P-1
LOWER LIMB NEUROLOGICAL SEQUELAE AFTER LABOR EPIDURAL ANALGESIA
Kaul, B.; Darwich, A.A. Vallejo, M.C.; Ramanathan, S.; Mandell, G.L. Department of Anesthesiology,Magee Women's Hospital, University of Pittsburgh, Pittsburgh, PA

The aim of this study is to study the incidence and nature of lower limb neurological symptoms in patients receiving labor epidural analgesia (LEA). At our institution LEA blocks are usually performed in the sitting position at L3-L4/L2-L3. Bupivacaine 0.25% is administered in 5ml increments to a total of 10ml to initiate the block and then a continuous epidural infusion of bupivacaine 0.125% with fentanyl 2 μg/ml started at 10-12ml/hour. Patients who had lower limb neurological symptoms (motor or sensory) after LEA were identified through the departmental CQI reporting process. After obtaining institutional IRB approval, their records were checked. 52 patients out of 20,500 patients who had LEA, had post-delivery numbness in the lower limbs. Data from these 52 patients is presented(Table). Results: Lumbar dermatomes (single or multiple) were more frequently involved (Table). The L3 dermatome was the single most affected dermatome. Of the 50 patients for whom complete information was available, 24 patients had complete resolution of symptoms within 24 hours, 16 in 2–7 days and in the rest, resolution took longer than 7 days. One patient had foot drop. Prolonged numbness could be due to residual local anesthetic action or obstetric nerve injury. Obstetric nerve injuries last longer than 24 hours. Thus it seems that in 50% patients the etiology appears to be prolonged anesthetic action. Conclusion: Based on this study it appears reasonable to keep the patient in the hospital for 24 hours following delivery with some patients needing continued observation for up to a week or longer following delivery. Severe cases may require evaluation by a neurologist. 1. JFOA,9(2)2000,99–124

| Bupivacaine Dose (mg, mean±SD) | 89.10±57.54 |
| Baby weight (gm, mean±SD) | 3403±460.77 |
| Duration of second stage (minutes, mean±SD) | 85±38.56 |
| Instrumental deliveries (n, %) | 12 (23) |
| Patient weight (kg, mean±SD) | 82±55±16.12 |
| Dermatomes Involved | Single Lumbar | Multiple Lumbar | Thoacic | Lumbar | Sacral | No Information |
| 1 | 2 | 9 | 2 |
RESEARCH: AN INNOVATIVE TOOL FOR INITIATING AN OBSTETRIC ANESTHESIA SERVICE

Owen, M.D.1 Sahin, S.2 Uckunkaya, N.2
1. Anesthesiology, Wake Forest University School of Medicine, Winston-Salem, NC; 2. Anesthesiology, Uludag University Medical Faculty, Bursa, Turkey

Introduction: Prior to 1998, regional anesthesia (RA) was uncommon for vaginal and operative delivery at Uludag University, Bursa, Turkey. Fear of RA by obstetricians and patients and lack of experience by anesthesia providers accounted for the infrequent utilization. Consequently, pregnant Turkish patients experienced severe labor pain or cesarean section with general anesthesia. Multiple attempts to initiate an epidural labor analgesia service had failed.

Methods: At Uludag University, research is required for resident graduation and faculty promotion, therefore, to facilitate acceptance of RA for obstetric patient care, two strategically designed studies were organized in 1998(1,2). The studies utilized the combined spinal-epidural technique for labor analgesia(1) and spinal anesthesia for cesarean section(2).

Results: Through motivation to perform the required research, RA techniques became accepted contrary to earlier attempts. Data presented in the table represent change in obstetric anesthesia practice patterns at Uludag University over several years.

Conclusion: At Uludag University, research was used as a teaching tool to introduce RA techniques for labor and delivery. The obstetric staff observed patient satisfaction with minimal side effects and the anesthesiologists gained expertise in placing neuraxial blocks. This resulted in changes in physician practice patterns that have been self-sustained.

Support: Dr. Owen was supported by a Fulbright Scholarship 1. Anesth 2000; 92:361–6. 2. IMRAPT 2001;13(3): ESRA abstract No. 62.

<table>
<thead>
<tr>
<th></th>
<th>1997*</th>
<th>1998*</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA for C/S (%)</td>
<td>21</td>
<td>53</td>
<td>62</td>
</tr>
<tr>
<td>RA for L&amp;D (%)</td>
<td>&lt;1</td>
<td>15</td>
<td>56</td>
</tr>
</tbody>
</table>

* Time period Dr. Owen was present as a mentor at Uludag University.
P-5
NATIONAL IN-TRAINING EXAM TRENDS: BACK TO THE FUTURE OR FORWARD TO THE PAST Glassenberg, R. Anesthesia, Northwestern, Chicago, IL Introduction: In acquiring basic knowledge: (1) How does OB anesthesia compare to other anesthesia subspecialties (2) Are the specific deficits in pathology, pharmacology, or physiology? Methods: The test scores of CA-3 residents taking the ABA/ASA In-Training exam were reviewed for the years 1996–2001. Key word phrases were divided into sections for OB, neuro, pediatric, and cardiac subspecialties. The percent of each item answered correctly was averaged for each of the four subdivisions. The questions that pertained to OB anesthesia were then regrouped into 12 categories ranked from lowest to the highest median score. Conclusion: Test results ranged from 60% to 90% correct for each subspecialty. In OB anesthesia, the lowest score was found in comprehension of factors affecting placental blood flow and oxygen transport, areas which may best be suited for teaching by computer simulation. These results were confirmed by a recent British survey of OB anesthetists. References: Kinsella, Int J Obstet Anaes 2000; 9; 15–19

P-6
COMBINED SPINAL-EPIDURAL WITH PATIENT-CONTROL EPIDURAL ANALGESIA FOR LABOR: QUALITY ASSURANCE SURVEY FROM A UNIVERSITY HOSPITAL IN SWITZERLAND Landau, .; Giraud, .; Kern, . Anesthesiology, Hopitaux Universitaires de Geneve (HUG), Geneva, Switzerland

Combined spinal-epidural (CSE) for labor analgesia is extremely popular, despite ongoing concern resulting from the relative paucity of randomized prospective studies regarding maternal and fetal safety with this technique (1). As part of a quality assurance (QA) program, we standardized our labor analgesic practice and initiated our team to CSE with patient-control epidural analgesia (PCEA). With Institutional approval, data was gathered from all parturients delivering with neuraxial analgesia in the Geneva University Hospital Maternity from 7.20.01 to 1.20.02. Choice of epidural or CSE was made by anesthesiologist. CSE (Tuohy 18G and Whitacre 27G) consisted of spinal 2.5mg bupivacaine + 25mcg fentanyl, followed immediately by PCEA bupivacaine 0.0625% + fentanyl 2mcg/cc (10cc continuous infusion, 5cc bolus, 15 min. lock-out). For epidurals, bupivacaine 0.125% 10cc + 50mcg fentanyl was given, followed by same PCEA settings. Demographics, anesthetic technique, obstetrical and neonatal outcomes were gathered on a QA sheet in the Labor Room, with a 24–48h post-partum follow-up. Complications and maternal satisfaction were recorded. Data were analyzed using chi squared and t-tests as appropriate (p<0.05 significant). This prospective observational study recorded 958 cases over 6 months. Results are presented in Table 1. We conclude that CSE with PCEA, introduced with standardized guidelines in a teaching hospital, can be safely performed with few maternal complications and good neonatal outcome, while providing excellent maternal satisfaction. 1. Norris M. Anesthesiology 2001;95:913–20.

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**SOAP ABSTRACTS**

Anesthesiology

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**P-5**

NATIONAL IN-TRAINING EXAM TRENDS: BACK TO THE FUTURE OR FORWARD TO THE PAST

**Glassenberg, R.**

Anesthesia, Northwestern, Chicago, IL

**Introduction:** In acquiring basic knowledge:
(1) How does OB anesthesia compare to other anesthesia subspecialties
(2) Are the specific deficits in pathology, pharmacology, or physiology?

**Methods:** The test scores of CA-3 residents taking the ABA/ASA In-Training exam were reviewed for the years 1996–2001. Key word phrases were divided into sections for OB, neuro, pediatric, and cardiac subspecialties. The percent of each item answered correctly was averaged for each of the four subdivisions. The questions that pertained to OB anesthesia were then regrouped into 12 categories ranked from lowest to the highest median score.

**Conclusion:** Test results ranged from 60% to 90% correct for each subspecialty. In OB anesthesia, the lowest score was found in comprehension of factors affecting placental blood flow and oxygen transport, areas which may best be suited for teaching by computer simulation. These results were confirmed by a recent British survey of OB anesthetists. References: Kinsella, Int J Obstet Anaes 2000; 9; 15–19

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**P-6**

COMBINED SPINAL-EPIDURAL WITH PATIENT-CONTROL EPIDURAL ANALGESIA FOR LABOR: QUALITY ASSURANCE SURVEY FROM A UNIVERSITY HOSPITAL IN SWITZERLAND

**Landau, .; Giraud, .; Kern, .**

Anesthesiology, Hopitaux Universitaires de Geneve (HUG), Geneva, Switzerland

**Combined spinal-epidural (CSE) for labor analgesia is extremely popular, despite ongoing concern resulting from the relative paucity of randomized prospective studies regarding maternal and fetal safety with this technique (1).**

As part of a quality assurance (QA) program, we standardized our labor analgesic practice and initiated our team to CSE with patient-control epidural analgesia (PCEA). With Institutional approval, data was gathered from all parturients delivering with neuraxial analgesia in the Geneva University Hospital Maternity from 7.20.01 to 1.20.02. Choice of epidural or CSE was made by anesthesiologist. CSE (Tuohy 18G and Whitacre 27G) consisted of spinal 2.5mg bupivacaine + 25mcg fentanyl, followed immediately by PCEA bupivacaine 0.0625% + fentanyl 2mcg/cc (10cc continuous infusion, 5cc bolus, 15 min. lock-out). For epidurals, bupivacaine 0.125% 10cc + 50mcg fentanyl was given, followed by same PCEA settings. Demographics, anesthetic technique, obstetrical and neonatal outcomes were gathered on a QA sheet in the Labor Room, with a 24–48h post-partum follow-up. Complications and maternal satisfaction were recorded. Data were analyzed using chi squared and t-tests as appropriate (p<0.05 significant). This prospective observational study recorded 958 cases over 6 months. Results are presented in Table 1. We conclude that CSE with PCEA, introduced with standardized guidelines in a teaching hospital, can be safely performed with few maternal complications and good neonatal outcome, while providing excellent maternal satisfaction. 1. Norris M. Anesthesiology 2001;95:913–20.

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**Table 1:**

<table>
<thead>
<tr>
<th>Event</th>
<th>Epidural (n=194)</th>
<th>CSE (n=764)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous vaginal delivery</td>
<td>57%</td>
<td>63%</td>
<td>NS</td>
</tr>
<tr>
<td>Instrumental delivery</td>
<td>16%</td>
<td>23%</td>
<td>NS</td>
</tr>
<tr>
<td>Urgent CS</td>
<td>26%</td>
<td>14%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Nulliparity</td>
<td>59%</td>
<td>63%</td>
<td>NS</td>
</tr>
<tr>
<td>Cervical dilation (cm ± SD)</td>
<td>1.7±2.4</td>
<td>2.7±2.7</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Time to delivery (min ± SD)</td>
<td>410±333</td>
<td>365±224</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Paraesthesia</td>
<td>16%</td>
<td>12%</td>
<td>NS</td>
</tr>
<tr>
<td>IV catheter, immediately replaced</td>
<td>2.5%</td>
<td>2.7%</td>
<td>NS</td>
</tr>
<tr>
<td>No CSF during CSE</td>
<td>-</td>
<td>4.7%</td>
<td>-</td>
</tr>
<tr>
<td>Wet tap (cath. replaced)</td>
<td>n=1</td>
<td>n=0</td>
<td>NS</td>
</tr>
<tr>
<td>Spinal catheter</td>
<td>0.05%</td>
<td>0.07%</td>
<td>NS</td>
</tr>
<tr>
<td>Failed analgesia → cath. replaced</td>
<td>3.6%</td>
<td>3%</td>
<td>NS</td>
</tr>
<tr>
<td>Failed analgesia → GA for CS</td>
<td>2.0%</td>
<td>0.1%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Uterine hypertonus → fetal bradycardia</td>
<td>1.0%</td>
<td>3.1%</td>
<td>NS</td>
</tr>
<tr>
<td>Post-dural puncture headache</td>
<td>1.0%</td>
<td>0.9%</td>
<td>NS</td>
</tr>
<tr>
<td>Blood patch</td>
<td>n=2</td>
<td>n=3</td>
<td>NS</td>
</tr>
<tr>
<td>Neurological deficit</td>
<td>1.0%</td>
<td>0.6%</td>
<td>NS</td>
</tr>
<tr>
<td>Pruritus</td>
<td>10.3%</td>
<td>10.9%</td>
<td>NS</td>
</tr>
<tr>
<td>Insufficient 1st stage analgesia</td>
<td>8.2%</td>
<td>4.3%</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Insufficient 2nd stage analgesia</td>
<td>8.7%</td>
<td>10.6%</td>
<td>NS</td>
</tr>
<tr>
<td>Motor block</td>
<td>1.5%</td>
<td>2.2%</td>
<td>NS</td>
</tr>
<tr>
<td>Satisfaction score (VAS 0-10 cm,± SD)</td>
<td>9.0±1.8</td>
<td>9.2±1.6</td>
<td>NS</td>
</tr>
</tbody>
</table>

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**Graphs:**

- Percentage of correct answers for uterine tone, aneuresm embolus, magnesium, maternal phys, placenta infection, hemorrhage, neonatal necrotic, fetal tachycardia, pre eclampsia, toxemia, and placental trauma.
- Percentage of correct answers for cervical dilation, time to delivery, maternal paraesthesia, IV catheter, no CSF during CSE, wet tap (catheter replaced), spinal catheter, failed analgesia, post-dural puncture headache, blood patch, neurological deficit, pruritus, insufficient analgesia, and motor block.
- Satisfaction score graph showing VAS 0-10 cm, ± SD.
ESTABLISHING A HIGH RISK REGISTRY TO IMPROVE PATIENT CARE AND RESIDENT EDUCATION

**Finegold, H. Ramanathan, S.**
Anesthesiology, Magee Womens Hospital, Pittsburgh, PA

**Background:**
Many pregnancies are classified as high-risk by their obstetricians and are referred to the Maternal-Fetal Medicine (MFM) department for further management. Because patients can present to the labor suite at any time, we collect data on the high-risk parturients so that we may be better prepared with preoperative evaluations and interventions.

**Methods:** We identified patients from the weekly conference listing of the MFM department. During these meetings, patient’s clinical problem and their obstetrical management were discussed. Data including demographics, gestational age, referring diagnosis, co-existing medical problems, medications and the relevant ICD-9 disease code were entered into a computerized high risk registry (HRR). Results: To date we have collected data for a three-year period and the results include 513 patients from November 1999-December 2000. There were 100 different codes listed as the primary diagnosis. The 5 most frequent diagnosis were tabulated followed by the most common secondary diagnosis within each primary group (Table). Discussion: The most prevalent diagnosis in our HRR is advanced maternal age (AMA) and this condition is associated with an increased incidence of preclampsia, diabetes, hypertension, cesarean section, placenta previa and even maternal mortality (1). As a part of the obstetric anesthesia rotation, each resident chooses a patient from the HRR to present as a problem based learning discussion (PBLD). Patients from the HRR are asked to come for an evaluation at the Anesthesia Preoperative Clinic. The resident and/or the fellow interviews the patient and plans the anesthetic in consultation with the attending anesthesiologist. The anesthetic plan is then discussed at the departmental conference and is made available to the rest of the staff. Establishing the HRR has been an effective method to identify the needs of our patients, to improve our preparedness and patient management, and to develop PBLD topics for a bimonthly conference which helps our residents to develop the skills necessary to become effective consultants in obstetric anesthesia.


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**HOW DO WE EDUCATE OUR PATIENTS ABOUT OBSTETRIC ANESTHESIA? (ANIMATED WEBSITE: WWW.PAINFREEBIRTHING.COM)**

**Kodali, B.**
Anesthesiology, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA

Patient education is an important component of obstetric anesthesia practice. Childbirth education sessions, information brochures, and prenatal interviews are some of the methods through which women obtain information. World Wide Web is another option that is being used by patients in this millennium to acquire childbirth information; however, there is no comprehensive website which conveys the information in an easily understandable fashion. The purpose of this project is to design a comprehensive, animated website to explain the concepts of obstetric anesthesia to women. Programming: The evolution of information technology has created an avenue for the development of educational tools that are dynamic, animated, interactive, up-to-date, and readily accessible. The power of this new educational paradigm is illustrated at www.painfreebirthing.com (accessible online). This site has been designed with multimedia programs, digital images and clip arts, and employs real-time animations that convey the complex obstetrical anesthesia principles and procedures to lay, pregnant women. Web design layout: The content of the website has been divided into several easily accessible sections that include understanding of childbirth pain, intensity of childbirth pain, methods of childbirth pain relief, procedures of epidural and spinal anesthesia, monitoring, walking epidurals, oral intake policies, effects on the babies, timing of epidural analgesia, and frequently asked questions. A section on cesarean delivery is also included. The majority of these concepts have been explained using animation graphics in an easily understandable fashion. The web site is also useful for new obstetric anesthesia residents to prepare them for questions that they may face in prenatal interview.
THE USE OF VIDEO TAPES OF SPECIFIC ERRORS AS AN ADJUNCT TO TEACH EPIDURAL TECHNIQUE
Birnbach, D.J.; Marenco, J.E.; Kerimoglu, B.; Stein, D.J.; Santos, A.C. Anesthesiology, St. Luke’s-Roosevelt Hospital Center, Columbia University, New York, NY

Introduction: Videotaping of residents performing epidural analgesia on laboring women and subsequent review of the videotapes has been shown to enhance performance (1). The aim of this preliminary study was to determine whether reviewing a videotape collection of commonly occurring errors performed by others would also enhance teaching. Methods: An exam was prepared and was administered to ten residents who were taught via conventional practices (no video) and to 4 residents who viewed videotapes of epidural errors as part of their instruction. The residents were asked a total of ten questions, such as: How does povidone iodine work and how should it be applied? What is the optimal management of a catheter that becomes intravascular during placement? How do you manage a catheter that can only be threaded two cm into the epidural space? How far should the catheter be threaded into the epidural space? What intravenous fluid should be administered prior to an epidural for labor and how much fluid is optimal in a healthy parturient? Results: Prior to use of the videotape, our educational objectives were not being met. Of the ten residents who were taught by conventional methods, 70% answered 4 or more questions wrong. The 4 residents who have been taught using the video tape collection of errors, however, have answered all questions correctly. The video will be shown and the questions outlined at the SOAP meeting. Discussion: It has been previously reported that self-assessment by residents of videotapes obtained while they were initiating epidural analgesia enhances performance (1). That study, however, did not differentiate between the benefit of viewing of one’s own errors versus simply viewing a videotape. These preliminary data suggest that self-assessment may not be necessary, but that resident education may improve by observing the videotaped missteps of others. If further study confirms this finding, a video library of errors considered important for residents to learn can be easily prepared, individualized, and used in different institutions. A randomized study comparing knowledge and skills following either self-assessment or video review of the performance of others will be undertaken and should help determine if self assessment is necessary. I. Anesthesiology 2002;96: 5–9

MEDICAL STUDENT EDUCATION IN OB ANESTHESIOLOGY: CONNECTING BASIC AND CLINICAL SCIENCES IN A NEW MEDICAL SCHOOL CURRICULUM
Wissler, R. Anesthesiology and Obstetrics & Gynecology, University of Rochester School of Medicine and Dentistry, Rochester, NY

The new “double-helix” medical student curriculum at our institution includes a two week block of advanced basic science after each ten week inpatient core clinical rotation during the third year of medical school. OB anesthesiology is an ideal topic for a one-day module in the advanced basic science block that follows the pediatric and OB/Gyn core clerkship. The “double-helix” medical student curriculum was developed at our institution, and began in 1999 with the class of 2003. Therefore, the 2001–2002 academic year is the first time that the new curriculum has been applied to the third year of medical school. The “double-helix” restructures the traditional medical student curriculum into two integrated four-year strands of basic science and clinical medicine. It is designed in part to respond to the experience of upper level medical students who report that “now that I know a little clinical medicine, I wish I could go back and really learn the basic sciences”(1). Several themes are woven throughout the curriculum including: aging, diversity, ethics, and health economics. The learning objectives for the OB anesthesiology module are listed in the Table. The one-day module consists of one OB anesthesiology faculty and 28 third year medical students. The day begins with a one-hour session of four rotating poster board stations that review anatomy and physiology of acute labor pain, applied anatomy of neuraxial analgesia, and pharmacology of local anesthetic agents and opioids. Next the students are divided into two sequential groups for a 90 minute case discussion conference. In addition to the stated learning objectives, these cases are chosen to illustrate two concepts: basic science knowledge used in clinical problem solving, and problems in labor analgesia that have motivated improvements through clinical research. Following lunch, the day continues with two student presentations of 30 minutes each on a special topic in OB anesthesiology. So far, the students have chosen “neuraxial labor analgesia and labor outcomes” and “fetal pulse oximetry” as presentation topics. The day concludes with a question and answer period. Feedback evaluations from the students have been very enthusiastic. In conclusion, a new medical student curriculum at our institution has provided an opportunity to develop an OB anesthesiology module within the advanced basic science program for third year medical students. It is an efficient model of faculty utilization (four days/year), that provides all third year medical students with one day of small group interaction with an OB anesthesiology faculty member.

Table: Learning Objectives for the OB Anesthesiology Module
1. List the range of labor analgesic options available to patients
2. Explain the anatomy and physiology of labor pain
3. Understand the pharmacology of local anesthetics and opioids used to treat labor pain
4. Describe the pathophysiology, evaluation and treatment of post-dural puncture headache
5. Recognize the potential impact of economic diversity on access to labor analgesia
INITIAL FEEDBACK ON MOSES (MULTIDISCIPLINARY OBSTETRIC SIMULATED EMERGENCY SCENARIOS): A COURSE ON TEAM TRAINING, HUMAN BEHAVIOUR AND ‘FIRE DRILLS’

Davis, C.1,3 Gregg, A.1,2 Thornley, D.1,2 Razzaque, M.1,2 Woods, M.1,2 Ayida, G.1,4 Sadler, C.1,2


Escalating NHS litigation bills and a timetable to reduce by 25% the instances of harm in Obstetrics, make risk reduction strategies imperative. Lack of teamwork was highlighted in the Confidential Enquiries as contributing to substandard care, with a recommendation for units to practice ‘fire drills’. Simulation centres were identified in ‘Building a safer NHS’ as having a role in risk reduction strategies by exposing staff to emergency situations with no actual patients involved. The goals of MOSES are to teach multidisciplinary teamwork skills and the role human behaviour can play in crisis prevention and resolution. Obstetricians, anaesthetists and midwives manage ‘real time’ simulated obstetric emergency scenarios in a high fidelity medical simulation centre. Trained facilitators debrief the scenarios. Clips of video recorded during the scenarios are used to encourage reflective practice and to illustrate the effects of team working and behaviour on outcome.

Participants completed semi-quantitative post course questionnaires using the Likert scale (1 strongly disagree to 5 strongly agree) immediately following the course. The questionnaires were analysed using SPSS to yield mean score (±SEM) for each question. Eleven senior midwives, 7 consultant obstetricians and 7 consultant anaesthetists attended the first three courses. The table shows responses for selected questions. The MOSES course is achieving its goals. Simulators are valuable tools for multidisciplinary team training. Currently, it is too early to evaluate if this form of training will have an influence on clinical practice. 1. Why Mothers Die. Confidential Enquiries into Maternal Deaths 1998. 2. Building a safer NHS for Patients. Department of Health, 2001.

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean response ±SEM 1 strongly disagree 5 strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural issues are important for successful crisis management</td>
<td>4.68 ±0.09</td>
</tr>
<tr>
<td>Simulators are valuable tools for practicing mock drills</td>
<td>4.44 ±0.12</td>
</tr>
<tr>
<td>Simulators are valuable tools for learning about team working</td>
<td>4.24 ±0.18</td>
</tr>
<tr>
<td>The scenarios prompted realistic responses from me</td>
<td>4.0 ±0.12</td>
</tr>
<tr>
<td>I feel better equipped to deal with an obstetric crisis now</td>
<td>4.2 ±0.12</td>
</tr>
</tbody>
</table>

COMBINED OBSTETRIC AND ANESTHESIA JOURNAL CLUB SERIES: A FORUM FOR COLLABORATION

Kodal, B. Camann WR, Department of Anesthesia, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA 02115

Camann, W. Kodali, B. Anesthesia, Brigham and Women’s Hospital, Boston, MA

Purpose: Close collaboration between obstetric anesthesiologists and our obstetric colleagues is important for mutual exchange of professional information and high quality patient care. An understanding of issues relevant to both of our specialties can provide a collegial atmosphere for discussion of topics of mutual interest, as well as areas of controversy. Methods: A monthly series of “Journal Clubs” was instituted by joint agreement of our department of Anesthesiology and Obstetrics. Each evening session is held at the home of a faculty physician, and includes dinner and discussion of relevant articles. We alternate monthly sessions between the home of an obstetrician and an anesthesiologist. Topics included airway evaluation in Obstetrics, Maternal Mortality, VBAC, Maternal Request Cesarean Sections, Regional Anesthesia for External Cephalic Version, Anesthesia for Fetal Surgery, and the Fetal Stress Response, Infectious Morbidity in Obstetrics, and Practice Guidelines for Obstetric Anesthesia. Results: The sessions have met with extraordinary success and are well-attended. An improved interpersonal relationship among obstetricians and anesthesiologists has been observed as a result of this journal club series. Common problems viewed from alternative perspectives foster a learning environment for all. Both anesthesiologists and obstetricians have the opportunity to educate each other about our respective concerns. Conclusion: Numerous publications and guidelines from both ASA and ACOG encourage collaborative efforts. This combined journal club series has been a popular and effective educational tool to achieve this goal. Collaborative research projects can be originated and discussed in such a forum. The obstetric anesthesia and obstetric residents and fellows can use these sessions to develop and mature their understanding of interdepartmental communication. The opportunity to meet in an informal and relaxed environment further enhances the collegiality of the event.
P-13
IS THERE A RELATIONSHIP BETWEEN RESPONSE TIME FOR LABOR EPIDURAL AND PATIENT SATISFACTION? Megally, M. Joseph, N.J.; Salem, M. Department of Anesthesiology, Advocate Illinois Masonic Medical Center, Chicago, IL. I ntroduction: We instituted a patient evaluation survey designed to determine satisfaction with anesthesia services for labor and delivery. Responses from the questionnaire were used to examine the relationship between response time for epidural and patient satisfaction. Methods: 486 patients receiving epidural analgesia for labor at an urban teaching hospital were surveyed during a 3 month period. The epidurals were performed by 2nd and 3rd year residents under supervision. A standard technique was used in all cases. The survey form sought to determine, whether the obstetrician/midwife discussed methods of pain relief, whether other methods of pain relief were tried initially, estimates of pain before and after epidural, response time for epidural, and patient's expectations and overall satisfaction with anesthesia services for labor epidural. Response time was calculated as the difference between times of bolus injection and request for epidural. Estimates of pain were made according to a 10 point (0 = no pain and 10 = most severe pain) visual analog scale (VAS). Results: Data from 330 returned forms were submitted for analysis. The table summarizes the results.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean ± SD (range) or Count (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>26.2 ± 6.2 yrs</td>
</tr>
<tr>
<td>Discussed pain relief?</td>
<td>Yes 284 (89.7%) No 34 (10.3%)</td>
</tr>
<tr>
<td>Received IM or IV pain med?</td>
<td>Yes 151 (51.9%) No 140 (48.1%)</td>
</tr>
<tr>
<td>Pain prior to epidural</td>
<td>7.9 ± 2.3 (0-10)</td>
</tr>
<tr>
<td>Pain after epidural</td>
<td>2.9 ± 3.1 (0-10)</td>
</tr>
<tr>
<td>Response time satisfactory?</td>
<td>Yes 290 (93.2%) No 21 (6.8%)</td>
</tr>
<tr>
<td>Pain moderate or severe after epidural?</td>
<td>Always 14 (4.4%) Almost Always 14 (4.4%) Almost Never 43 (14.4%) Never 67 (27.9%)</td>
</tr>
<tr>
<td>How much pain after epidural?</td>
<td>Much More 34 (10.9%) More 22 (6.8%) A lmost None 14 (44.7%) Never 67 (27.9%)</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>Very Satisfied 203 (62.8%) Satisfied 93 (28.5%) Neither 15 (4.6%) Dissatisfied 7 (2.2%) Very Dissatisfied 5 (1.5%)</td>
</tr>
<tr>
<td>Response time</td>
<td>32.3 ± 22.5 min (15-185)</td>
</tr>
</tbody>
</table>

Discussion: We hypothesized that response time following request for epidural would be a major factor in determining patients’ satisfaction. However, we found no difference when comparing mean response time between patients who found the time frame satisfactory or unsatisfactory; nor was there any correlation between response time and overall satisfaction. A search of the literature failed to adequately define a reasonable response time to requests for labor epidural analgesia. As others have found, patient satisfaction is a multifactorial issue. In conclusion, patient satisfaction surveys yield valuable information and sometimes unexpected results. We submit that other factors (primigravida/multipara, previous anesthetics, etc.) not necessarily elicited from our survey, were involved. Further investigations are required. References: 1. Clin Obstet Gynaecol 1998;12:499; 2. Reg Anesth Pain Med 2001; 26:468; 3. J Perinat Med 1997;25:433.

P-14
NITROGLYCERIN FOR MANUAL REMOVAL OF PLACENTA Sabzposh, S.A.1,2 Sabzposh, N.A.3 Sultana, K.4 1. Anesthesiology, SUNY-Downstate Medical Center, Brooklyn, NY; 2. Anesthesiology, JN Medical College, Aligarh, India; 3. Ob & Gyn, JN Medical College, Aligarh, India Background: Retained placenta occurs in up to 1% of all vaginal deliveries. In the absence of prior regional analgesia, general anesthesia is usually required for manual removal of placenta (MRP). Nitroglycerin (NTG) has been used in a number of obstetric procedures as a uterine relaxant(1). Objective: To evaluate intravenous (IV) NTG for manual removal of placenta and study its side effects. Methods: With IRB approval and informed consent, thirty patients with retained placenta were included in this study. Two large bore IV lines were secured and patients were resuscitated as needed. All patients were preloaded with 500 ml of Ringer’s Lactate. Sedation was given with pentazocine and diazepam. With the patient prepped and draped and Obstetrician ready, NTG 50 μg IV was given and the degree of uterine relaxation and cervical dilatation was assessed. Vitals were assessed q min and repeated boluses of NTG titrated to effect, when MRP was done by the Obstetrician. Results: Mean age of patients was 27.53 yrs ± 5.61 SD, range 20 – 40 yrs. HGB level of patients ranged from 4 –11 gms%, mean 7.24 gms% ± 2.08 SD. Mean change in pulse rate after NTG was 4.95 BPM ± 4.05 SD, statistically significant (P<0.01) but clinically insignificant. Mean fall in pulse rate after NTG was 4.95 BPM ± 4.05 SD, statistically significant (P<0.01) but clinically insignificant. Mean fall in SBP and DBP after NTG was 17.6 mm Hg ± 6.67 SD and 10.86 mm Hg ± 8.89 SD respectively. No patient developed shock. Total dose of NTG required was 50 –250 μg, mean 108.35 μg ± 63.08 SD. Mean cervical dilatation was 2.76 cm ± 0.50 SD before and 9.60 cm ± 0.96 SD after NTG. Correlation between dose of NTG and cervical dilatation was highly significant (P<0.001). Time to onset of cervical dilatation after NTG was 40 –90 sec, mean 68.33 sec ± 14.34 SD. Mean time for recovery of uterine tone was 3.9 min ± 1.21 SD. Peroperative blood loss was 100 – 600 ml, mean 258.35 ml ± 99.20 SD. There was no significant correlation (P>0.05) between blood loss and dose of NTG. No major side effects occured. Two patients complained of palpitations that were attributed to severe anemia and successfully treated accordingly. No mortality was observed. Success rate after NTG for full cervical dilatation was 96.6%. MRP could not be done in 2 patients who had morbid adhesion of placenta and were treated surgically under anesthesia. Conclusion: NTG is effective and safe for MRP. General anesthesia and its inherent risks can be avoided with this technique in a high risk population. 1) Abouleish AE, Corn SB: Intravenous nitroglycerin for Intrapartum External Version of the Second Twin. Anesth Analg 1994; 78: 808-9.
P-16  
LEG TOURNIQUETS TO SEQUESTER BLOOD DURING C/S IN A  
JEHOVAH’S WITNESS WITH TWINS AND PLACENTA PREVIA  
Price DT, Palmer S.K. 1. Department of Anesthesiology, University of  
Colorado Health Sciences Center, Denver, CO; 2. Department of An-  
esthesiology, University of Colorado Health Sciences Center, Denver,  
CO A 22 yo Hispanic Jehovah’s Witness, G3P2002, twin gestation,  
presented with painless vaginal bleeding at 35 2/7 weeks gestation.  
Ultrasound exam of the uterus revealed complete placenta previa.  
After discussion of risks/benefits of C/S, including the high probability  
of severe blood loss, the patient reaffirmed her decision to decline  
blood transfusion or blood products. Precautionary placement of  
uterine artery catheters was refused because of the risk to placental  
perfusion. The patient was taken to the OR, and finger stick hemoglo- 
bin (Hgb) of 12.8gm/Dl was measured. A combined spinal/epidural  
was placed at the L2-3 interspace. The patient was placed supine with  
LUD. Appropriate padding and bilateral tourniquets were placed prox- 
imally on the thighs. Brisk fluid administration was concurrent with  
the onset of her regional analgesia. After 30 minutes, a repeat  
Hgb=9.8gm/Dl indicated successful hemodilution. Analgesia to T3 was  
confirmed, surgery initiated, and the leg tourniquets were inflated to  
250 torr just before the uterus was entered. Two vigorous baby boys  
were delivered within 6 minutes. Blood loss immediately post-partum  
was unstoppable, so supra-cervical hysterectomy was initiated. Hgb  
levels reached a nadir of 8.0 gm/Dl. Twenty minutes later the uterus  
was isolated and hemostasis achieved. The tourniquets were deflated  
and 15 minutes later Hgb=9.3 gm/Dl. The patient was alert,comfort- 
able, and able to briefly cuddle her infants. She was discharged 3 days  
later with hematocrit =28%. Because the rapid blood loss phase was  
limited in time by hysterectomy, we were able to use leg tourniquets  
to isolate and protect some of this patient’s red cell mass. Such a  
strategy has not been previously reported in the obstetric literature.  
Tourniquets have their own risks and benefits, with most risks propor- 
tional to the inflation pressures and length of application time. It is  
difficult to estimate the contribution of the thigh tourniquets to red  
blood cell conservation. Our attempts at pre-operative hemodilution  
were limited by the patient’s unwillingness to have blood removed  
from her body, but aided by the onset of a high epidural block. Because  
we observed an increase in hemoglobin from 8.0 to 9.3 gm/dl after  
release of the thigh tourniquets, it appears that our strategy of acute  
hemodilution and brief sequestration of blood in the legs may have  
conserved blood during this procedure. Obstetric patients who do not  
agree to homologous transfusion, blood scavenging, uterine artery  
balloon catheter placements, or out-of-body blood storage may be  
helped by the brief use of limb tourniquets during the period of rapid  
blood loss.
P-17

ANESTHETIC MANAGEMENT OF TH EXIT (EX UTERO INTRAPAR-TUM TREATMENT) PROCEDURE UTILIZING SEVOFLURANE. Liechty, K., Hoyt, M. University Hospitals of Cleveland, Cleveland, OH. The Ex Utero Intrapartum Treatment (EXIT) procedure was developed to assist in the direct evaluation and management of a potential fetal airway obstruction before placental circulation is terminated. One of the anesthetic goals is to provide for fetal oxygenation and anesthetization allowing for direct visualization, evaluation, and securing of the fetal airway. Case Report: A 22 year old presented at 38 weeks gestation for an EXIT procedure and cesarean delivery. The fetus was diagnosed at 18 weeks with a large left sided neck mass. Because neonatal airway compromise was likely the patient agreed to the unique delivery plan. A rapid sequence induction was performed with pentothal and succinylcholine. Prior to uterine incision, sevoflurane was increased to 3.5% to ensure fetal anesthesia. The fetus was delivered to the level of the torso and a neonatal pulse oximeter was applied. Fetal heart rates were between 140 and 160 with oxygen saturations between 36-48 percent. Under direct laryngoscopy, the pediatric ENT service visualized the airway and noted some tracheal compression, but placed a 3.0 ETT. After securing the airway the fetus was fully delivered, and the neonate was handed over to the pediatric team. The umbilical artery blood gas were a pH of 7.37, PCO2 of 44 mmHg, and a PO2 of 47 mm Hg. After delivery the maternal anesthetic was adjusted by stopping the sevoflurane and administering fentanyl and nitrous oxide. The uterus contracted well following ptoctin. Discussion: The anesthetic goals during the EXIT procedure are to provide maternal anesthesia and uterine relaxation, maintain uteroplacental circulation, provide fetal oxygenation and anesthesia, and to minimize maternal blood loss. Use of a volatile agent is necessary to provide fetal anesthesia and uterine relaxation but can significantly increase blood loss. Once delivery is completed, anesthetic management focuses on minimizing maternal blood loss from a relaxed uterus. All of the reported EXIT cases except one, used isoflurane to achieve the anesthetic goals. We chose to use sevoflurane because its blood solubility is lower than isoflurane allowing for faster titration and limiting blood loss secondary to uterine relaxation. We did not use nitrous oxide until after delivery because fetal oxygenation is a priority. Liechty KW, et al: Intrapartum airway management for giant fetal neck masses: The EXIT (ex utero intrapartum treatment) Procedure. The American Journal of Obstetrics and Gynecology 1997;177 Gaiser RR, et al: Anesthetic management of Cesarean delivery Complicated by Ex Utero Intrapartum Treatment of the Fetus. Anesthesiology 1997;84 Shib GH, et al: The EXIT Procedure Facilitates delivery of an infant with a Pretracheal Teratoma. Anesthesiology 1998; 89

P-18

PREGNANCY COMPLICATED BY HEPATOCELLULAR CARCINOMA Shib, G. Forster, J.; Myers, S. Kansas University Medical Center, Kansas City, KS. Pregnancy complicated by hepatocellular carcinoma is rare but has a high fetal and maternal mortality rate. Historically, termination of pregnancy was recommended. Successful resection has been described. We present the anesthetic management of a successful left hepatectomy during pregnancy. The patient was a 27-year-old white primigravida at 28 weeks gestation with right upper quadrant pain. An ultrasound of the upper abdomen demonstrated a 20-cm left lobe liver mass. MRI of the lesion demonstrated a 16 x 9-cm vascular left liver lobe mass. Liver enzymes were elevated (SGOT of 102 U/L and SGPT of 182 U/L). Hemoglobin was 9.9 g/dl. The patient had stable vital signs with an unremarkable physical exam. RUQ pain was not elicited upon examination. Preoperatively, aspiration prophylaxis was given. Rapid sequence induction with cricoid pressure was performed, with the patient in the left uterine displacement position. After confirmation of ETT placement, a right radial arterial line and right internal jugular vein introducer were placed. A triple lumen catheter was threaded through the introducer. The patient was maintained on oxygen and isoflurane during surgery. A perinatologist performed continuous fetal heart rate monitoring during surgery. Approximately one hour into the case, uterine activity was noted, and a magnesium sulfate drip was initiated. 15 minutes later 3 doses of terbutaline were given subcutaneously due to persistent uterine activity. One contraction was noted over the next hour. Two more doses were given prior to the end of surgery. Fetal heart rate in the preoperative period was 120–125 bpm. Intraoperatively, the rate was 140–145 bpm with no decelerations. The patient remained hemodynamically stable throughout and did not require vasopressor support. Estimated blood loss was 2600 ml. The patient received 7700 ml of crystalloid, 500 ml of hetastarch, 3 units of packed red blood cells and 500 ml of cell saver. Her hemoglobin was 11.4 g/dl after surgery. Pain was controlled with IV PCA during the postoperative period. The patient did well and was discharged on postop day 8. The size of the mass, vascularity, risk of rupture and possible relationship to hormonal stimulation may necessitate surgery. Successful resection of hepatocellular carcinoma in pregnancy can be done to allow the mother and fetus to reach term. The patient returned in labor at 37 5/7 weeks and delivered a healthy 3056 gm female infant by midforceps delivery. Anesthesiology SOAP ABSTRACTS V96, Suppl 1, Apr 2002
P-19
ORAL JEWELRY IN THE PARTURIENT: A NEW CONCERN FOR THE ANESTHESIOLOGIST
Kuczkowski, K.M. Benumof, J.L. Anesthesiology and Reproductive Medicine, University of California, San Diego, CA
Introduction: We present a case of an obstetric patient who presented for an emergency postpartum surgery with fixated tongue jewelry in-situ, which resulted in trauma to the tongue and difficult airway management. Since the popularity of body piercing is increasing in our society (1), it is reasonable to expect that the incidence of oral jewelry interference with airway management will increase. Report of case: A 27 y/o G3 P3 hypotensive female with severe postpartum hemorrhage required emergent evacuation of retained fragments of placenta under general anesthesia. Spontaneous vaginal delivery had been accomplished without anesthesia. Pre-anesthetic evaluation revealed barbell type oral jewelry piercing through the middle segment of her tongue. Otherwise her airway was normal. Time constraints to stop the uterine hemorrhage did not allow for removal of the oral jewelry. Rapid sequence induction of anesthesia was performed in a standard manner. Direct laryngoscopy with a Macintosh #3 blade caused significant bleeding from the pierced surface of the tongue; fortunately tracheal intubation was successfully accomplished. The tongue bleeding was controlled with a pressure gauze pack. During the case the tongue was noted to swell; fortunately the degree of swelling was not considered significant enough to prevent tracheal extubation at the end of case. Discussion: We consider the tongue bleeding at the time of laryngoscopy and the tongue edema at the time of extubation to be near misses of “cannot intubate” and “cannot ventilate” situations respectively. This case clearly demonstrates that piercing of the body in “unconventional” sites such as tongue may impact anesthetic management, especially in an emergency when prompt removal of oral hardware is not feasible. Airway engorgement in pregnancy may further increase the incidence if complications in presence of oral jewelry. Conclusion: When airway management in the presence of oral jewelry is indicated, trauma to highly vascular oral tissue, bleeding, difficult intubation, aspiration and airway obstruction by loose hardware should be anticipated. Anesthesiology, 1998; 88: 279–280.

P-20
ONCE A POST-DURAL PUNCTURE HEADACHE PATIENT, ALWAYS POST-DURAL PUNCTURE HEADACHE PATIENT
Kuczkowski, K.M. Benumof, J.L. Anesthesiology and Reproductive Medicine, University of California, San Diego, CA
Introduction: It is known that symptoms of post-dural puncture headache (PDPH) are more likely if there has been a preceding PDPH. We report a case to show that this general rule applies even after the passage of 50 years. Report of case: A 72 y/o 160cm, 59kg otherwise healthy female underwent a diagnostic cystoscopy for persistent hematuria under uneventful single dose spinal anesthesia with bupivacaine performed with 25 GA Pencan needle. Eighteen hours after the procedure she developed severe positional headache and other symptoms consistent with the diagnosis of PDPH. The positional nature of the headache and patient’s admission of similar symptoms following spinal anesthesia she had received for Cesarean section 50 years ago led to a prompt diagnosis. The neurological examination revealed no deficits. Epidural blood patch (EBP) with 14 ml of autologous blood successfully treated the symptoms. Discussion: PDPH is a well-known complication of procedures in which the dura mater of the spinal cord is punctured. The incidence of this complication is affected by many factors and varies from 0.2–24%. In general PDPH is more common in young women particularly in pregnancy. History of a previous PDPH is a strong risk factor for another PDPH if spinal anesthesia is administered in these patients. Elderly patients are considered at low risk for CSF leak and development of PDPH, particularly when small gauge non-cutting edge, pencil-point needles are used. In the elderly, the dura may be less elastic and more likely to retract to a closed position. In addition, CSF leakage may be impeded by adhesions and calcifications. Finally, the elderly are less active physically and less likely to complain. Gentili has suggested that PDPH in the elderly may be less pronounced and have different temporal symptomatology, further decreasing the likelihood of prompt diagnosis (1). Conclusion: In summary this case should serve as a reminder that patients with a history of previous PDPH may be at higher risk for subsequent PDPH, even after the passage of as many as 50 years. Anesth Analg 2000; 91: 1311.
P-21
ANOTHER REBOUND PHENOMENON: HYPERKALEMIA AFTER CESSATION OF TOCOLYTIC THERAPY Kuczkowski, K.M. Benumof, J.L. Anesthesiology and Reproductive Medicine, University of California, San Diego, CA
Introduction: The occurrence of hypokalemia during the use of beta-adrenergic tocolytic agents for the treatment of preterm labor (PTL) is a common side effect of the therapy (1). However, there have been no reports of hyperkalemia occurring after the cessation of beta-adrenergic tocolytic therapy for PTL. We herein present such a case. Report of case: 21 y/o G2P1 female with the diagnosis of PTL at 32 wks received beta-adrenergic tocolytic therapy with iv terbutaline. The tocolytic therapy proved unsuccessful despite maximal dosage and C-section was indicated for progression of the PTL and breech presentation. Tocolytic therapy was discontinued and approximately 30 minutes later the ECG showed tachycardia of 120 beats/min., premature ventricular contractions (PVCs) and peaked T waves. Serum electrolytes were obtained and potassium level was 6.8 mmol/L. No treatment was initiated. Uneventful abdominal delivery was performed under spinal block with 12 mg of 0.75% bupivacaine and 10 mcg of fentanyl. Five lead ECG monitoring did not record any new changes intraoperatively. Serum potassium, the T wave and the heart rate returned to normal 3 hours after iv terbutaline had been terminated. Discussion: Ritodrine and terbutaline are the most commonly used beta-adrenergic tocolytic agents. The maternal side effects of tocolytic therapy include hypotension, cardiac arrhythmias, myocardial ischemia, pulmonary edema and hypokalemia. The cardiovascular effects of beta-adrenergic agents persist for 60–90 min. after therapy is discontinued. The occurrence of hypokalemia during tocolytic therapy with beta-adrenergic agents is well established. No adverse side effects associated with hypokalemia have been reported. Our report appears to be the first to link cessation of terbutaline therapy of PTL to rebound hyperkalemia. The mechanism of the hyperkalemia remains unclear. We speculate that the increase in serum potassium might have resulted from release of intracellular potassium back to the extracellular compartment following cessation of terbutaline therapy. Hyperkalemia may cause significant cardiovascular complications including sudden asystole. This report emphasizes the need to monitor potassium levels before, during and after beta-adrenergic therapy for PTL. Conclusion: In summary, this case should serve as warning that unusual side effects such as rebound hyperkalemia might occur after beta-adrenergic tocolytic therapy and require increased vigilance. Am J Obstet Gynecol 1983; 145: 1–6.

P-22
COMBINED SPINAL EPIDURAL ANESTHESIA: A NEW ANESTHETIC OPTION FOR REPEAT CESAREAN SECTION IN A MORBIDLY OBSESE PARTURIENT Kuczkowski, K.M. Benumof, J.L. Anesthesiology and Reproductive Medicine, University of California, San Diego, CA
Introduction: Combined spinal epidural anesthesia (CSEA) has become an attractive alternative to continuous epidural technique for repeat C-section of "uncertain" duration. However, due to increased skin-epidural space distance and lack of appropriate needle design, the advantages of this technique have not been routinely available to morbidly obese patients. We present a case of a morbidly obese parturient who underwent an elective repeat C-section under CSEA with a newly introduced needle set, specifically designed for morbidly obese patients. Report of case: A 32 y/o 172 cm, 209 kg G4P3 female required an elective repeat x 4 C-section. Her previous 3 C-sections were performed sequentially under single dose spinal, continuous epidural and continuous spinal anesthesia. Unfortunately, proper placement of the epidural catheter required multiple attempts and the epidural anesthetic eventually proved inadequate and needed iv ketamine supplementation. The continuous spinal resulted in postdural puncture headache. We opted to proceed with a single interspace needle-through-needle CSEA, which was performed in a standard manner with the newly introduced 17G x 125 mm epidural needle (Arrow, model # NPx7806) and the 26G x 160 mm spinal needle (Arrow, model # GM25160). A subarachnoid injection of 12 mg of 0.75% bupivacaine with 10 mcg of fentanyl and 200 mcg of epi- nephrine provided excellent operating conditions for 142 minutes. As anticipated subsequent extension of anesthesia with 3 ml epidural incremental injections of 2% lidocaine (9ml total) was required to complete the surgery. Discussion: The CSEA technique provides a rapid onset of dense spinal block combined with the temporal flexibility of epidural anesthesia via catheter (1). The ability to extend the block in time should the duration of surgery outlast the duration of spinal block maximizes the benefits of regional anesthesia and eliminates the risks of general anesthesia to both the mother and fetus. Since most C-sections in morbidly obese patients require longer operative time, the CSEA technique may be uniquely advantageous for these patients. Conclusion: With the introduction of new (longer) needle design, the CSEA technique should become an attractive anesthetic option for the morbidly obese patients. 1. Reg Anesth 1997; 22:406–423.
AMPHETAMINE ABUSE IN PREGNANCY: ANESTHETIC IMPLICATIONS

Kuczkowski, K.M.; Benumof, J.L. Anesthesiology and Reproductive Medicine, University of California, San Diego, CA

Introduction: We present a case of an amphetamine abusing parturient who developed acute hemodynamic instability and convulsions in the immediate postpartum period and required endotracheal intubation. Report of case: A 21 y/o G2P2 amphetamine abusing female developed chest pain, hypertension, ventricular arrhythmias and convulsions with progressive desaturation in the immediate postpartum period following an uneventful term delivery. The cessation of seizures was accomplished with iv diazepam while rapid sequence induction of general anesthesia with endotracheal intubation established the airway control. The arrhythmias were successfully treated with iv lidocaine while iv labetalol restored BP to normal. No subsequent adverse events were reported and the patient was extubated after a short period of assisted ventilation. The diagnosis of eclampsia was ruled out by routine laboratory studies (liver and kidney function tests). However, toxicology screening was positive for amphetamines and patient admitted to recent drug intake. Discussion: Illicit substance abuse has crossed geographic, economic and social borders. Consequently it is not surprising to find women who abuse drugs in pregnancy. The most commonly abused substances in pregnancy include ethanol, tobacco, cocaine, amphetamines and opioids. Poly-substance abuse is common. The literature concerning management of patients with amphetamine intake is limited (1). Hypertension, tachycardia and myocardial ischemia, which can occur before, during or after delivery, are amongst the cardiovascular complications of acute amphetamine intake. Intense amphetamine induced CNS stimulation can cause confusion, hyperreflexia, and seizures. The combination of hypertension, proteinuria and convulsions resulting from acute amphetamine intake may be mistaken for eclampsia at presentation; consequently routine laboratory studies may be the key differential between the two disorders. Conclusion: This report emphasizes the need for a high index of suspicion for drug abuse in pregnancy. The diverse clinical manifestations of amphetamine abuse may be easily mistaken for other pregnancy specific disorders such as pregnancy-induced hypertension.

References

CONTINUOUS SPINAL ANESTHESIA FOR CESAREAN SECTION IN A MORBIDLY OBESE PATIENT WITH MULTIPLE SCLEROSIS

P-25

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Introduction: Morbid obesity is defined as a body mass index (BMI) of greater than 40. Multiple sclerosis (MS) is an acquired, demyelinating disease of the CNS, which is marked by periods of relapses and remissions. **Report of case:** A 34 yo G3P1 African-American woman presented at 37 weeks gestation for elective 2° cesarean section and bilateral tubal ligation. She had a fetus in breech position and oligohydramnios. The patient weighed over 500 pounds (BMI 90) and had MS diagnosed 16 months prior to presentation. She initially had blurry vision and loss of balance, a confirmatory MRI, and was treated with corticosteroids and interferon beta-1a with resolution of symptoms. Her first cesarean section was performed under general anesthesia after awake fiberoptic intubation. On examination, she had a Mallampati class II airway with several missing teeth, full range of neck motion, and normal thyromental distance. She had a normal CBC, EKG, echocardiogram, CXR, and PFTs. The risks and benefits of general and regional anesthesia were thoroughly discussed and continuous spinal anesthesia was planned. Intravenous and arterial access was obtained. In the sitting position, a 13cm 17g Tuohy needle was passed until CSF was obtained at a depth of 10cm. A flexible, single-orifice catheter was inserted and sutured at a depth of 16cm. The patient was placed supine with left uterine displacement. The catheter was dosed with 7.5mg of 0.5% bupivacaine, 25mcg of fentanyl, and 250mcg of preservative-free morphine, which provided a T4 level. Surgery proceeded uneventfully and a female weighing 3090gm was born 18 minutes after skin incision with Apgars of 8,9,9. Bupivacaine 2.5mg was administered 45 minutes after the initial dose, and surgery lasted for 2 hours. One week postoperatively, the patient experienced numbness and sharp, shooting pains in her legs. She was started on gabapentin and interferon with moderate improvement. Her neurologist attributed her symptoms to MS relapse. **Discussion:** It has been shown that morbidly obese parturients have a higher incidence of failed epidurals, difficult intubation, and prolonged cesarean section operation times.1 While there is no absolute contraindication to the use of spinal anesthesia in MS, many feel that spinal anesthesia may contribute to MS relapse. However, one third of all women with MS have postpartum relapses.2 We believe that continuous spinal anesthesia provided our morbidly obese patient with MS a safe alternative for cesarean section, but we cannot rule out a role for spinal anesthesia in her relapse. 1. Anesthesiology 1993; 79: 1210–8. 2. JAMA 1988; 259: 3441-3.

INTRA-OPERATIVE MYOCARDIAL INFARCTION IN A PARTURIENT: ANESTHETIC IMPLICATIONS

P-26

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Introduction: We present a case of a parturient with unrecognized severe 3-vessel coronary artery disease who developed acute myocardial infarction (MI) during an emergent C-section under regional anesthesia. **Report of case:** A 42 y/o G3P2 previously “healthy” female admitted with non-specific chest and abdominal pain in active labor at 36 weeks gestation required emergent C-section secondary to previous classical uterine incision. Preoperative ECG evaluation revealed non-specific (1 mm) ST-segment depression. Invasive intraarterial blood pressure monitoring was initiated and a T4 sensory level of spinal anesthesia was established with 12 mg of 0.75% bupivacaine and 0.25 mg of morphine. Immediately after the delivery of the fetus the patient developed intense chest pain, hypotension and ST-segment depression (5 mm). A Swan Ganz catheter was deemed necessary to facilitate intra-operative monitoring. Chest pain was successfully treated with sublingual nitroglycerin while iv phenylephrine and ephedrine restored BP to normal. Surgery was promptly completed. Thirty hours postoperatively, continuous ECG monitoring and cardiac enzymes were indicative of a non-Q wave MI. A trans-thoracic echocardiogram showed significantly reduced (25%) left ventricular ejection fraction. Coronary angiogram demonstrated severe coronary artery disease. Coronary artery bypass graft x 5 was successfully conducted in the immediate postpartum period. Discussion: The literature concerning intra-operative MI in pregnancy is very limited (1). The most common mechanisms include coronary artery vasospasm, dissection, and hypercoagulability or plaque rupture (2). We are not aware of any reports documenting emergent, intra-operative anesthetic management of a parturient presenting with unrecognized severe coronary artery disease and an acutely evolving MI. Conclusion: In summary, this case should serve as warning that although extremely rare, evolving MI may be occasionally encountered intra-partum, particularly in an “advanced maternal age” (AMA) parturients. Because of the increasing incidence of pregnancy in AMA group of women, increased vigilance on the part of anesthesiologist is indicated. **References:** 1. Anesthesiaesthetist 2001; 50: 280–284; 2. Angiology 1996; 47:739–756.