcium and inhibited by adenosine monophosphate (cAMP). Cyclic guanosine monophosphate (cGMP) reduces intracellular calcium. Oxytocin hydrolyzes membrane phospholipids to make arachidonic acid available for conversion by prostaglandin H 2 synthetase (cyclooxygenase) to PGF2α and PGE2, potent uterine constrictors. PGF2 alpha and oxytocin stimulate calcium release.

Placebo controlled studies suggest that beta-adrenergic receptor agonists (betas), prostaglandin inhibitors (PI) and atosiban are most effective short term.[3] Betas, Magnesium sulfate (MgSo4), calcium channel blockers (CCB), PI and atosiban are all better than no treatment[1]. There is no benefit in maintenance therapy. The greatest maternal harm is associated with betas > MgSO4 > PI. Calcium channel blockers and atosiban have the best maternal profile. Fetal/neonatal harms occur with PI > MgSO4 and Betas. Calcium channel blockers and atosiban have the best fetal profile.

Betamimetics are effective. Terbutaline is the most commonly used beta in the US. They delay delivery, may improve birth weight and reduce RDS.[4] Betas have the greatest maternal side effects because of cross reactivity of B1 and B2 receptors. Most symptoms are mild. The tachycardia and stroke volume are a B1 effect, hypotension is a B2 effect. But metabolic problems as hyperglycemia, hypokalemia, lipolysis; and serious tachycardia, arrhythmias, angina, heart failure occur. Infection, inflammation or preeclampsia may predispose to pulmonary edema. Glucose, potassium, and intake and output must be monitored. Fetal tachycardia, hyperinsulinemia, hypoglycemia occur but acid base is usually normal. Tachyphylaxis from down regulation of B2 receptors requires increasing doses. Synergism with other beta agonists occurs. Use phenylephrine rather than ephedrine for hypotension. Tachycardia may be confused for hypovolemia and produce arrhythmias or angina.

Magnesium sulfate is safe but limited in effectiveness at 48 hours.[5] Nonetheless, fewer maternal side effects make it the most popular agent in the US. Rapid infusion of MgSO4 can produce vasodilation with diaphoresis, flushing, and hypotension. Other effects include nausea (N), vomiting (V) headache (HA), visual disturbances, and palpitations. There have been cases of dyspnea, pulmonary edema, and chest pain. Maternal magnesium toxicity is related to serum concentration. Loss of reflexes occurs at 8-10 mEq/L, respiratory paralysis at 10-15, and cardiac arrest at 20-25. Calcium gluconate (1 g IV) is the immediate antagonist. MgSO4 produces slow fetal heart rates and reduced variability. The newborn may have hypotonia, hyporeflexia, and respiratory depression. Rare deaths were due to excessive doses and prematurity. MgSO4 reduces general anesthesia requirements. Nondepolarizing muscle relaxants are a clinical problem only when large doses of MgSO4 are used.

Prostaglandin inhibitors (PI) are more effective than betas, MgSO4, and CCB with fewer maternal problems.[5] They block cyclooxygenase (prostaglandin synthetase) and decrease the potent myometrial constrictors PGF2 alpha and PGE2. Gastrointestinal tract problems occur at lower rates than with betas, CCB, MgSO4. Reversible platelet dysfunction and bleeding are possible but epidurals are usually placed after failed tocolysis and not contraindicated. PIs are considered most harmful to the fetus because of the potential for constriction of the ductus arteriosus and production of oligohydramnios. Only 50 % of the drug crosses the placenta, but the fetal liver is immature and the half life is 5 times greater than mother (4.5 hr vs 2hr.). Constriction of ductus arteriosus occurs < 28 weeks and after 31 to 32 weeks gestation and if therapy exceeds 48 hours. Vascular constriction and subsequent increase in ADH results in reduced blood flow to the fetal kidney, brain, and mesentery. There may be a predisposition to necrotizing enterocolitis, small bowel perforation. Oligohydramnios a can be seen within 24 hours but is readily reversed when drug is stopped. Indomethacin is effective in treatment of polyhydramnios. Use of indomethacin is confined to 28 to < 32 weeks. There is no placebo controlled study. Cochrane analysis finds numbers too small to recommend its use.

The calcium channel blocker (nifedipine) is very popular outside of the US because it is low in cost, as effective as betas with a low incidence of mild cardiovascular effects. Suggestions of reduction in neonatal outcomes of RDS, NEC, IVH, jaundice and maternal side effects is hopeful.[7,8] As vasodialators, the side effects include flushing, headache, dizziness, nausea, reflex tachycardia, palpitations, but less than betas. Fetal acid-base is not disturbed. CCB may enhance the myocardial depressant effects of inhalation agents, local anesthetics and dantrolene. The combination of

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Tocolytic Agents in the Management of Preterm Labor

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MgSO4 and CCB potentiates hypotension, left ventricle dysfunction and neuromuscular weakness. Respiratory depression is a risk.

Atosiban is a selective oxytocin – vasopressin receptor antagonist (not available in US). Atosiban is more effective than placebo, and possibly more effective than betas and CCB. But the Cochrane review concluded insufficient evidence of benefit over betas.[9] Atosiban has the best maternal safety profile with no serious cardiovascular effects. But headache, vertigo, nausea and vomiting have been reported. Atosiban also has the best fetal profile after > 28 weeks, with no adverse fetal effects. Unfortunately, one trial suggested an increase in deaths at 12 months with more birth weights < 1500 grams, probably related to infection and extreme prematurity.[9] The FDA did not approve because of concerns about effects on fetus < 28 weeks.

The nitric oxide donor, nitroglycerine (NTG), produces smooth muscle relaxation. While NTG did delay labor in some patients 24-48 hours, the evidence for effectiveness and fetal safety is insufficient to recommend routinely.[10] Headaches are common and mild but the potential for hypotension exists. It is contraindicated in women with hypotension or preload- dependent cardiac lesions. There are little data on fetal effects.

Agent Effectiveness	Mechanism of Action	Fetal adverse effects	Maternal effects	Contraindication
Beta-adrenergic receptor agonists	↑cAMP ↓MLK	↑FHR ↑insulin ↓glucose normal fetal acid-base	↑HR, palpitations ↑SV, ↓BP, tremors, dyspnea, angina pulmonary edema ↓K ↑glucose	Hyperthyroid, diabetes, cardiac disease, CHF
Beta-adrenergic receptor agonists	↑cAMP ↓MLK	↑FHR ↑insulin ↓glucose normal fetal acid-base	↑HR, palpitations ↑SV, ↓BP, tremors, dyspnea, angina pulmonary edema ↓K ↑glucose	Hyperthyroid, diabetes, cardiac disease, CHF
Magnesium Sulfate	↑cAMP ↓MLK	slows FHR ↓ beat to beat variability	↓BP N/V/ HA, flushing, palpitations pulmonary edema, angina	Myasthenia, Renal insufficiency. CHF, conduction defects
Ca channel blockers Very effective	L type channel ↓Ca^{++} ↓MLK	No fetal acid-base abnormal.	↓BP ↑HR, palpitations N/V HA, flushing	Liver, renal insufficiency LV dysfunction CHF
Prostaglandin inhibitors 28-31 wks.	↓PGF2 ↓PGE2	Constriction of PDA > 32 wks. Oligohydramnios	GI problems	Oligohydramnios Chorioamnionitis GI, renal, hepatic, platelet dysfunction ASA sensitive asthma Fetus < 28 or > 32 wks.
Oxytocin receptor blocker 28-34 wks.	↑cAMP ↓MLK	<28 wks. Death, <1500 grams	IV site only	Fetus < 28 wk.
Nitric Oxide Donor	↑cGMP, ↓Ca^{++} ↓MLK	Insufficient data	↓BP, HA, ↑HR, palpitations N/V flushing	Hypotension Aortic insufficiency

ASA/SOAP Abstract Submission:

The deadline to submit your abstracts for the ASA and SOAP Jointly Sponsored ASA 2006 Abstract Session is **April 1, 2006**.

Additional information available at: **http://www.call4abstracts.com/asa/**

SOAP 2006 Abstracts
Gertie Marx Symposium
Thursday, April 27, 8:00-9:30 Am
SOAP A1-A6

SOAP A1
Sterile Technique Practices (STP) for Obstetrical Neuraxial Analgesia and Anesthesia (ONAAA) – Year 2005 Survey

SOAP A2
Ethnicity and the Distance to the Epidural Space in Parturients

SOAP A3
Peripheral Venous Pressure as a Hemodynamic Variable in Pregnant Patients Undergoing Spinal Anesthesia

SOAP A4
Comparison of Loss of Resistance Technique with Air Versus Saline to Identify Epidural Space for Combined Spinal Epidural Labor Analgesia

SOAP A5
Prophylactic Granisetron does not Prevent Nausea and Vomiting During Elective Cesarean Section Under Spinal Anesthesia

SOAP A6
Effects of Crystalliod and Colloid Preloads on Coagulation Assessed by Thromboelastography in Parturients Prior to Elective Cesarean Section

Oral Presentation #1
Thursday, April 27, 10:15-11:30 AM
SOAP A7-A11

SOAP A7
Lumbar Dural Sac Width Determined by Ultrasound does not Correlate with Sensory Levels of Spinal Anesthesia for Elective Cesarean Section

SOAP A8
A Randomized Controlled Trial of the Impact of Combined Spinal-Epidural Analgesia on the Success of External Cephalic Version for Breech Presentation

SOAP A9
Maternal Heart Rate Variability Before and After Combined Spinal-Epidural Labor Analgesia

SOAP A10
Maternal Body Temperature Changes With Intermittent Versus Contunuous Labor Epidural Analgesia

SOAP A11
Simulation in Labor and Delivery: Full Team, in Situ Drills in a Large HMO

Zuspan Award Symposium
Thursday, April 27, 2:30-3:30 PM
SOAP A12-A15

SOAP A12
A Womb with a View: Anesthetic, Obstetric, and Neonatal Care Issues for In-Utero Fetal Surgery

SOAP A13
Patient-Controlled Analgesia with Background Remifentanil Infusion for Labor Pain

SOAP A14
Does Eating in Labor Influence Obstetric Outcome: A Randomized Controlled Trial in 2400 Primiparous Women?

SOAP A15
Explicit Communication In An Obstetrical Emergency

Oral Presentation #2
Friday, April 28, 8:00-9:00 AM
SOAP A16-A19

SOAP A16
Comparison Of Contractions: IUP vs. EHG

SOAP A17
CSF Concentration does not Predict Onset or Duration of Spinal Fentanyl for Labor Analgesia

SOAP A18
Combined Spinal-Epidural Versus Epidural Analgesia in Multiparous Women

SOAP A19
Anesthesia-Related Maternal Mortality in Michigan: 1985-2003

Best Paper Presentations
Saturday, April 29, 1:00-2:30 PM
SOAP A20-A25

SOAP A20
Maternal Pneumoperitoneum with Carbon Dioxide does not Depress Near-Term Fetal Sheep Cerebral Oxygenation

SOAP A21
3 Holes are not Better than 1: A Randomized, Prospective Comparison of 2 Wire-Reinforced Epidural Catheters for Labor Analgesia

SOAP A22
Neuropathic Injury to the Levator Ani Occurs in 1 in 4 Primiparous Women

SOAP A23
Tocolytic Desensitization: Plasmalemmal Sodium Calcium Exchanger (NCX) Activity and Function in Myometrial Cytosolic Free Calcium Concentration ($[Ca^{2+}]_{cyt}$) Oscillations and Relaxation

SOAP A24
MRI Following Neuraxial Analgesia. Can a Radiologist Determine what is Pathologic?

SOAP A25
Thromboembolism Risk Assessment: Guidelines Alone will not Change Practice!

Poster Review #1
Friday, April 28, 10:30-11:30 AM
SOAP A26-A54

SOAP A26
Flow Dynamics of Multi-Port Epidural Catheters

SOAP A27
Chronobiology of Spinal Bupivacaine During Initial Phase of Labor

SOAP A28
Influence of Chronopharmacology on Duration of Intrathecal Fentanyl Labor Analgesia

SOAP A29
A Comparison of Combined Spinal-Epidural-PCA Analgesia with Continuous Epidural-PCA Analgesia Alone for Labor Pain

SOAP A30
The Use of Intrathecal Catheter After Accidental Dural Puncture

SOAP A31
Women with Induced Labor do not Receive Benefit from Delaying Labor Epidural Analgesia

SOAP A32
The Influence of Severe Preeclampsia on Maternal Cerebral Circulation Haemodynamics

SOAP A33
Epidural Neostigmine-Bupivacaine for The Treatment of Labor Pain

SOAP A34
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