Abstracts of Scientific Papers

presented at the
Society for Obstetric Anesthesia and Perinatology
37th Annual Meeting
May 4-7, 2005

JW Marriott Desert Springs Resort & Spa
Palm Desert, California

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology

THE JOURNAL OF THE AMERICAN SOCIETY OF ANESTHESIOLOGISTS, INC.

AMERICAN SOCIETY OF CRITICAL CARE ANESTHESIOLOGISTS

SOCIETY FOR OBSTETRIC ANESTHESIA AND PERINATOLOGY

Michael M. Todd, M.D., Iowa City, Iowa, **EDITOR-IN-CHIEF**

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Society for Obstetric Anesthesia and Perinatology 2004-2005 Board of Directors

M. Joanne Douglas, MD, FRCP
President

William R. Camann, MD
President-Elect

David J. Wlody, MD
First Vice-President, Editor

Gurinder M. S. Vasdev, MD
Second Vice-President

McCallum R. Hoyt, MD, MBA
Treasurer

Lawrence C. Tsen, MD
Secretary

Richard N. Wissler, MD, PhD
Immediate Past President

David J. Birnbach, MD
Chair, ASA Committee on Obstetric Anesthesia

Andrew P. Harris, MD, MHA
ASA House of Delegates

Mark I. Zakowski, MD
Meeting Host 2005

David J. Birnbach, MD and
Jose Carvalho, MD
Meeting Co-Hosts 2006

Divina J. Santos, MD
Director-at-Large

Joy L. Hawkins, MD
ASA Alternate Delegate

2005 Annual Meeting Program Committee

William J. Camann, MD (Chair)
Brigham & Women's Hospital
Boston, MA

Mark I. Zakowski, MD (Vice Chair)
Cedars-Sinai Medical Center
Los Angeles, CA

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

Robert D'Angelo, MD
Wake Forest University
School of Medicine
Winston-Salem, NC

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

Lee S. Perrin, MD
St. Elizabeth's Medical Center
Boston, MA

Linda S. Polley, MD
University of Michigan Medical System
Ann Arbor, MI

David J. Wlody, MD
State University of New York - Downstate Medical Center
Brooklyn, NY

Kathryn J. Zuspan, MD
University of Minnesota
Minneapolis, MN

SOAP 2005 Annual Meeting Faculty

Yasodananda Kumar Areti, MD
Queen Elizabeth Hospital
St. Michale, Barbados

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

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

Brenda A. Bucklin, MD
University of Colorado Health Science Center
Denver, CO

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

David C. Campbell, MD, MSc, FRCPC
Royal University Hospital
Saskatoon, Saskatchewan, Canada

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

Robert D'Angelo, MD
Forsyth Medical Center
Winston-Salem, NC

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

James C. Eisenach, MD
Wake Forest University School of Medicine
Winston-Salem, NC

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

Pamela Flood, MD
Columbia University
New York, NY

Miriam Harnett, MB, FFARCSI
Brigham & Women's Hospital
Boston, MA

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

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

Bhavani S. Kodali, MD
Brigham & Women's Hospital
Boston, MA

Ruth Landau, MD
Hopiteur University de Geneva
Geneva, Switzerland

Alison J. MacArthur, MD, MSc, FRCPC
Mount Sinai Hospital
Toronto, Ontario, Canada

Robert S. McKay, MD
Wesley Medical Center
Wichita, KS

Kenneth E. Nelson, MD
Wake Forest University School of Medicine
Winston-Salem, NC

Errol R. Norwitz, MD, PhD
Yale New Haven Hospital
New Haven, CT

Geraldine O'Sullivan, MD, FRCA
St. Thomas Hospital
London, England, United Kingdom

Medge D. Owen, MD
Wake Forest University School of Medicine
Winston-Salem, NC

Peter H. Pan, MD
Wake Forest University School of Medicine
Winston-Salem, NC

Moeen K. Panni, MD, PhD
Duke University Medical Center
Durham, NC

Donald H. Penning, MD, MSc, FRCPC
Johns Hopkins University
Baltimore, MD

May Pian-Smith, MD, MS
Massachusetts General Hospital
Boston, MA

Felicity Plaat, MD
Hammersmith Hospital
London, England, United Kingdom

Linda S. Polley, MD
University of Michigan Medical System
Ann Arbor, MI

Raymond Powrie, MD, FRCP(C), FACP
Women and Infant Hospital of Rhode Island
Providence, RI

Giridhara Rao, MD
Kuwait Oil Company Hospital
Kuwait

Alan C. Santos, MD, MPH
Ochsner Clinic Foundation
New Orleans, LA

Paula J. Santrach, MD
Mayo Clinic
Rochester, MN

Scott Segal, MD
Brigham & Women's Hospital
Boston, MA

Steven Shafer, MD
Stanford University
Palo Alto, CA

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

John Sullivan, MD
Northwestern University
Chicago, IL

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

SOAP 2005 Annual Meeting Faculty (continued)

John Thomas, MD
Wake Forest University School of Medicine
Winston-Salem, NC

Lawrence C. Tsen, MD
Brigham & Women's Hospital
Boston, MA

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

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

Richard N. Wissler, MD, PhD
University of Rochester Medical Center
Rochester, NY

Bernard Wittels, MD
University of Chicago
Chicago, IL

David J. Wlody, MD
State University of New York - Downstate Medical Center
Brooklyn, NY

Cynthia A. Wong, MD
Northwestern University
Chicago, IL

Mark I. Zakowski, MD
Cedars-Sinai Medical Center
Los Angeles, CA

Wednesday Workshop Faculty

Jill K. Boyle, MD
Vanderbilt University Medical Center
Nashville, TN

Deanna Dorantes, MD
Wayne State University
Detroit, MI

Ku-mie Kim, MD, PhD
Loyola University Chicago
Chicago, IL

Edward T. McGonigal, MD
Creigton University
Omaha, NE

Deborah Qualey, MD, MEd
Cooper Hospital/Univ. Medical Center
Camden, NJ

Maya S. Suresh, MD
Baylor College of Medicine
Houston, TX

From the Mayo Clinic Rochester, MN:

Edwin H. Rho, MD

Kristi Boldt, MD

Brian Brost, MD

Robert V. Johnson, MD

Gerard S. Kamath, MD

Kenneth P. Scott, MD

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

SOAP 37th Annual Meeting Exhibitor Listing:

Arrow International
B. Braun Medical
BD Consumer Healthcare
Curlin Medical
Endo Pharmaceuticals
International Medical Development
Lippincott, Williams & Wilkins
LMA North America, Inc.
Ministry Healthcare
Smiths Medical MD, Inc.

The exhibit hours are:

Thursday, May 5 • 7:00 a.m. – 4:00 p.m.
Friday, May 6 • 7:00 a.m. – 10:30 a.m.

Social Activities: A listing of social activities is available on the website. These activities include jeep tours, tram rides, a theater show, and shopping excursions.

Scientific Program

WEDNESDAY, MAY 4, 2005

12:00 n - 6:00 pm	Registration
12:00 n - 5:00 pm	Poster Mounting
1:00 - 5:00 pm	**Workshop on Neonatal Resuscitation Program** (By Ticket Only - Limited Registration) *Gurinder M.S. Vasdev, MD; Edwin H. Rho, MD; et al.*
6:00 - 8:00 pm	SOAP Opening Reception

THURSDAY, MAY 5, 2005

6:30 am	Registration
7:00 - 7:45 am	**Breakfast with Exhibitors; Posters**
7:45 - 8:00 am	**Opening Remarks and Welcome** M. Joanne Douglas, MD, FRCP; William R. Camann, MD; Mark I. Zakowski, MD
8:00 - 9:30 am	**Gertie Marx Symposium** (6) – Moderator: G. M. Bassell, MD Judges: Yaakov Beilin, MD; M. Joanne Douglas, MD, FRCP; Alan C. Santos, MD, MPH; Richard N. Wissler, MD, PhD
9:30 - 9:45 am	**Distinguished Service Award** Awarded to Frederick P. Zuspan, MD Presenter: M. Joanne Douglas, MD, FRCP
9:45 - 10:15 am	**Coffee with Exhibitors; Posters**
10:15 - 11:30 am	**Oral Presentations** (4) – Moderator: Pamela Flood, MD
11:30 - 12:30 pm	**Fred Hehre Lecture: Pain and Delivery – Why, What, and When** Introduction: M. Joanne Douglas, MD, FRCP James C. Eisenach, MD
12:30 - 1:30 pm	**Lunch with Exhibitors; Posters**
1:30 - 2:30 pm	**What's New in Obstetrics?** Introduction: William R. Camann, MD Errol R. Norwitz, MD, PhD
2:30 - 3:30 pm	**Zuspan Award Symposium** (4) – Moderator: John Thomas, MD Judges: Joy L. Hawkins, MD; Ruth Landau, MD; Raymond Powrie, MD, FRCP(C), FACP; Gurinder M. S. Vasdev, MD
3:30 - 4:00 pm	**Coffee Break with Exhibitors; Posters**
4:00 - 6:00 pm	**SOAP Business Meeting – Awards Presentations** Moderator: M. Joanne Douglas, MD, FRCP

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Visit www.soap.org to view the new SOAP website design.

Society for Obstetric Anesthesia and Perinatology
2 Summit Park Drive, Suite 140, Cleveland, Ohio 44131-2571
Phone: 216-447-7863 • Fax: 216-642-1127 • Email: soaphq@soap.org • Web: www.soap.org

Scientific Program

FRIDAY, MAY 6, 2005

6:00 - 7:00 am	Fun Run/Walk
6:30 am	Registration
7:00 - 8:00 am	**Breakfast with Exhibitors; Posters**
8:00 - 9:00 am	**Oral Presentations** (4) – Moderator: Felicity Plaat, MD
9:00 - 10:00 am	**What's New in Obstetric Medicine?** Introduction: William R. Camann, MD Raymond Powrie, MD, FRCP(C), FACP
10:00 - 10:30 am	**Coffee with Exhibitors; Posters**
10:30 - 11:30 am	**Poster Review #1 –** Moderator: Alison J. MacArthur, MD, MSc, FRCPC
11:30 - 1:00 pm	**Panel Discussion: International Aspects of Obstetric Anesthesia** Moderator: William R. Camann, MD Panelists: Yasodananda Kumar Areti, MD; Jose Carvalho, MD, PhD, FRCPC; Medge D. Owen, MD; Giridhara Rao, MD
1:00 pm	**SOAP Golf and Tennis Activities**
Afternoon	SOAP Golf and Tennis; Water Sports, etc. (Golf Tournament begins at 1:30 pm)

SATURDAY, MAY 7, 2005

6:30 am	Registration
7:00 - 8:00 am	**Breakfast with the Experts –** Moderator: Donald H. Penning, MD, MSc, FRCPC Experts: Jose Carvalho, MD, PhD, FRCPC; Roshan Fernando, FRCA; Miriam Harnett, MB, FFARCSI; David L. Hepner, MD; Ruth Landau, MD; Kenneth E. Nelson, MD; Moeen K. Panni, MD, PhD; May Pian-Smith, MD, MS; John Sullivan, MD; Lawrence C. Tsen, MD; Bernard Wittels, MD; David J. Wlody, MD
8:15 - 9:15 am	**Gerard W. Ostheimer Lecture: What's New in OB Anesthesia?** Introduction: Lawrence C. Tsen, MD Brenda A. Bucklin, MD
9:15 - 9:45 am	**Coffee Break; Posters**
9:45 - 10:45 am	**Poster Review #2** – Moderator: Linda S. Polley, MD
10:45 - 11:45 am	**PRO/CON Debate: Is Cell Salvage a Safe Technique for the Obstetric Patient?** Moderator: Bhavani S. Kodali, MD **Pro**: Jonathan H. Waters, MD **Con**: Paula J. Santrach, MD
11:45 - 1:00 pm	**Lunch** (On Your Own)
1:00 - 2:00 pm	**Poster Case Reports: You did what? The Best Case Reports of the Year! –** Moderator: Scott Segal, MD
2:00 - 3:30 pm	**Best Paper Presentations** (6) – Moderator: Geraldine O'Sullivan, MD, FRCA Judges: David C. Campbell, MD, MSc, FRCPC; Robert S. McKay, MD; Peter H. Pan, MD; Cynthia A. Wong, MD; Mark I. Zakowski, MD
3:30 - 3:45 pm	**Break**
3:45 - 5:00 pm	**Research Hour –** Robert D'Angelo, MD; Steven Shafer, MD; Richard M. Smiley, MD, PhD
5:00 pm	**Meeting Adjourned**
6:00 -11:00 pm	**SOAP Banquet**

Downloaded from http://asa2.silverchair.com/anesthesi/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

GERTIE MARX SYMPOSIUM

SOAP A-1
THE EFFECT OF SERIAL IN-VITRO HEMODILUTION WITH MATERNAL CSF ON TEG BLOOD COAGULATION PARAMETERS - IMPLICATIONS FOR EPIDURAL BLOOD PATCH

P. Tamilselvan[1], R. Fernando[1], J. Dick[1], M. Columb[2];
[1]Royal Free Hospital, London, United Kingdom, [2]South Manchester University Hospital NHS Trust, Manchester, United Kingdom.

Introduction: Post dural puncture headache [PDPH] is not uncommon after spinal anesthesia with epidural blood patch [EBP] being the most effective treatment. Controversy exists regarding EBP including uncertainty about the volume of blood needed for effective treatment, with considerable variation in the amounts of blood (10-20 mL) used. An in vitro study with thromboelastography [TEG] has shown the procoagulant action of CSF on blood 20% hemodiluted with CSF (1). The aim was to quantify the effect of a range of CSF dilutions on TEG values.
Method: After ethical approval and informed written patient consent, 1 mL of CSF was obtained from 34 pregnant patients undergoing spinal anesthesia for elective cesarean section. After intravenous cannulation, 10 mL of blood was collected and anticoagulated with buffered citrate. CSF samples then underwent serial hemodilution with whole blood calculated to produce final CSF concentrations of 10%, 20% and 30%. Similar dilutions with Ringer's lactate (RL) acted as controls. Blood samples were recalcified by mixing 0.33 mL blood with 0.03 mL 0.2M $CaCl_2$ within a TEG cup warmed to 37°C. Using the TEG 5000, *r* and *k* times, alpha angle (α) and maximum amplitude (MA) were measured. Analysis of data included Friedman and RMANOVA ($P<0.05$).

	r time (min)	*K* time (min)	α angle (°)	MA (mm)
CSF10	7.6 (1.8) •	1.5 (0.4) •	67.3 (5.8) •	67.4 (5.8) •
RL10	9.3 (2.6)	2.0 (0.7)	61.7 (8.7)	68.6 (4.7)
CSF20	6.4 (1.7) •	1.4 (0.4) •	68.7 (6.4) •	63.8 (6.6)
RL20	8.5 (2.5)	2.1 (1.0)	61.0 (8.4)	64.6 (5.0)
CSF30	5.7 (1.5) •	1.3 (0.3) •	69.5 (6.2) •	60.2 (6.9) •
RL30	8.9(4.3)	2.0(0.8)	61.2(7.9)	64.0(5.3)

Results: Progressive hemodilution with CSF significantly reduced r and k time and increased α angle compared with RL (Table). MA was significantly
Data are mean (SD); • $P < 0.05$ compared to RL.
reduced by both diluents.
Conclusion: Addition of increasing amounts of CSF speeds up both clotting activation and clot formation (r, K & α angle), but decreases clot strength (MA). This may have implications for EBP, in terms of a reduced success rate, if attempted when CSF leak following dural puncture is thought to be maximal.
Reference: Ruttmann TG, James MFM and Wells KF. Effect of 20% in vitro haemodilution with warmed buffered salt solution and cerebrospinal fluid on coagulation. Br J Anaesth 1999; 82: 110-11.

SOAP A-2
EXPRESSION OF CALCITONIN GENE-RELATED PEPTIDE (CGRP) AND SOMATOSTATIN (SST) IN NEURONS INNERVATING THE UTERINE CERVIX

B. B. Clyne, D. R. Conklin, J. C. Eisenach, C. Tong;
Wake Forest University School of Medicine, Winston-Salem, NC.

Introduction: Labor pain is effectively treated with neuraxial local anesthetics and/or narcotics. Pain during labor and other acute gynecological conditions originate from the cervix, but little is known regarding innervation of this structure. Calcitonin gene-related peptide (CGRP), present in a subset of C fibers, is an excitatory neurotransmitter in the spinal cord and increases in the dorsal root ganglia (DRG) during pregnancy. In contrast, somatostatin (SST), present in a different subset of C fibers, may inhibit nociceptive neurotransmission. The aim of this study is to determine the expression of these neuropeptides in sensory neurons innervating the uterine cervix (UC).
Methods: The protocol was approved by the ACUC. Four female Sprague-Dawley rats were anesthetized for laparotomy and both ovaries were removed. A fluorescent tracer, 4% fluorogold (FG), was injected into the ventral surface of the UC and lower uterine segment in multiple sites (2 µl each) to label cervical afferents. Twenty-one days later the animals were perfused and tissues fixed. L1 DRGs were harvested and cryostat sectioned (16 µm) to immunostain for CGRP and SST neuropeptides. Sections were visualized with epifluorescence microscopy and sections positive for FG staining were analyzed. Data are expressed as mean ± SEM. Unpaired t-test was used for statistic analysis.
Results: There were 11 DRGs stained for CRGP and 8 DRGs for SST from 4 animals. Only 1-2% of neurons in each series were FG positive (cervical afferents). The average diameter of FG+ cells was 22.1 µm (range 12-30 µm). Sixteen of 24 FG+ cells co-localized with CGRP immunostaining, and this proportion (67%) was greater than FG- cells (29%, $p<0.05$). In contrast, only 1 of 14 FG+ cells co-localized with SST, and this proportion (7.1%) was similar to the population of FG- cells immunostained for SST (4.5%).
Discussion: The small proportion of DRG cells innervating the UC (1-2%) is similar to the proportion of sensory neurons innervating other visceral structures (urinary bladder and colon). The greater co-localization of CGRP in UC afferents suggests that CGRP plays an important role in UC pain transmission. In contrast, the lack of SST staining suggests minimal importance to UC nociception.
In conclusion, the majority of sensory nerves that innervate the non-pregnant rat UC synthesize and release the excitatory neurotransmitter CGRP, suggesting a potential role in pain transmission and cervical ripening. The inhibitory peptide, SST, is synthesized by a small minority of UC afferents, and therefore is unlikely to directly modulate pain transmission from cervical stimulation. Further experiments will investigate the effect of estrogen on CGRP and SST expression in to this hormonally responsive structure.
Supported in part by NIH GM48085 and NS48065

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

GERTIE MARX SYMPOSIUM

SOAP A-3
PREVENTION OF HYPOTENSION FOLLOWING SPINAL ANESTHESIA FOR CESAREAN SECTION USING NONINVASIVE TRANSTHORACIC ELECTRICAL IMPEDANCE CARDIOGRAPHY

R. Garrison, J. Wiley, J. Philip, S. Sharma;
University of Texas southwestern medical center, Dallas, TX.

Introduction: The decrease in systemic vascular resistance (SVR) due to sympathetic blockade with spinal anesthesia may result in peripheral pooling of blood, which will lead to a decrease in cardiac output and hypotension. SVR obtained noninvasively by thoracic electrical bioimpedance cardiography (TEBC) is useful in predicting the risk of hypotension with regional anesthesia (1). The purpose of this randomized study was to determine whether early treatment of drop in systemic vascular resistance index (SVRI), as obtained by TEBC following spinal anesthesia prevents development of hypotension in healthy women undergoing cesarean section (CS).

Methods: Following IRB approval, in this ongoing study informed consent was obtained from healthy women at term undergoing planned CS under spinal anesthesia. After preloading with 1L of lactated Ringer's, spinal anesthesia was induced with 1.6 mL of intrathecal 0.75% hyperbaric bupivacaine and 20mcg fentanyl. In all patients, hemodynamic parameters including SVRI were continuously obtained before and after spinal anesthesia using a TEBC (BioZ, Cardiodynamics, San Diego,CA). Patients were randomized into two groups: In the SVRI group, a drop in SVRI $\geq$ 20% following spinal anesthesia was immediately treated with IV ephedrine in 5-mg boluses at 1-2 minute interval. Hypotension was defined as a decrease in systolic blood pressure (SBP) of $\geq$ 20%. In the control group, drop in SBP $\geq$20% following spinal anesthesia was treated with ephedrine 5- mg increments. Intravenous phenylephrine in 25 mcg increments were also used as needed. A p value of $\leq$ 0.05 was considered significant.

Results: Demographic characteristics were similar in two groups. The incidence of hypotension was significantly lower in the SVRI group compared to the control group (38% vs 84%, P 0.003). More patients had nausea/vomiting in the control group. There was no significant difference in the neonatal outcome between the two groups.(Table).

TABLE:

	SVRI n = 21	Control n = 19	P-value
Baseline Systolic BP	121±10	122±11	0.960
Baseline SVRI	1904±450	2002±508	0.523
Hypotension	8 (38)	16(84)	0.003
Nausea/vomiting	0	3(16)	0.058
Ephedrine (mg)	21 ±13	15 ±11	0.114
Phenylephrine (mcg)	31 ±64	19 ±51	0.50
Umbilical artery blood	.	.	.
pH:	7.21 ± 0.10	7.22 ± 0.08	0.497
$pCO_{2\ (mmHg)}$:	62 ±15	60 ± 9	0.617
Base excess mEq/L	-7.9±5	-6.5 ± 4	0.280
Umbilical venous blood	.	.	.
pH	7.29 ± 0.07	7.30 ± 0.06	0.730
$pCO_{2\ (mmHg)}$	48 ± 7	47 ± 5	0.822
Base excess mEq/L	-5.4± 3	- 4.9 ± 3	0.745

Data are mean ± SD, or N (%).

Discussion: The hypotension following spinal anesthesia occurs in up to 80% of women undergoing cesarean section. Crystalloid preloading and prophylactic intravenous boluses of ephedrine provide some success in prevention of spinal hypotension (3). This study indicates that early treatment of drop in SVR immediately following spinal anesthesia is effective in minimizing the risk of hypotension in women undergoing cesarean section.

References: 1. Am J Obstet Gynecol 1996; 174:1019-25.
2. Anesthesiology 1993; 79:262-269.

SOAP A-4
PROSTAGLANDIN E_2 RECEPTORS REGULATE ENDOTHELIAL NITRIC OXIDE SYNTHASE EXPRESSION: CLINICAL IMPLICATION IN MODULATION OF UTERINE TONE FOR HUMAN PREGNANCY

M. Fang, M. K. Slodzinski, K. S. Lindeman, S. Doré;
Johns Hopkins University School of Medicine, Baltimore, MD.

Introduction: Preterm labor and delivery is emotionally and economically very costly to society. The etiology of preterm labor remains largely unknown, since the basic mechanisms underlying the control of myometrial quiescence and contractility during pregnancy and labor are not completely defined. It is postulated that a balance of various factors, such as progesterone, estrogen, prostaglandins (PGs) and nitric oxide (NO), and others, responsible for the modulation of myometrial tone. Prostaglandin E_2 (PGE_2) is a major mediator of myometrial relaxation and contraction during gestation and parturition. PGE_2 exerts its effects through activation of a diverse group of G protein-coupled receptors, designated EP_1, EP_2 , EP_3, and EP_4. NO plays an important role in the maintenance of myometrial quiescence in human pregnancy. It has been known that NO can increase PGE_2 synthesis via activation of cyclooxygenase; however, it is unclear whether PGE_2 can regulate NO production in myometrial cells. This study was designed to evaluate the effect of PGE_2 on endothelial NO Synthase (eNOS) protein expression in human myometrial cells.

Methods: After IRB approval, human myometrial cell culture was obtained from the lower uterine segment of a pregnant woman undergoing elective cesarean delivery at term were established as described previously (1)**.** Cells were grown until almost confluent for each experiment. Before treatment, cells were incubated for 3 hours in DMEM containing 0.1% FBS and antibiotics. Serum-starved cells were either exposed to a vehicle alone or treated with PGE_2 or different EP agonists for 48 hours before harvest. Protein expression was assayed with western blot analysis.

Results: eNOS protein expression was significantly enhanced by 100 nM PGE_2. This effect is eNOS specific, as neuronal NOS (nNOS) expression in treated groups did not differ from that in control cells. To verify which EP receptor mediates the effect of PGE_2 on eNOS expression, cells were treated with selective agonist of EP_2 receptor (butaprost), EP_4 receptor [1(OH)-PGE_1], or EP_1/EP_3 receptors (sulprostone), respectively. Only sulprostone (EP_1/EP_3) caused a significant increase in eNOS expression. EP_2 and EP_4 agonists failed to affect eNOS expression. Upregulation of eNOS expression by the PI-3 kinase/Akt pathway has been recently reported in human endothelial cells (2). We examined phosphorylation of Akt in human myometrial cells after incubation with different PGE_2 receptor agonists. Phosphorylation of Akt at serine 473 was significantly increased after sulprostone treatment.

Discussion: Our results indicate that PGE_2 upregulates eNOS protein expression through activation of EP_1/EP_3 receptors in human myometrial cells. This effect is PI-3 kinase/Akt pathway dependent. This study has described for the first time the functional role of EP_1/EP_3 receptors in the communication between PGE_2 and NO pathways in human myometrial cells.

References: 1. Biol Reprod 65:401-406, 2001. 2. J Biol Chem 276: 1211-1219, 2001.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

GERTIE MARX SYMPOSIUM

SOAP A-5
MATERNAL CARDIAC OUTPUT CHANGES OCCURRING WITH PHENYLEPHRINE AND EPHEDRINE INFUSIONS AFTER SPINAL ANESTHESIA FOR ELECTIVE CESAREAN SECTION

K. J. Ashpole[1], P. Tamilselvan[1], R. Fernando[1], M. Columb[2];
[1]Royal Free Hospital, London, United Kingdom, [2]South Manchester University Hospital NHS Trust, Manchester, United Kingdom.

Introduction: Maintenance of baseline systolic BP (bSBP) with a phenylephrine (P) infusion has recently been shown to improve maternal and fetal outcome during spinal anesthesia (SA) for cesarean section (CS) (1). Our aims were to see if an ephedrine infusion (E) could produce similar results while maintaining bSBP, and to quantify the associated cardiac output (CO) changes using a suprasternal Doppler (SupraQ®).
Method: In this randomized double blind study, 40 patients scheduled for CS were allocated either E (N=20, 5mg/min) or P (N=20, 100mcg/min) infusions, titrated to maintain bSBP. Data collection included HR, SBP, and CO parameters, such as peak velocity (PV) and corrected flow time (FTc), measures of contractility and venous return respectively. These were recorded in the left lateral tilt position, before and after fluid preload, and at 5 min intervals after a standard SA. Information on block height, nausea and vomiting scores (NV), APGARs and umbilical cord gases were also recorded. Statistical analysis included RMANOVA, ANCOVA and Tukey-Kramer tests (*P<0.05*).
Results: Maternal characteristics were similar. SBP equivalence (ratio 1.07, *95%CI* 1.00-1.14) was attained in both groups with no significant periods of NV, hypotension (*P*=0.24) or hypertension (*P*=0.76) (SBP <80% bSBP or >120% bSBP respectively). However, E had a lower umbilical arterial pH compared with P (median (IQR); 7.22 (7.14-7.27) v 7.33 (7.35-7.31) *P*=0.0001).

		Baseline	5 min	10 min	15 min	20 min
CO L/min	P	5.56 (0.67)	5.26 (0.93)	4.55* (0.70)	4.67* (0.72)	4.92 (0.94)
	E	5.11 (0.52)	4.93 (1.33)	5.41♦ (1.04)	5.52♦ (0.87)	5.73♦ (1.18)
HR bpm	P	81.70 (10.41)	71.50 (13.79)	68.11* (15.79)	63.55* (8.87)	64.80* (7.90)
	E	74.10 (11.28)	84.05♦ (15.95)	93.63* (19.54)	85.60* (20.96)	89.20* (22.32)
PV cm/s	P	103.7 (12.98)	102.1 (12.89)	97.63 (12.55)	97.95 (12.96)	97.95 (12.85)
	E	98.95 (12.75)	100.80 (18.17)	101.70 (16.22)	105.50 (15.69)	106.30 (18.3)
FTc ms	P	379.00 (95.27)	361.10 (46.63)	353.50 (38.42)	356.40 (38.74)	366.10 (41.84)
	E	362.20 (36.8)	348.90 (47.64)	346.90 (30.91)	348.50 (37.67)	356.20 (52.65)

Data are mean (SD); $P < 0.05$ compared to baseline* (within group), compared to P♦ (between group).
Conclusion: Despite equivalent SBP control, this was at the expense of greater fetal acidosis with E. CO changes mirrored the HR changes in both groups. The CO fell in the P group so the SBP was presumably maintained by a vasoconstrictor effect.
References: 1. Ngan Kee WD, Shaw KS, Ng FF. Comparison of phenylephrine infusion regimens for maintaining maternal blood pressure during spinal anaesthesia for Caesarean section. Br J Anaesth 2004; 92: 469-74.

SOAP A-6
COMPARISON OF VISUAL ANALOG PAIN SCALE (VAPS) AND VERBAL NUMERIC RATING SCALE (VNRS) FOR PAIN ASSESSMENT DURING LABOR ANALGESIA

V. S. Misa, P. H. Pan, M. D. Owen;
Wake Forest University, Winston Salem, NC.

Introduction: The Visual Analog Pain Scale (VAPS) and the Verbal Numeric Rating Scale (VNRS) are commonly used pain assessment tools. VAPS has been validated in different clinical settings, but requires visual acuity, motor function and the cognitive ability to translate the pain level onto a distance on a line. VNRS is simpler to administer and is often used instead of VAPS. However, there has been no study demonstrating the validity of using VNRS instead of VAPS in assessing labor pain.
Methods: After IRB approval and informed consent, 72 healthy nulliparous term parturients in active labor (cervical dilation 2-5 cm) were prospectively enrolled at request for neuraxial labor analgesia. Combined spinal-epidural analgesia (CSEA) with 20 mcg intrathecal (IT) fentanyl was administered in the usual fashion; the epidural catheter was not dosed until the patient requested further analgesia. VAPS and VNRS were obtained at the following times: the initial request for labor analgesia (preCSE), 15 min after IT fentanyl (IT15min) and when the patient requested additional analgesia via the epidural catheter (preEPID). The VAPS was measured with an unscaled ruler having a 100-mm line that indicated no pain on the left and the worst imaginable pain on the right. The patient used a movable arrow pointer to slide the arrow to the position on the line corresponding with their pain level. NVRS was administered simultaneously by asking the patient to verbally rate their pain on a scale of 0 to 10, with 0 representing no pain and 10 the worst imaginable pain. Demographics and duration of IT fentanyl analgesia were recorded. Sigma Stat 3.01 was used for analysis. Pearson product moment correlation, linear regression analysis, and ANOVA were applied for correlation and prediction among VAPS, VNRS and analgesic duration with P<0.05 being significant.
Results: All 72 patients completed the study. The correlation coefficients (R) between the VAPS and VNRS were 0.84, 0.88 and 0.88 for times preCSE, IT15min and preEPID, respectively (P<0.00001). PreCSE pain measurements did not predict the duration of IT analgesia or the level of preEPID pain using either VAPS or VNRS (R<0.1, P>0.05). However, lower pain at IT15min did correlate with a longer duration of IT analgesia with both tests (R=-0.33, p<0.005).
Discussion: There is a strong correlation between the VAPS and VNRS as pain assessment tools during labor analgesia, validating the substitution of the VNRS for the VAPS in clinical practice. The finding that the initial pain level did not predict the analgesic duration or the degree of pain severity at request for further analgesia might indicate that some patients with higher initial pain may request analgesia via the epidural catheter sooner or at lower pain levels to avoid experiencing the same high initial pain.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

ORAL PRESENTATIONS #1

SOAP A-7
OXYTOCIN REQUIREMENTS AT CESAREAN SECTION FOR FAILURE TO PROGRESS IN LABOR: A DOSE-FINDING STUDY

M. Balki, M. Ronayne, S. Davies, J. Kingdom, R. Windrim, J. Carvalho;
Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

Introduction: Oxytocin is administered at Cesarean section (CS) to promote uterine contraction and reduce blood loss. Serious side effects have been documented with large doses or rapid boluses. The purpose of this study was to estimate the minimum dose of oxytocin required to produce effective uterine contraction (ED_{90}) at CS following failure to progress in labor.

Methods: With REB approval and informed consent, a prospective, randomized, single-blinded study was conducted in 30 healthy parturients undergoing CS for failure to progress in labor, under epidural anesthesia. Oxytocin was administered as a bolus immediately after fetal delivery (initial dose), according to a biased coin up-down sequential allocation scheme with increments/decrements of 0.5 IU (starting dose 0.5 IU). Additional boluses of 0.5 IU were administered if required (total dose). Uterine contraction and intra-operative complications were recorded. Blood loss was estimated based on Hct changes (pre-op and 48h post-partum).

Results: All patients received oxytocin during labor (maximum dose 10.3 ± 8.1 mIU/min and duration of infusion 9.7 ± 6.4 hours). The ED_{90} of oxytocin at CS was 2.99 IU (SE=0.34, 95% CI=2.32-3.67). The estimated blood loss was 1178 ± 716 ml. There was no significant association between the initial dose of oxytocin at CS and estimated blood loss (p=0.11). There were no significant correlations between the time required for effective uterine contraction or the total dose of oxytocin at CS and the duration of oxytocin infusion during labor (p=0.98 and 0.49) or the maximum oxytocin dose used for augmentation of labor (p=0.80 and 0.67). Post-delivery complications included hypotension 30%, tachycardia 30%, nausea 60%, vomiting 40% and flushing 40% (no dose-response was sought). In all cases, the uterus was exteriorized for repair.

Discussion: The effective bolus dose of oxytocin at CS for failure to progress in labor (ED_{90}=2.99 IU) can be lower than those currently recommended. However, this dose is much larger than that required at elective CS (ED_{90}=0.35 IU)[1], likely secondary to oxytocin receptor desensitization due to prolonged oxytocin exposure during labor[2]. Patients not responding to such doses should be considered for other uterotonic agents, not only to avoid oxytocin-induced side effects, but mainly to provide effective control of blood loss and prevent post-partum hemorrhage.

References:
1. Obstet Gynecol 2004;104:1005-1010
2. Am J Obstet Gynecol 2003;188: 497-502

SOAP A-8
IS OBSTETRIC OUTCOME RELATED TO EPIDURAL ANALGESIA LOCAL ANESTHETIC CONCENTRATION?

S. H. Halpern, M. Davallou, J. Yee, P. A. Angle, S. Tang;
Sunnybrook and Women's College Health Sciences Centre, Toronto, ON, Canada.

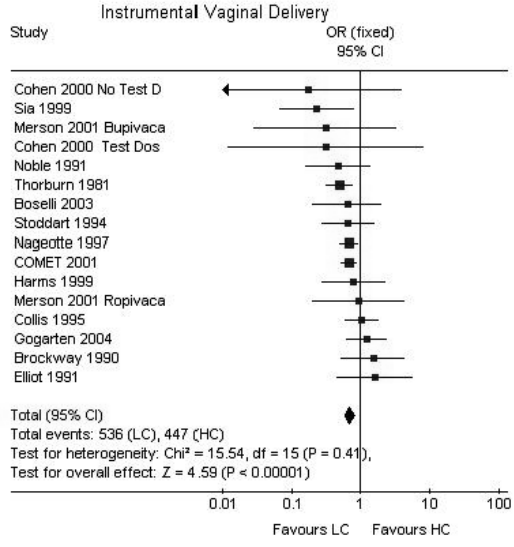
INTRODUCTION: Studies comparing epidural to parenteral opioid analgesia demonstrate an increase in instrumental vaginal delivery (IVD) in the epidural group(1). None of these studies were blinded and so it is possible the increase was due to a change in physician behavior rather than a biologic effect. There are a number of studies that compared high concentration (HC) to low concentration (LC) local anesthetics (ropivacaine or bupivacaine). Therefore it may be possible to establish a concentration dose-response relationship. Earlier work has shown an increase in forceps delivery when HC local anesthetics were compared to very dilute solutions(2). In this meta-analysis we broadened the definition of low and high concentrations to conform to the authors definitions.

METHODS: We searched electronic databases and bibliographies (including manual searches) to September 2004, MESH terms and text words for epidural analgesia, labor analgesia, local anesthetic concentration, forceps delivery, cesarean section. We included RCTs that compared LC to HC local anesthetics for labor analgesia. Only studies that compared the same local anesthetic with (or without) the same additives were included. The studies were rated on a 5 point scale for quality(3). The primary outcome was IVD. The outcomes were combined using meta-analytic techniques. An odds ratio <1 favored LC. A $p<0.05$ was considered statistically significant.

RESULTS: 16 studies in 14 manuscripts met our criteria (studies available from the authors). There were 1914 patients in the LC groups and 1259 patients in the HC group. The median quality score was 4 (range 2 to 5). 12 studies were blinded. The concentration of local anesthetic was between 0.5% and 0.06%. There was a substantially increased risk of IVD in the HC group (OR=0.69, 95% CI=0.59--0.81, $p<0.0001$, Figure). This was reflected by an increased incidence of spontaneous delivery in the LC group (OR=1.38, 95% CI=1.38--1.60, $p<0.0001$). The incidence of C/S was identical in the groups (OR=1.01, 95% CI=0.84--1.22, p=0.93).

CONCLUSION: The data from our meta-analysis show that the use of LC consistently reduces the incidence of IVD over a wide range of concentrations and clinical environments. We therefore recommend the use of LC local anesthetic whenever possible.

REFERENCES:
1. Am J. Obstet Gynecol 2002;185:S69-S78.
2. Can J Anesth 2002;49:A58
3. Controlled Clinical Trials 1996;17:1-12.



Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

ORAL PRESENTATIONS #1

SOAP A-9
EPIDURAL TOP-UP IN THE COMBINED SPINAL EPIDURAL ANALGESIA HAS TIME-LIMITED DIRECT SPINAL EFFECT

M. Islam, E. Lew;
KK Women's and Children's Hospital, Singapore, Singapore.

Introduction: Volume effect of epidural top-up in combined spinal-epidural (CSE) is well known. The aim of this prospective double blind randomised study was to investigate if the epidural component of epidural top-up could pass through the spinal puncture into the CSF to have the spinal effect, injected immediately after the spinal component of CSE in early labour and to find the time duration of the passage of epidural top-up.
Method: After ethics approval and informed consent, 50 healthy women with singleton pregnancy at 3-5cm of cervical dilatation requesting epidural analgesia were recruited to receive CSE analgesia using a needle-through-needle technique with 27G Whitacre needle. They were randomised into two groups: saline group (NS) received 10mls of normal saline and bupivacaine group (B) received 10mls of 0.1% bupivacaine top-up, 5 minutes after the intrathecal injection of 1mg of bupivacaine with 5µg of fentanyl in normal saline to make 2mls. Pain was assessed using verbal analogue scale (VAS=0-100) score and effective pain relief was defined as a VAS <20 after 10min. Pain score, sensory block level to cold, motor block, maternal and foetal vital signs were recorded as baseline and every 5min for first 30min, then every hour until delivery. If any parturient had a VAS score>20 after 10min, she received rescue top-up with 10mls of 0.1%bupivacaine at 15min. If pain was not relieved, another 5ml top-up of the same was given at 20min. To detect a difference of 34% (NS=35%vsB=1%) in the incidence of VAS>20 at 10mins, 25 women were required in each group with a power of 90% and a two-sided test of 5%.
Results: The groups were similar in demographics and obstetric data. B group is 2.08 times more likely to have no pain at 10min, compared to those in saline group. (Relative Risk = 2.08, 95% CI 1.38 to 3,38, $p < 0.001$, Chi square test). At 10min and 20min, the median sensory level of B and NS groups were T7and T11 respectively ($p < 0.001$, Mann Whitney U test), though NS group received similar bupivacaine dose at 15 minutes. The median of differences in block level at 5 and 10mins for bupivacaine and saline group were 5 and 1 respectively ($p < 0.001$).
Conclusion: Immediate epidural top-up of 10mls of anaesthetic in CSE does have direct spinal effect as epidural content may pass into the CSF through the spinal puncture. The movement of the content is time limited, as the effect is less significant after 15 minutes.

SOAP A-10
PREDICTORS OF PAIN AND ANALGESIC USE AFTER CESAREAN SECTION

J. C. Eisenach, R. C. Coghill, P. Pan, L. Harris;
Wake Forest University School of Medicine, Winston-Salem, NC.

Introduction: Patients with severe postoperative pain are at increased risk to develop chronic pain after surgery, and preoperative tests to predict severe postoperative pain would allow testing of interventions to reduce development of chronic pain. Pain rating to a supra-threshold heat stimulus correlates with overall assessment of pain after cesarean section,[1] but in itself has low predictive value. We therefore performed detailed psychophysical and psychological testing before surgery to determine which tests better predict postoperative pain and analgesic drug use.
Methods: Following written informed consent 31 healthy women for elective cesarean section were studied 1-10 days prior to their surgery. Pain and unpleasantness ratings to 5 sec heat stimuli applied to the arm and to the lower back were obtained, state and trait anxiety were measured using a validated questionnaire, and patients rated their expected pain and drug use after surgery. Spinal anesthesia was used in all patients, followed by nurse administered IV opioids in the recovery room and IV PCA opioids thereafter. On the day after surgery, patients rated their overall pain, pain at rest, and pain on standardized movement using a 10 cm mechanical VAS, and opioid use was recorded. Stepwise linear regression was applied to test for associations.
Results: There was large inter-individual variability in all preoperative tests as well as in postoperative overall pain (0.5-9.5), pain at rest (0-7), pain with movement (0.2-9.2), and morphine use for the first 10 hr (0-81 mg). None of the pain scores correlated with morphine use. Regression analysis revealed 3-4 significant factors correlated with pain and analgesic use. For resting pain: trait anxiety, expected postop pain, sensory level at the time of incision (r^2=0.36). For movement pain: supra threshold pain testing in arm, state anxiety, expected pain, and duration of surgery (r^2=0.38). For analgesic drug use: pain threshold in arm, trait anxiety, expected pain, and duration of surgery (r^2=0.28).
Discussion: This ongoing study suggests that severity of post cesarean section pain and opioid use is determined by a combination of innate individual factors and surgical factors. The predictive value of 3 or 4 variables for each pain and drug use outcome is nearly double that of a single factor previously published,[1] and preliminary logistic regression suggests the ability to use a few preoperative tests to obtain a 90% probability of the presence of severe pain after cesarean section. Duration of surgery influences postoperative pain, perhaps from more extensive dissection due to scarring from previous surgery. Interestingly, low dermatomal sensory level of anesthesia at the time of incision is associated with increased postoperative opioid use, perhaps from enhanced central sensitization with less dense sensory blockade.
Supported in part by NIH grant NS41386.
Reference: 1. Anesthesiology 2003;98:1422-6

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

ORAL PRESENTATIONS INCLUDING THE ZUSPAN AWARD

SOAP A-11
THE EFFECT OF MATERNAL POSITION ON UMBILICAL DOPPLER VELOCIMETRY IN NORMAL TERM PREGNANCY

P. Tamilselvan[1], M. Shankar[1], R. Fernando[1], M. Columb[2];
[1]Royal Free Hospital, London, United Kingdom, [2]South Manchester University Hospital NHS Trust, Manchester, United Kingdom.

Introduction: Fetal oxygenation depends on the placental transfer and therefore depends on the maternal hemodynamic state. It is well known that to maximize placental blood flow the mother should be allowed to adopt the full lateral position to avoid the supine hypotension syndrome. Although during cesarean section, left lateral table tilt is commonly practised to avoid maternal hypotension and consequent fetal hypoxemia (1), the effect of lateral tilt on umbilical blood flow is unknown. Therefore, we used umbilical artery Doppler to measure pulsatality index [PI] ((maximum systolic velocity [S] - minimum diastolic velocity [D]) / mean velocity) and resistance index [RI] ((S-D)/S) in different maternal positions to determine the effect of positional change on the umbilical blood flow velocimetry pattern in normal term pregnancy.

Method: After ethical approval and informed written consent, we recruited 16 healthy term singleton pregnant volunteers who were asked to adopt 4 different positions for 5 min in random order; full left lateral (90°LL), full right lateral (90°RL) and supine with either 7.5 (7.5°L) or 15 (15°L) degrees of left table tilt. During this period the following observations were recorded; maternal heart rate (HR), systolic blood pressure (SBP), oxygen saturation (SPO_2) and umbilical Doppler indices PI and RI along with fetal heart rate (FHR). Statistical analyses included repeated measures analysis of variance and Tukey-Kramer post-tests with $P<0.05$ defined as significant.

Results: Although not achieving statistical significance, lower values of RI and PI were recorded in the 15°L position, indicating comparatively higher umbilical blood flows (Table 1). The HR and FHR were similar in all positions, whereas SBP was significantly lower in the 90°RL position.

Resistance Index (RI) & Pulsatility Index (PI) for various table tilt positions

Position	SBP♦	PI	RI	FHR*
90°RL	109.6 (13.9)	0.94 (0.3)	0.56 (0.09)	139.06 (9.3)
7.5°L	117.3$^{\nabla}$ (13.4)$^{\nabla}$	0.88 (0.2)	0.54 (0.09)	138.81 (9.8)
15°L	123.0$^{\nabla}$ (12.4)	0.89 (0.2)	0.51 (0.09)	134.31 (6.9)
90°LL	117.1$^{\nabla}$ (15.8)	0.93 (0.2)	0.51 (0.08)	137.56 (8.3)

Data are mean (SD); $P < 0.05$ compared to 90°RL$^{\nabla}$; ♦mmHg; *bpm

Conclusion: Maternal position does not appear to cause significant changes in fetal umbilical artery Doppler indices in normal pregnancy, but further studies are needed to determine the impact on the fetus at high risk for in-utero hypoxemia.

Reference: Halpern S and Glanc P et al. Uterine and umbilical blood flow velocity during epidural anaesthesia for caesarean section. Can J Anaesth 1994; 41: 1057-62.

SOAP A-12
THE INFLUENCE OF MORBID OBESITY ON THE INCIDENCE OF CESAREAN DELIVERY

J. M. Mhyre[1], M. V. Greenfield[1], L. S. Polley[1], T. R. Johnson[2];
[1]The University of Michigan Health System, Ann Arbor, MI, [2]University of Michigan, Ann Arbor, MI.

Introduction: Obesity has been associated with cesarean section, independent of the effects of parity, diabetes, preeclampsia, and chronic hypertension (1,2). The Institute of Medicine classifies obesity as a body mass index (BMI) 30-39.9, and morbid obesity as a BMI>40. This study evaluated the relevance of this distinction between obesity and morbid obesity for cesarean section (C/S) rates at our institution.

Methods: A total of 272 obese and morbidly obese parturients were identified from a quality assurance (QA) database by selecting all cases between July 1, 1999 and June 30, 2002 in which the anesthesiologist documented maternal morbid obesity. Chart reviews were completed to verify mode of delivery (elective cesarean section, vaginal delivery, cesarean section after a trial of labor), patient BMI at the time of delivery, age, and race. Logistic regression was used to determine the possible association of non-elective C/S with BMI controlling for diabetes, hypertension, parity, race and maternal age. Forty-three women with elective cesarean section (C/S) and one woman whose BMI was <30 were excluded from the analysis.

Results: Two hundred twenty-eight parturients were identified, 62 with BMI 30-39 and 166 with BMI 40-88. Compared with obese women, morbidly obese women were not more likely to deliver by C/S (42% vs. 46%, $P>0.05$). The bivariate relationship between C/S and BMI was not statistically significant unless BMI was categorized as a dichotomous variable with BMI>46 (39% vs. 58%, $P=0.008$). Graphical analysis confirmed an inflection point at a BMI of 46.5 in the relationship between BMI and the log-odds of delivering by cesarean section. In stepwise logistic regression, BMI>46 and parity remained independent predictors for mode of delivery (adjusted OR BMI>46: 2.2, $P=0.008$; adjusted OR parity: 0.55, $P<0.001$) with an AUROC curve of 0.6782. All other predictors were not significant.

Conclusion: In this hypothesis-generating study, ultimate mode of delivery among obese and morbidly obese women who labor does not appear to be associated with BMI unless the BMI is at least 47. We will test this hypothesis in a future sample of parturients. Institutional variation in labor management policy for obese and morbidly obese women may introduce differences in the relationship between cesarean section rate and BMI. The Institute of Medicine categories of obesity and morbid obesity may be less relevant than institution specific cut-points derived from outcomes data.

References: (1) AJOG 2004;190:1091-7. (2) Obst Gynecol 2004;103[2]:219-24.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

ORAL PRESENTATIONS INCLUDING THE ZUSPAN AWARD

SOAP A-13
COMPLICATIONS OF EXTERIORIZED VERSUS *IN SITU* UTERINE REPAIR AT CESAREAN SECTION UNDER SPINAL ANESTHESIA

M. Siddiqui, E. Goldszmidt, U. Tharmaratnam, J. Kingdom, R. Windrim, J. Carvalho;
Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

Introduction: Exteriorization of the uterus for repair during cesarean section (CS) is a common practice in North America.1 It is theoretically easier and faster, resulting in reduced blood loss.2 Complications associated with this technique include nausea and vomiting, pain, hypotension, bradycardia and air embolism.1, 2, 3 The purpose of this prospective, randomized, single blinded study was to compare intra-operative complications of exteriorized versus *in situ* uterine repair during elective CS under spinal anesthesia.

Methods: With REB approval and informed written consent, 80 patients were randomized to exteriorized or *in situ* uterine repair. After acute preload with 10ml/kg of LR, spinal anesthesia was performed using 10-12 mg of 0.75% hyperbaric bupivacaine, 100 μg of morphine and 10 μg of fentanyl. Following delivery, all patients received 0.5 IU of oxytocin iv, followed by infusion of 20 IU/1L LR at a rate of 120 ml/h. Incremental boluses of 0.5 IU were given if requested. Obstetricians were asked to perform assisted delivery of placenta. Phenylephrine was used to maintain systolic blood pressure within 10% of the baseline. The primary outcome was nausea post-delivery. Secondary outcomes included vomiting, pain, hemodynamic changes, surgical time and estimated blood loss (based on preoperative and postoperative Hct).

Results: Demographic data and sensory levels of anesthesia were similar in both groups. Nausea post-delivery was significantly reduced in the *in situ* group as compared to the exteriorized group (17% and 38% respectively, $p<0.05$). There was a trend toward less post-delivery pain/discomfort (12.5% *vs.* 25%), vomiting (5% *vs.* 18%), hypotension (15% *vs.* 28%) and tachycardia (2.5% *vs.* 18%) in the *in situ* group. In the exteriorized group, episodes of hypotension and tachycardia tended to occur shortly after returning the uterus to the abdomen. The duration of uterine repair (11±0.03 *vs.* 12±0.04 min), duration of surgery (36±0.08 *vs.* 40±0.12 min) and estimated blood loss (624±489 ml *vs.* 652±415 ml) were not different between groups exteriorized and *in situ*. There was no correlation between duration of uterine repair and estimated blood loss.

Discussion: Exteriorization of the uterus was associated with increased patient discomfort. This may be of even more significance for cesarean sections under epidural anesthesia, as this block is not as dense. This study did not support the claim that exteriorization of the uterus results in shorter surgical time and decreased blood loss. We hypothesize that, in addition to visceral pain, hemodynamic changes associated with exteriorization and repositioning of the uterus may also add to patient discomfort. We recommend that uterine repair should be done *in situ* where possible.

References:

1. Obstet Gynaecol Surv 1996; 51: 445-451
2. Br J Obstet Gyn 1999; 106:913-916
3. Br J Obstet Gyn 1998; 105:1070-1078

SOAP A-14
IS THE INDIGENT POPULATION MORE AT RISK FOR EPIDURAL FEVER?

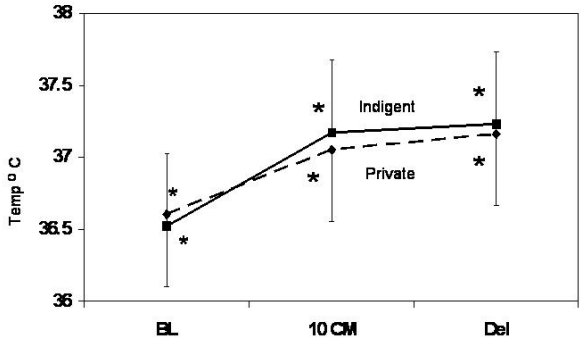
S. Ramanathan, B. Kaul, M. C. Vallejo, D. M. Enegess;
Magee-Womens Hospital, Pittsburgh, PA.

Introduction: This study compares the occurrence of epidural fever in private versus indigent patients. The house staff usually manages our indigent patients and the private patients are managed by experienced private obstetricians. The indigent population is less likely to receive adequate prenatal care and they may also be subjected to more frequent vaginal examination. We wanted to see if the indigent population has a higher risk of epidural fever compared to the private patients.

Methods: Data were collected from a CQI database of 8000 patients. The data base includes data on maternal analgesia, the types of regional block, anesthetic agents, maternal tympanic temperature at baseline (BL), at 10 cm cervical dilatation and at delivery. The time interval between epidural administration and the delivery was noted. The data collection and entry were made by a dedicated database manager using the Medical Record # set as the key field.. We retrieved data from the database on patients who received epidural analgesia with continuous infusion. Criteria for Inclusion: nulliparous patients, vertex presentation, no chorioamnionitis, normal BL temperature, singleton fetus, patients delivering vaginally, oxytocin augmentation, term gestation. All patients received oxytocin for labor augmentation. Results were expressed as mean± 1SD where applicable and analyzed using repeated measures analysis of variance, t-test and nonparametric analysis at p of <0.05. Post-hoc comparisons were done using Fisher's least significant difference method.

Results: A total of 1110 patients were included in the study out of which 244 patients were Indigent patients. The epidural time to delivery time was longer in the Indigent group 7.34 ±4.17 hrs, and 6.7±3.84 hrs in the Private group.(p=0.02). No significant differences existed in the demographic data or gestational age. The temperature increased significantly in both groups over time with respect to the BL temperature with no intergroup differences at any measurement time (Fig 1). The number of patients who had a temp <38 deg C were 8 and 16 at 10 cm cervical dilatation,and 28 and 74 in the Indigent and Private groups respectively.(p=NS)

Conclusion: Our data show that temperature increases following epidural analgesia in private and indigent patients with no significant differences between the groups.



Legend: * -different from both corresponding measurements in the respective group. Data are mean (1SD).

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

ORAL PRESENTATIONS #2

SOAP A-15
A COMPARATIVE STUDY OF LOW DOSES OF ISOBARIC OR HYPERBARIC BUPIVACAINE FOR CSE ANESTHESIA FOR ELECTIVE CESAREAN SECTION

S. E. Cerda, P. Leyton, G. A. Hidalgo, C. Allen, J. A. Escobar, V. M. Parra, F. Cumsille;
Universidad de Chile, Santiago, Chile.

Introduction: There is no consensus about the optimal dose of spinal bupivacaine for C section. Hemodynamic stability and quality of anesthetic blockade are oppossed aspects of the dose selection. Using CSE anesthesia as a flexible technique should be possible to determine the efficacy and safety of different doses in this setting.
Methods: Local Ethics Committee approval, and written informed consent were obtained. After 10 ml/kg Ringer pre-hydration, 120 patients scheduled to undergo elective CS received a CSE , in the left lateral position and were randomly allocated to one of 6 dose - baricity groups.
Coded vials containing 3.75 - 5.0 or 6.25 mg of isobaric or hyperbaric (8% dextrose) bupivacaine were provided (Biosano Lab). Fentanyl 25 mcg and epinephrine 50 mcg, were added up to a 3 ml total volume, as the spinal component of the CSE anesthesia.
Primary endpoints were: upper sensitive level > T4 , incidence of intraoperative pain (visceral) in different epochs and degree of motor blockade (0-1-2 modified scale)
Secondary endpoints were: number of epidural top ups, IV sedation dose and need of conversion to general anesthesia.
Statistics: one way ANOVA, chi square and Fisher's Exact test. P< 0.05 was considered significant.
Results: Groups were comparable respect of age, height, weight and BMI. Maximum cephalad spread was achieved before 8 minutes indepently of dose and baricity. Differences in pain were observed in Group 3.75 ISO, compared to all other Groups (p <0,05). Only patients in the 6.25 HYPER exhibit absence of any kind of pain whitin all intraoperative period. A dose response behaviour was observed for motor blockade, specially in HYPER Groups, however all patients get a satisfactory blockade. Patients in Group 3.75 ISO received more top ups than any other Group (p<0.001). Groups 3.75 and 5.0 ISO received a significant higer dose of IV sedation , compared to 6.25 ISO and all HYPERBARIC doses (p<0.05). Only 1 failure of anesthesia was observed (Group 3.75 ISO) and received GA for unsatisfactory blockade after epidural extension.
Discussion: HYPER bupi should be preferred, 3.75 and 5 mg are adequate, higher doses showed no additional benefit. ISO bupi produces a weak blockade and only at 6.25 mg is comparable to HYPER groups. In summary, HYPER bupi is reccomended when low LA dosage approach for CS is selected.

SOAP A-16
TIMED INTERMITTANT EPIDURAL BOLUS COMPARED TO CONTINUOUS EPIDURAL INFUSION FOR THE MAINTENANCE OF LABOR ANALGESIA

C. A. Wong, J. Ratliff, R. J. McCarthy, R. Patel, C. Robles;
Northwestern University, Chicago, IL.

Introduction: Bolus injection through an epidural catheter may result in better analgesia compared to continuous infusion of the same dose.[1] The purpose of this randomized, double-blinded study was to compared quality of labor analgesia and need for supplemental epidural analgesia in women who received timed intermittent (TI) boluses compared to continuous infusion (CI) for maintenance of labor analgesia.
Methods: 125 multiparas scheduled for induction of labor, who requested analgesia at cervical dilation 2-5cm, gave informed consent to participate in this IRB-approved study. CSE analgesia was initiated with intrathecal bupivacaine 1.25-mg/fentanyl 15µg and a single-orifice Flex-tip™ Arrow epidural catheter. All subjects received the same epidural anesthetic solution (bupivacaine 0.0625%/fentanyl 2-µg·mL^{-1}). Subjects were randomized to TI (6-mL bolus q30 min beginning 45-min after the intrathecal injection) or CI (12-mL·h^{-1} infusion beginning 15-min after intrathecal injection). All patients had patient-controlled epidural analgesia (PCEA: 5-mL bolus, 10-min lockout, maximum 15-mL·h^{-1}). Anesthesiologists administered rescue analgesia using bupivacaine 0.125%. The primary outcome variable was bupivacaine consumption/hour of analgesia. Visual analog scores for pain (VAS) were recorded hourly. Data were normalized per hour of maintenance analgesia. Subjects who delivered within 90-min of analgesia initiation were excluded from analysis. Data were compared using the Mann-Whitney U test. $P < 0.05$ was significant.
Results: Height, weight, parity, cervical dilation at analgesia initiation, baseline VAS and labor duration did not differ between groups (Table). The total bupivacaine dose/hour of analgesia was less in the TI compared to CI group and satisfaction scores were higher. Labor pain, PCEA and manual bolus doses did not differ.
Discussion: The important finding of this study is that timed intermittent epidural bolus combined with PCEA provided similar analgesia, but with a lower bupivacaine dose and better patient satisfaction compared to a continuous infusion with PCEA for maintenance of epidural labor analgesia. These results are similar to those of a smaller study with multi-orifice catheters.[2] Although application of this method is currently limited by epidural pump design, future research to examine optimal drug concentration, dose and dosing interval is warranted.
References: 1. Anesth Analg 1999;89:534. 2. Can J Anesth 2004;51:581.
Table

	TI (n=56)	CI (n=52)	*P*
Cervical dilation (cm)	3 (2, 5)	3 (2, 5)	0.91
Duration of labor (min)	175 (92, 498)	174 (96, 572)	0.87
Labor pain[a]	8.3 (0, 28.2)	10.7 (0, 57.6)	0.12
PCEA requests (n·h^{-1})	0.8 (0, 13,6)	1.0 (0, 4.3)	0.53
PCEA bolus dose (mg·h^{-1})	1.7 (0, 6.9)	2.1 (0, 5.9)	0.54
Manual bolus dose (mg·h^{-1})	0 (0, 8.1)	1.7 (0, 10.8)	0.06
Total bupivacaine use (mg·h^{-1})	9.2 (6.5, 18.9)	10.8 (7.0, 19.8)	0.04
Satisfaction[b] (mm)	92 (20, 100)	85 (1,100)	0.008

Data are median (range). Doses are mg bupivacaine/hour of analgesia. [a](Area under the VAS · time curve)/duration of epidural analgesia. [b]100 mm line where 0=not satisfied at all and 100=very satisfied.

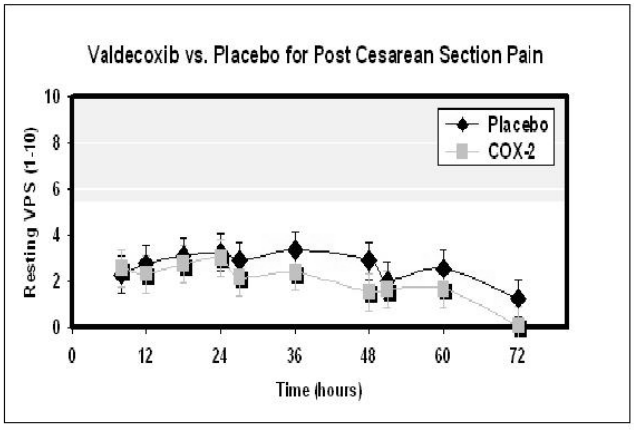
Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

ORAL PRESENTATIONS #2

SOAP A-17
VALDECOXIB FOR POSTOPERATIVE PAIN MANAGEMENT AFTER CESAREAN SECTION: A RANDOMIZED, DOUBLE-BLINDED, PLACEBO-CONTROLLED STUDY

A. J. Fuller[1], C. Brummel[2], A. Saxena[1], L. Chu[1], E. T. Riley[1], S. E. Cohen[1], B. Carvalho[1];
[1]Stanford University, Stanford, CA, [2]Colorado Permanente Medical Group, Lafayette, CO.

Introduction: NSAIDs improve post-operative pain relief following cesarean section (CS).[1] However, traditional NSAIDs have potential side-effects (anti-platelet and gastrointestinal). Peri-operative COX-2 inhibitors show similar analgesic efficacy to NSAIDs in many surgical models. [2] However, no previous study has examined analgesic effects of COX-2 inhibitors following CS. The aim of this randomized double-blinded, placebo-controlled study was to determine the analgesic efficacy and opioid-sparing effects of valdecoxib post-CS.
Methods: After informed consent and IRB approval, 48 healthy patients undergoing elective CS under spinal anesthesia with 12 mg hyperbaric bupivacaine, 10 mcg fentanyl, and 100 mcg morphine were randomized to receive oral valdecoxib 20 mg or placebo (n=24 per group). Valdecoxib or placebo was given 90 minutes after the spinal block and every 12 hours for a total of six doses over the 72 hour study period. Total analgesic consumption (converted to morphine mg-equivalents) and time to first analgesic request, as well as pain intensity, functional activity, patient satisfaction, side-effects (pruritus, nausea, vomiting, bleeding) and breast feeding success were recorded. A priori power analysis was based on previous post-CS studies using NSAIDs. Statistical analyses included appropriate parametric and nonparametric testing with $p<0.05$ considered significant..
Results: We found no differences in total analgesic consumption between the two groups (144±49 versus 127±76 morphine mg-equivalents; p=0.37). There were no differences in IV morphine requirements, time to first analgesic request, breast feeding success, or functional activity. Pain at rest (Fig 1) and during activity were similar between the groups. There were no significant maternal or fetal side effects. Posthoc power analysis indicated that we had 80% and 90% power to detect a clinically significant difference of 30% difference in pain scores and analgesic consumption respectively.
Conclusion: Under the conditions of our study, the COX-2 inhibitor valdecoxib did not significantly reduce pain or opioid consumption in the 72 hours following CS. Pain following CS under spinal anesthesia with 100 mcg intrathecal morphine is generally well controlled and the addition of valdecoxib to this regimen is not supported at this time.
References: IJOA 1996; 5:14-18; Am J Ther 2002; 9:43-51; Anaesthesia 2004; 59:876-80; Anesth Analg 2002; 95:741-5



SOAP A-18
RISK TO DEVELOP CHRONIC PAIN AFTER ELECTIVE CESAREAN DELIVERY IN YOUNG HEALTHY PARTURIENTS

P. M. Lavand'homme, F. Roelants, B. Vanderbeck, L. Alluin;
Universite Catholique de Louvain, Brussels, Belgium.

Introduction: Chronic pain remains one potential adverse outcome of surgery (1). Although cesarean section (CS) represents a common procedure in young healthy women, incidence and risk factors to develop chronic pain are still underevaluated (2).
Methods: After informed consent, 100 healthy parturients undergoing elective CS were studied. Surgery was performed under spinal anesthesia, with Pfannenstiel incision and peritoneal layers closure in all patients. Patient Controlled Analgesia delivering morphine was available with NSAIDs for postoperative analgesia. Residual pain at 6 months was questioned by mail. Medical history and 48h postoperative data (pain scores VAS 0-100, morphine use, area of wound hyperalgesia) were recorded. Statistical analysis used one way ANOVA and X^2.
Results: Six months after CS, 14.8 % patients reported residual pain and discomfort around the scar, associated to a visceral component (2%) and to regular analgesics intake (4%). Respectively in Pain and no Pain (control) Group: age 35±5 vs 32±5 yrs, average pregnancies number 2.4 (1-7) vs 2.6 (1-8), % nulliparas (50% vs 32.8%) were similar. Medical history did not differ respectively in Pain and no Pain Group for previous events like: CS (31% vs 41%), abdominal surgery (25% vs 34%), endometriosis (6.2% vs 2.8%) or obstetric procedures (37.5% vs 21.4%). More women with pain reported previous genitourinary infections (56% vs 17%; p=0.003). For postoperative data, chronic Pain Group displayed higher 24h VAS pain scores at rest (30±21 vs 17±16; p=0.04) and movement (72±18 vs 46±22;p=0.003) but no greater morphine use (25±12 vs 24±18 mg). Area of wound hyperalgesia was similar while at 24h and 48h, 69% and 56% chronic pain patients presented hyperalgesia for only 24% (p=0.002) and 14% (p=0.001) in no Pain Group.
Discussion: Chronic pain after elective CS should not be ignored. Our results match those already published (12.3% at 10 months (2)). Previous infectious conditions of genitourinary tract and higher postoperative pain represent risk factors, probably in relation with a central sensitization (assessed by the presence of postoperative wound hyperalgesia).
References: (1)Perkins, Anesthesiology, 2000; (2)Nikolajsen, Acta Anaesthesiol Scand, 2004.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

BEST PAPER PRESENTATIONS

SOAP A-19
BETA-2 ADRENOCEPTOR GENOTYPE AFFECTS TREATMENT RESPONSE TO HYPOTENSION AFTER SPINAL ANESTHESIA FOR CESAREAN SECTION

R. M. Smiley[1], R. Landau[2], P. V. Freedman[1], M. Negron[1], J. A. Scott[1], J. Blouin[3];
[1]Columbia University, New York, NY, [2]University of Geneva and Columbia University, New York, NY and Geneva, Switzerland, [3]University of Geneva, Geneva, Switzerland.

Introduction: Variability exists in the incidence and treatment response of hypotension during spinal anesthesia for cesarean section (CS). Functionally important polymorphisms occur in the beta-2 adrenergic receptor ($ß_2AR$).[1] At position 16, arginine or glycine is found (Arg16Gly); at position 27, glutamine and glutamate are the variants (Gln27Glu). We investigated if genotype of the β_2AR alters the occurrence or treatment response of hypotension during spinal anesthesia for CS.
Methods: With IRB approval and consent, 200 healthy women undergoing elective CS were studied. Spinal anesthesia was performed with bupivacaine 12 mg/fentanyl 25 mcg/morphine 200 mcg. Hypotension was treated with ephedrine (EPH) 5-15 mg or PE 40-80 mcg IV. EPH was used if maternal HR was < 90, PE if HR > 120; clinician choice determined drug if HR was 90-120. $ß_2AR$ genotype was determined.[2] Quantitative data are expressed as mean (SD). ANOVA was used to compare variables between genotypes.
Results: 200 patients were studied. Genotype and clinical data is available for 153, technical problems interfered with genotyping of 22 samples, and genotyping is pending for the rest. Variables are defined as **PE15**, dose of phenylephrine given in 15 minutes post spinal; **EPH 15**, dose of ephedrine given in 15 minutes post spinal; **ml vasopressor 15**, total ml ephedrine and phenylephrine given during 15 minutes after spinal (1 ml = 5 mg ephedrine or 40 mcg phenylephrine). There was a significant effect of β_2AR genotype, with Gly16 homozygotes and Glu27 homozygotes requiring significantly less vasopressor than Arg 16 or Gln 27 homozygotes respectively. (Table)

	Arg16Arg	Arg16Gly	Gly16Gly	p
n	23	84	45	
Baseline SBP, mm Hg	122 (13)	121 (14)	119 (15)	ns
Maternal weight, kg	78 (10)	82 (14)	84 (14)	ns
Neonatal weight, g	3428 (420)	3481 (539)	3379 (404)	ns
EPH15, mg	28 (14)	29 (20)	17 (14)	.10
PE15, mcg	88 (96)	107 (134)	60 (83)*	.001
ml vasopressor 15	7.8 (3.0)	8.6 (5.3)	5.0 (3.9)*	.002
	Gln27Gln	**Gln27Glu**	**Glu27Glu**	
n	76	64	12	
Baseline SBP, mm Hg	121 (14)	119 (14)	121 (14)	ns
Maternal weight, kg	83 (14)	81 (14)	84 (12)	ns
Neonatal weight, g	3457 (452)	3479 (532)	3279 (434)	ns
EPH15, mg	30 (20)	23 (16)	13 (14)**	.003
PE15, mcg	89 (121)	98 (117)	63 (90)	ns
ml vasopressor 15	8.3 (5.0)	7.0 (4.6)	4.2 (3.9)**	.02

* different from Arg16Arg **different from Gln27
Discussion: These data suggest that glycine at position 16 and/or glutamate at position 27 lead to a lower requirement for treatment of hypotension after spinal anesthesia. The Glu27 "hypertensive" effect is consistent with the finding[3] that Glu27 homozygotes had a greater increase in mean arterial pressure and rate pressure product after intubation than glutamine homozygotes, and is consistent with what is known about the function of this genotype.[1] This is the first demonstration that genetic variants of an adrenoceptor affect the response to regional anesthesia.
References: 1. Am J Respir Crit Care Med 1997; 156: S156-62
2. Am J Obstet Gynecol 2002; 187: 1294-8
3. Anaesthesia 2002; 57: 227-32

SOAP A-20
FOCAL ADHESION SIGNALING CONTRIBUTES TO ERK ACTIVATION IN MYOMETRIUM DURING LATE PREGNANCY

Y. Li[1], S. Malek[2], C. Gallant[2], K. G. Morgan[2];
[1]Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, [2]Boston Biomedical Research Institute, Watertown, MA.

We previously reported that labor in the rat is associated with a significant increase in the phosphorylation and activation of extracellular signal-regulated kinase 2 (ERK2) and caldesmon (1), and that an ERK inhibitor delays preterm labor (2). ERK-mediated phosphorylation of caldesmon is thought to reverse caldesmon's inhibitory effects on actomyosin interaction and promote contraction of the uterus during labor. However, the upstream events responsible for ERK activation during labor remain elusive. Approaching term pregnancy, it is well known that rapid increase in fetal growth leads to a dramatic increase in uterine tension. Focal adhesions (FA) on the cell membrane make contact with the extracellular matrix and have been postulated as mechano-sensors and sites for protein tyrosine kinase mediated signaling pathways. Therefore, we tested the hypothesis that gestation-dependent stretch, via activation of FA signaling, is responsible for activation of ERK and caldesmon during late pregnancy. First, we determined the subcellular location of ERK in myometrial cells by confocal microscopy and observed that ERK is targeted to the surface membrane during late pregnancy. The membrane translocation of ERK may be necessary for ERK to be activated by FA signaling. We screened for FA signaling by using a proteomics approach-monitoring activation with anti-phosphotyrosine antibodies. Myometrial strips from 20-day pregnant rats were stretched and maintained at a passive tension of 50 mN in organ culture. Mechanical stretch triggered a dramatic increase in myometrial contractility and also induced a significant increase in ERK and caldesmon phosphorylation, confirming the presence of stretch sensitive element(s) in pregnant myometrium in vitro. Notably, stretch induced a significant increase in tyrosine phosphorylation of 125kD and 68kD proteins. Additionally, a prominent 60kD band appeared constitutively tyrosine phosphorylated. Immunoprecipitation with anti-phosphotyrosine antibodies and immunoblotting with protein-specific antibodies confirmed the stretch-induced activation of focal adhesion kinase (FAK, p125) and an adapter protein-paxillin (p68). In vascular smooth muscle, a p60 phosphotyrosine protein Src mediates ERK activation (3) . To test a possible role of a Src kinase family member in the stretch-induced response in myometrium, pretreatment with PP2, a Src kinase inhibitor, significantly suppressed stretch-induced increases in myometrial contractility, FAK and paxillin phosphorylation. In summary, we have demonstrated that mechanical stretch can induce the activation of FA signaling, ERK and caldesmon phosphorylation. This is the first report of stretch-dependent, ERK-mediated phosphorylation of caldesmon in myometrium. These results point to FA signaling molecules as potential targets in the modulation of the myometrial contractility and the onset of labor. Support: NIH grants HL31704, HL42293 and HD043054 to K.G.M. and NIH GM07592 and FAER grant to Y.L.
1. Li, Y., et al., AJP, 2003. 284(1): p. R192-9.
2. Li, Y., et al., AJP, 2004. 287: p. R328-35.
3. Ginnan, R., et al., AJP, 2004. 286(6): p. C1281-9.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

BEST PAPER PRESENTATIONS

SOAP A-21
MATERNAL GENERAL ANESTHESIA (GA) PRODUCES GESTATIONAL-AGE DEPENDENT CHANGES IN FETAL CEREBRAL OXYGENATION

R. J. McClaine[1], K. Shimazutsu[1], K. Uemura[1], D. J. McClaine[1], K. A. Campbell[1], S. Eubanks[2], J. D. Reynolds[1];
[1]Duke University Medical Center, Durham, NC, [2]University of Missouri, Columbia, MO.

Introduction: Despite its presumed safety, the fetal effects of GA have not been completely delineated. This is a concern in light of recent rodent studies that suggested passive exposure to common anesthetic agents such as isoflurane can damage the developing brain. Here we assessed this claim in a higher order species (pregnant sheep) using a clinically-relevant means of anesthetic delivery (i.e. active ventilation). To identify developmental differences, the experiments were conducted at two distinct gestational time points.
Methods: Ewes and fetuses at gestational day 90 (preterm, n=9) or 120 (nearterm n=9; term, 145 days) were surgically-instrumented with arterial catheters and a near-infrared spectroscopy 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, various fetal and maternal parameters were monitored before, during, and after 4h of GA (midazolam and sodium thiopental followed by 1.5% isoflurane in oxygen).
Results : Isoflurane produced the expected maternal cardiovascular and blood gas changes; no group differences were identified. Likewise, in both the preterm and nearterm groups, the fetal cardiovascular responses were similar. Isoflurane produced moderate fetal hypotension and bradycardia that persisted for the duration of anesthetic exposure. Extubation was accompanied by increases in fetal heart rate and mean arterial pressure. Group changes in blood gas status were also similar. There was an initial rise in fetal SaO2 followed by a gradual decline such that by the 4h time point, systemic oxygenation returned to baseline. Fetal SaO2 remained at baseline during the post-anesthetic monitoring period. Fetal base excess values were essentially constant during the study. Group differences were observed in fetal cerebral oxygenation. In the nearterm fetus, maternal isoflurane produced a significant increase in oxyHb (130% of baseline) and totalHb (122% of baseline), indicative of an increase in the amount and supply (i.e. an increase in blood flow) of oxygen to the fetal brain. These increases occurred independent of changes in cardiovascular status and systemic oxygenation. In contrast, oxyHb in the preterm brain increased by <10% and temporally-correlated with changes in fetal SaO2; totalHb varied by <5%.
Conclusion: In the nearterm fetus, isoflurane has a direct positive effect on the fetal cerebro-vasculature to increase cerebral oxygenation. While this response appears absent in the preterm fetus, physiologic monitoring of both groups failed to identify changes in status that could be injurious to the fetal brain. Collectively, these results appear to corroborate the presumed safety of inhalational anesthetic use during pregnancy.
Supported by grants HD042471 and NS42664 from the NIH. RJM is the recipient of a Howard Hughes Medical Student Fellowship.

SOAP A-22
RELIABILITY AND VALIDITY OF A SCORING SYSTEM USED TO MEASURE RESIDENT PERFORMANCE DURING AN OBSTETRIC ANESTHETIC SCENARIO ON A HUMAN PATIENT SIMULATOR

B. M. Scavone, M. T. Sproviero, V. J. Siddall, L. Wade, R. J. McCarthy;
Northwestern University Feinberg School of Medicine, Chicago, IL.

Introduction: The ACGME has mandated that residency programs assess competency by developing tools that evaluate proficiency in specific areas. We have reported the development, via a modified Delphi technique, of a weighted scoring system to evaluate residents providing general anesthesia (GA) for emergency Cesarean delivery (CS) on a patient simulator. The scoring system consists of 47 tasks (each weighted on a scale of importance from 1 -5) necessary to perform GA for emergency CS, with a total possible score of 196.5 points (1). The purpose of this study was to assess validity and reliability of that scoring tool.
Methods: Sixteen resident anesthesiologists of different levels of training (8 CA-3 residents with extensive obstetric anesthesia experience, and 8 CA-1 residents with little or no such experience) were videotaped performing the simulation. Four attending anesthesiologists viewed and scored each of the 16 videotapes. To assess validity of the scoring tool, scores between resident groups were compared, to determine if more experienced residents had higher scores than less experienced residents. Time from start of the simulation until "surgical incision", and resident self assessment of confidence were compared between groups. Inter-rater reliability among the four scorers was assessed by calculating Chronbach's Alpha and the intraclass correlation coefficient. Factor analysis was used to determine the number of raters needed to explain more than 95% of the variation between raters.
Results: CA-3 residents reported having done an average of 3 CS under GA, compared to 0 in the CA-1 group ($P = 0.002$). There was no difference in the number of times CA-3 vs. CA-1 residents had worked on the simulator. CA-3 residents scored an average of 150.5 points (77% of total possible 196.5, 95% C.I. = 71% - 83%), whereas CA-1 residents scored an average of 128 points (65% of total possible, 95% C.I. = 60% - 70%) ($P = 0.004$). Time interval from start to incision averaged 198 seconds for CA-3 vs. 380 seconds for CA-1 residents ($P = 0.002$). CA-3 residents reported more confidence than CA-1 residents. The scoring instrument demonstrated high inter-rater reliability (Chronbach's Alpha = 0.97) with an intraclass correlation coefficient of 0.97 (95% C.I. = 0.94 - 0.99) compared to the average score. With scores from 2 attending anesthesiologists, 96% of variance was explained, indicating little gain in having more than 2 attendings score the videotapes.
Discussion: CA-3 residents had higher scores, in a lesser amount of time, than CA-1 residents, indicating that they worked more thoroughly and more efficiently, as would be expected from level of training. The weighted scoring system obtained via the Delphi technique appears to be a valid and reliable means of evaluating residents performing GA for emergency CS.
References: Anesthesiology 2004; 100, Supp 1: A103.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

BEST PAPER PRESENTATIONS

SOAP A-23
POLYMORPHISM OF μ-OPIOID RECEPTOR (A118G) AFFECTS INTRATHECAL FENTANYL ED50 FOR LABOR ANALGESIA

R. Landau[1], C. Kern[1], R. M. Smiley[2], M. O. Columb[3], J. Blouin[1];
[1]University Hospital of Geneva (HUG), Geneva, Switzerland, [2]Columbia University, New York, NY, [3]Manchester University Hospital, Manchester, United Kingdom.

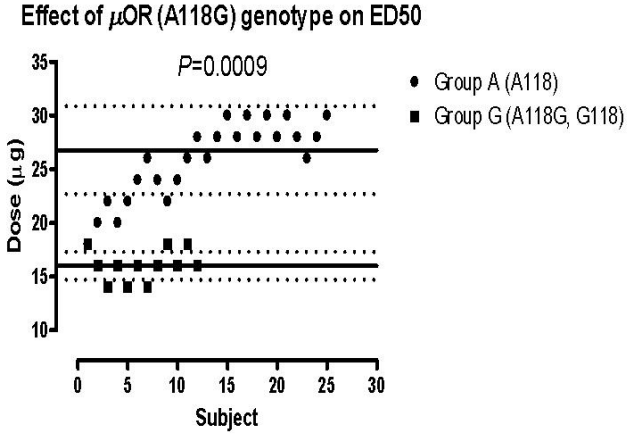
Background: The μ-opioid receptor (μOR) displays genetic variability, with a common polymorphism A118G on gene *MUOR1* (translated Asn40Asp, N40D) (prevalence=33%)[1]. Receptor G118 increases the binding affinity 3-fold for β-endorphin. The effect of this polymorphism on fentanyl or any kind of spinal analgesia has never been examined. The aim of this study was to assess the effect of A118G genotype on the ED50 of intrathecal fentanyl for labor analgesia, using the up-down sequential allocation method.

Methods: After IRB approval and informed consent, DNA of nulliparous women ≤35 weeks gestation was genotyped [1] for μOR A118G. Group A included A118 homozygotes. Group G included heterozygotes (A118G) and G118 homozygotes. At request for labor analgesia, parturients (>37 weeks gestation, spontaneous labor, cervical dilation <6cm) were enrolled to the appropriate sequence in this up-down allocation study. Anesthesiologist and parturient were blinded at all times to genotype and fentanyl dose. The starting dose[3] was fentanyl 18μg with a testing interval between subjects of 2μg. *Success* was defined as analgesia (VAS ≤1/10) lasting ≥60 minutes, *failure* as analgesia not achieved by 20 min or lasting <60 min, and *reject* as cervical dilation >8cm within 60 min of spinal. Analyses included *t*-test, up-down estimation of ED50 (Dixon-Massey), with $P<0.05$ as significant.

Results: To date, 113 women have been genotyped with an incidence of 32% for the A118G variant. Exclusions have included: obstetrical causes and protocol violations (N=18), epidural not requested or request at >6cm (N=15), inductions (N=38). Reject frequencies due to rapid cervical dilation were: group A 1/26, group G 4/16 ($P=0.061$). ED50 (*95%CI*) estimates were 26.8μg (22.7-30.9) and 16.0μg (14.7-17.3) for group A and group G respectively (Figure $P=0.0009$).

Discussion: We have demonstrated a highly significant 1.68 (*95%CI* 1.31-2.17) fold potentiation of intrathecal fentanyl effect by μOR A118G polymorphism. This could be due to an enhanced effect of intrathecal fentanyl, alterations in pain perception, or perhaps an effect on progress of labor in women carrying the G118 variant. This is the first demonstration of a genetic effect on fentanyl analgesia and suggests that μOR polymorphism plays a significant role in inter-individual opioid requirements. We are continuing to investigate this further.

References: 1. Landau, Anesthesiology 2004;100:1030-3.
2. Bond, Proc Natl Acad Sci USA 1998;95:9608-13
3. Nelson, Anesthesiology 2002,96;1070-3



SOAP A-24
EFFICIENCY AND ACCURACY OF UP-DOWN VS. RANDOM ALLOCATION TO DETERMINE ANALGESIC POTENCY AND DOSE RESPONSE

R. D'Angelo[1], S. Shafer[2], B. Clyne[1], J. C. Eisenach[1];
[1]Wake Forest University, Winston-Salem, NC, [2]Stanford University, Palo Alto, CA.

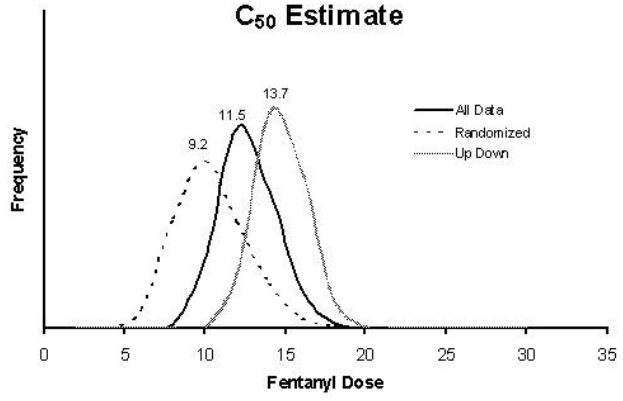
Introduction
Although the up-down sequential allocation study design has been utilized to estimate the EC_{50} for a number of drugs, including neuraxial local anesthetics and opioids[1,2], the clinical relevance of these results remains controversial. By design the up-down method concentrates all data around one portion of the dose response curve and thus may only reliably estimate the EC_{50}. The purpose of the current study was to determine if a random allocation design as efficiently estimates the EC_{50} as the up-down design, but also more accurately estimates the entire dose response curve.

Methods
After IRB approval and informed consent, 50 patients were randomized into the up-down or random allocation limbs (25 patients/group). The up-down limb patient doses were determined by the previous patient's response while the random allocation limb doses spanned the entire anticipated dose response in log increments and were randomized by computer. Intrathecal fentanyl was selected as the study agent because the authors previously estimated the EC_{50} for intrathecal fentanyl using an identical up-down design. Data were analyzed in three groups; up-down, random, and a pooled set of data using χ^2, T-test, Dixon and Massey analysis, regression analysis, and simulation modeling as appropriate.

Results
Demographic and labor characteristics were similar between groups. The EC_{50}'s for the up-down, random, and pooled groups were 13.7 ± 1.4, 9.2 ± 2.1, and 11.5 ± 1.8mcg, respectively while the EC_{95}'s were 26.7, 34.5, and 46mcg, respectively. The EC_{50} for 60 min of labor analgesia estimated by regression analysis was 11.4mcg, similar to the pooled EC_{50} estimation (figure).

Findings
The up-down study design produces a biased estimation of the EC_{50} higher than expected while significantly underestimating the EC_{95}. The random allocation design, on the other hand, produces a biased estimation of the EC_{50} lower than expected while more closely approximating the EC_{95}. Since both methods predicted an EC_{50} within 20% of the overall observed, but the random allocation method more accurately predicted the EC_{95}, of more clinical relevance, we suggest that random allocation should replace up down designs for examination of analgesic potency. Surprisingly, combining both approaches may yield the least biased estimation of the desired parameters.

1. Anesth Analg 1995;81:833-7, 2. Anesthesiology 2002; 96:1070-3.



Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 1

SOAP A-25
A NOVEL, *IN VITRO* MODEL OF TOCOLYTIC DESENSITIZATION

T. Chang, J. Maleski, K. Lindeman, M. K. Slodzinski;
Johns Hopkins University, Baltimore, MD.

Introduction: The neonatal morbidity and mortality of preterm labor and delivery results has tremendous emotional and financial costs to families and society. Clinical studies have shown short term efficacy (48hrs) of β adrenergic agonists (e.g., terbutaline sulfate) and magnesium in delaying parturition. The mechanism of tocolytic desensitization (beyond 48 hours) may result in a change in number of receptors linked to $G\alpha_s$-proteins, a change in the relative importance of G-proteins to stimulation versus inhibition, and/or a change in adenyl cyclase or phosphodiesterases isoforms. To examine the mechanism of tocolytic desensitization, we developed an in vitro model using human myometrial myocytes.

Methods: Human myometrial myocyte culture was obtained from the lower uterine segment of a pregnant woman undergoing elective cesarean delivery at term[1]**.** These myocytes were grown in DMEM with 10% FBS until the tocolytic desensitization experiments. During desensitization, the media was changed to DMEM with 0.5% FBS to stop cell proliferation, then myocytes were incubated with terbutaline (10μM), magnesium sulfate (5mM), or control vehicle for 0, 24, 48, 72, 96 and 120 hours. 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). Images were obtained with a CoolSnap CCD camera and analyzed with MetaFluor Imaging software.

Results: Human myometrial myocytes responded to oxytocin with an increased $[Ca^{2+}]_{cyt}$. We established an ED_{50} for oxytocin relative to the increase $[Ca^{2+}]_{cyt}$. Using oxytocin (30nM) as a standard dose, ED_{50}'s for acute terbutaline and magnesium were obtained based on the abolition of the oxytocin $[Ca^{2+}]_{cyt}$ increase. Next, terbutaline and magnesium were applied chronically to the cultured myometrial myocytes. With both agents, an in vitro tocolytic effect was produced; oxytocin induced increase in $[Ca^{2+}]_{cyt}$ was blocked for 48 hours. After 72 hours, the inhibitory effect of terbutaline and magnesium diminished as the myometrial myocytes began tocolytic desensitization. Full tocolytic desensitization was obtained after 96 hours exposure, when tocolyzed myocytes responded identically to oxytocin when compared with the control group.

Discussion: Clinically, tocolytics are useful in allowing preterm laboring patients to receive hydration, antibiotics, steroids, and/or transfer to a tertiary care facility, but tocolytics remain unsatisfactory in the long term. The problem of tocolytic desensitization remains unsolved. With this in vitro human model, we are now able to investigate the elusive physiological and biochemical mechanisms of tocolytic desensitization in cultured human myometrial myocytes and in fresh human myometrial tissue from patients undergoing cesarean sections. **References:** [1] Biol Reprod 65:401-406, 2001

SOAP A-26
ASP298 POLYMORPHISM OF ENDOTHELIAL NITRIC OXIDE SYNTHASE DOES NOT AFFECT RESPONSE TO TREATMENT OF HYPOTENSION DURING SPINAL ANESTHESIA FOR CESAREAN SECTION

R. M. Smiley[1], J. Blouin[2], M. Negron[1], P. V. Freedman[1], J. A. Scott[1], R. Landau[3];
[1]Columbia University, New York, NY, [2]University of Geneva, Geneva, Switzerland, [3]Columbia University and University of Geneva, New York, NY and Geneva, Switzerland.

Introduction: Variability exists in the incidence, severity, and response to treatment of hypotension during spinal anesthesia for cesarean section (CS). The endothelial nitric oxide synthase (eNOS) gene possesses a polymorphic site with aspartate (A) for glutamate substitution (G) at position 298 of the protein.[1] The homozygous aspartate variant has been associated with hypertension, preeclampsia,[2] vascular complications of pregnancy,[3,4] and increased vascular response to phenylephrine (PE).[5] We investigated if the A298 variant of eNOS alters the occurrence or response to treatment of maternal hypotension during spinal anesthesia for CS.

Methods: With IRB approval and informed consent, 200 healthy women undergoing elective CS were studied. Spinal anesthesia was performed with bupivacaine 12 mg/fentanyl 25 mcg/morphine 200 mcg. Hypotension was treated with ephedrine (EPH) 5-15 mg or PE 40-80 mcg IV. EPH was used if maternal HR was < 90, PE if HR > 120; clinician choice determined drug and dose if HR was 90-120. eNOS genotype was determined by minisequencing (Pyrosequencing, Uppsalla , Sweden). Quantitative data are expressed as mean (SD). T-tests were used to compare quantitative data between Asp homozygotes and others. χ^2 was used to compare categorical data. (Table)

Results: The planned cohort of 200 patients have been entered into the study, Full genotype and clinical data is available for 153, technical problems interfered with genotyping of 22 samples, and genotyping is pending for the rest. Variables are defined as **PE15**, dose of phenylephrine given in 15 minutes post spinal; **EPH 15**, dose of ephedrine given in 15 minutes post spinal; **ml vasopressor 15**, total ml ephedrine and phenylephrine given during 15 minutes after spinal (1 ml = 5 mg ephedrine or 40 mcg phenylephrine).

TABLE 1	Asp298	Asp298Glu or Glu298	p
n	12	141	
Baseline SBP, mm Hg	125 (13)	119 (14)	.11
Maternal weight, kg	76 (9)	82 (14)	ns
Neonatal weight, g	3468 (115)	3450 (43)	ns
No tx for hypotension, n (%)	2 (16%)	8 (6%)	.18
EPH15, mg	26 (18)	25 (19)	ns
PE15, mcg	48 (70)	88 (112)	.11
ml vasopressor* 15	6.4 (3.7)	7.3 (4.8)	ns

Discussion: Despite a trend for less women requiring treatment of hypotension among Asp homozyogtes, these results that genetic variation in the eNOS gene does not result in major differences in the cardiovascular response to spinal anesthesia or treatment of hypotension. Moderate effects of the Asp298 genotype will be difficult to detect due to the relatively low incidence of this functionally significant polymorphism in the study population.

References: 1. Trends in Pharmacological Sciences 2001; 22: 361-2.
2, J Soc Gynecol Invest 2000; 7:238-41
3. Hypertension. 2001;38:1289.
4. Hum Genetics 2001 ; 108 :181-3
5. Circulation 1999; 99:3096-8.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 1

SOAP A-27
MYOMETRIAL RELAXATION: THE SODIUM CALCIUM EXCHANGER FUNCTION IN HUMAN MYOMETRIAL MYOCYTES

J. Maleski, R. Pathel, K. Lindeman, M. K. Slodzinski;
Johns Hopkins University, Baltimore, MD.

Introduction: Much of preterm labor research has focused on the contractile mechanisms of parturition. In a paradigm shift, we have focused our efforts in understanding myometrial relaxation, i.e., decrease in cytosolic free calcium concentration ($[Ca^{2+}]_{cyt}$). In rodents, the expression of the $[Ca^{2+}]_{cyt}$ reducing protein, the sodium calcium exchanger (NCX), increases with gestation[1]. We hypothesize that the NCX is a critical for quiescent human gestation; the NCX allows the contractile machinery to develop while the myometrium remains inactive. In human myometrial myocytes, we have begun to investigate NCX physiology and biochemistry.

Methods: With IRB approval, human myometrial myocyte culture was obtained from the lower uterine segment of a pregnant woman undergoing elective cesarean delivery at term[2]**.** For calcium imaging, cells were incubated with fura-2/am (2µM), imaged on a Nikon TE2000 microscope (40x fluorescent lens) with DG-4 illumination (340/380nm excitation). Images were obtained with a CoolSnap CCD camera and analyzed with MetaFluor Imaging software. Western blots were stained with monoclonal NCX1 antibodies followed by a secondary anti-mouse IgG conjugated with horseradish peroxidase.

Results: Physiologically, to demonstrate a Na^+ dependent Ca^{2+} influx, extracellular sodium was reduced to 5mM; this resulted in a Ca^{2+} influx. Raising intracellular Na^+ with ouabain (a selective inhibitor of the Na^+/K^+ ATPase, 1mM) greatly augmented this Na^+ dependent Ca^{2+} influx. To demonstrate Na^+ dependent Ca^{2+} efflux, intracellular Ca^{2+}stores were mobilized pharmacologically. The rate of $[Ca^{2+}]_{cyt}$ reduction after caffeine (ryanodine sensitive store) and thapsigarin (IP_3 sensitive store) mobilization of intracellular Ca^{2+}stores was compared with normal and reduced (5mM) extracellular Na^+. The rate of Na^+ dependent stored Ca^{2+} efflux was significantly reduced when the Na^+ gradient was reversed. To demonstrate Na^+ dependent Ca^{2+}efflux of extracellular Ca^{2+}entry, we induced capacitative Ca^{2+}entry with normal and 5mM extracellular Na^+. Again, the rate of Na^+ dependent Ca^{2+}efflux (of capacitatively entered Ca^{2+}) was reduced when the Na^+ gradient was reversed. Compared to controls, inhibition of NCX activity (5mM extracellular Na^+) greatly augmented the oxytocin (30nM) increase of $[Ca^{2+}]_{cyt}$. Biochemically, we demonstrate that the NCX protein is present in human myometrial myocytes. Terbutaline (10µM) treatment increased NCX expression at 24 and 120 hours.

Discussion: Physiologically, we demonstrated Na^+ dependent Ca^{2+}efflux and influx is present in human myometrial myocytes. NCX activity is pivotal in recovery after physiological agonists (e.g. oxytocin). Biochemically, NCX is expressed in human myometrial myocytes. Tocolytic (terbutaline) augmentation of NCX expression is an extremely novel finding indicating that the NCX may play a role in tocolytic desensitization. Together, these results indicate the importance of NCX in maintaining a quiescent human myometrium. In the future, we will examine physiologically and biochemically the role of NCX in fresh human tissue from term and preterm and preeclamptic cesarean section patients.

References: [1]Cell Calcium. 22:333-41, 1997 [2]Biol Reprod 65:401-406, 2001

SOAP A-28
EPIDURAL MORPHINE FOR POST-VAGINAL DELIVERY PERINEAL PAIN: A RANDOMISED DOUBLE-BLIND TRIAL

A. J. Macarthur, C. Imarengaiye, K. Downey, L. Iheme, L. Tureanu;
University of Toronto, Toronto, ON, Canada.

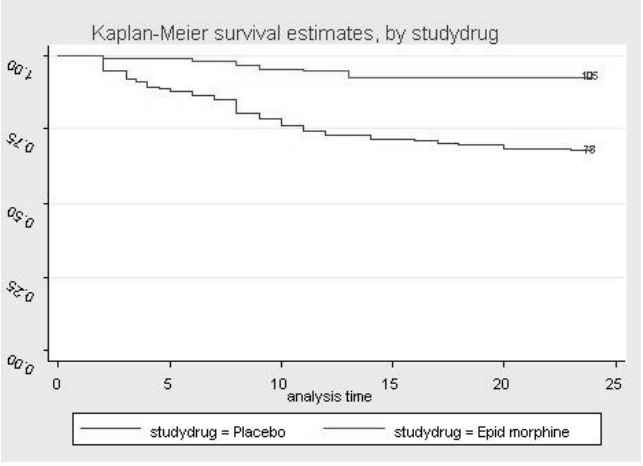
Introduction: Epidural morphine usefulness in treating post-vaginal delivery perineal pain is unclear. Our study hypothesis was a single dose of epidural morphine following vaginal delivery would reduce acute postpartum perineal pain.

Methods: This randomised double-blind placebo-controlled trial received institutional REB approval and recruited study patients from the population of women who had chosen epidural analgesia for labor at an academic obstetric unit. Following vaginal delivery all consenting participants were randomized to receive either 2.5 mg epidural morphine or 10 ml epidural preservative free saline within one hour of delivery. The randomization schedule was stratified by parity. All patients received a scheduled course of acetaminophen and nonsteroidal antiinflammatories for 24 hours. The primary outcome was the proportion of women in each group who received narcotic analgesic in the first 24 hours postpartum, analysed by intention to treat. Secondary outcomes included: time to request for analgesia, maternal pain scores, maternal satisfaction, and incidence of pruritus, nausea / vomiting, drowsiness and urinary retention. Demographic information was collected on potential confounding variables.

Results: A considerable number of women were approached to the study, however only a small proportion consented and delivered vaginally. Of the 231 women randomized there were 3 withdrawals and 228 women appropriate for study. (155 primiparous: 73 multiparous patients). The two groups did not differ by potential confounders. Results of outcomes are presented in the table and survival curve indicating time to first request in the 24 hours postpartum between the two groups.

Discussion: Women not receiving epidural morphine following a vaginal delivery were 4.5 times (95% CI: 2.4, 8.5) more likely to require additional analgesics in the 1st 24 hours postpartum. The analgesic effect of epidural morphine was consistent for both primiparous and multiparous patients.

Outcome	Morphine group (N =113)	Saline group (N = 115)	p value
# women additional analgesic in 1st 24 hours pp	8 (7%)	37 (32%)	0.000
VAS @ time of extra analgesic (sd)	4.6 (2.6)	5.2 (2.1)	0.50
Incidence of:			
Pruritus	13 / 108	16 / 109	0.099
Nausea / Vomit	10 / 107	5 / 109	0.19
Urinary ret	20 / 109	11 / 111	0.08



Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 1

SOAP A-29
MECONIUM ACCELERATES THE PROCOAGULOPATHIC EFFECTS OF AMNIOTIC FLUID

J. A. Dolak[1], J. H. Waters[2];
[1]The Cleveland Clinic Foundation, Cleveland, OH, [2]Magee-Womens Hospital, Pittsburgh, PA.

Introduction: Amniotic fluid embolism (AFE) is characterized by the abrupt onset of respiratory distress, hemodynamic compromise, and seizure activity, all of which may be complicated by disseminated intravascular coagulopthy (DIC). While AFE is a relatively rare disease, it is associated with a notable maternal mortality rate. Last year we characterized an in vitro model of the hypercoagulable state induced by clean (i.e. no meconium) amniotic fluid (AF) using Sonoclot® analysis[1]. We demonstrated that AF increased clot initiation (activated clotting time or ACT), rate of clot formation (CR), and time to peak clot signal (TP) in a dose-dependent manner, and that these changes could be detected with as little as 1.25 µ1 (or 0.3% v/v) of admixed AF. We now report further characterization of this model using meconium-containing AF (MAF).

Methods: Following IRB approval, 8 parturients undergoing elective or urgent cesarean section were enrolled in this study. A 5 ml aliquot of blood was placed in a citrated Vacutainer® (3.2% sodium citrate), and a 5 ml aliquot of AF was obtained by needle amniotomy after uterine incision and placed in a plain Vacutainer®. Samples containing 40 µl of either preservative-free saline or MAF were added to Sonoclot® cuvettes containing 340 µl of citrated blood and 20 µl of 250 mM $CaCl_2$ The following Sonoclot® parameters were measured: ACT, CR, TP, and PF (platelet function). The amount of meconium in the MAF was determined by spinning a small aliquot in a capillary tube at 6100 rpm for 2 min, and then reading the meconium fraction using a microhematocrit reader. Data are means +/- SD. Statistical analysis included the paired t-test with the Bobferroni correction for multiple comparisons, along with the unpaired t-test where appropriate. A $p < 0.05$ was considered significant.

Results: The ACT obtained in the saline control group in this study (269 +/- 44 sec) was not statistically different than that observed in our historical controls (266 +/- 33), indicating that these two groups represented a homogeneous population. Addition, of 40 µl of MAF to maternal blood resulted in a 65% decrease in the ACT, which was significantly greater than the 51% decrease observed previously with 40 µl of AF. The CR was dramatically increased by the addition of MAF (63%) as compared to AF (17%). The TP decreased 41% from baseline with both MAF and AF. As in our previous study with AF, PF was unchanged by addition of MAF.

Discussion: The presence of MAF appears to further enhance the procoagulopathic changes in maternal blood resulting from exposure to AF alone. This effect appears to be principally due to an increase in CR, with a more minor enhancement of ACT.

References: [1]Anesthesiology 100:A105, 2004

SOAP A-30
DOES INTERMITTENT EPIDURAL LABOR ANALGESIA PREVENT MATERNAL INTRAPARTUM FEVER?

V. R. Mantha, S. Ramanathan, M. Vallejo, C. Mackin;
Magee-Womens Hospital, Pittsburgh, PA.

Introduction: Labor epidural analgesia (LEA) is associated with maternal intrapartum fever (tympanic temperature >38 degrees centigrade) [1], although a cause-effect relationship has never been shown. The incidence in primiparas is about 35%. All the data reporting epidural fever included only patients who received continuous infusions of epidural medications. We speculate the mechanism of epidural fever ito bes due to inhibition of sweating and therefore heat loss in the lower half of the body secondary to continuous sympathetic blockade. We sought to determine if LEA with intermittent injections, by allowing intermittent partial recovery of the sweating mechanism, is protective.

Methods: After IRB approval and informed consent, 35 healthy primiparas were randomized to receive either continuous (n=17) or intermittent (n=18) epidural injections. The sample represents a part of an ongoing study. Tympanic temperatures were determined at baseline, and every 4 hours until delivery. Demographic data in the two groups were compared using student's t-test, Mann-Whitney U test and chi-square tests where applicable. Temperature comparisons at different time periods within each of the two groups were evaluated using repeated measures ANOVA. Post hoc analysis after ANOVA included Fisher's LSD for multiple pair-wise comparisons.

Results: Demographic data were comparable between the two groups. Repeated measures ANOVA revealed significant increases in temperatures in both groups. Pair-wise comparisons in post hoc analysis are shown in the table. The table reveals temperature elevations that reached statistical significance at 4 hours, 8 hours and at delivery compared to baseline maternal temperature in the continuous LEA group. In the intermittent LEA group, however, there is significant elevation only at 8 hours and at delivery.

	Continuous group			Intermittent group		
Periods { }	{1}	{2}	{3}	{1}	{2}	{3}
Mean Temp °C	36.343	36.957	37.157	36.7	37.240	37.920
{1} Baseline						
{2} At 4hours	0.013			0.204		
{3} At 8 hours	0.002	0.384		0.010	0.116	
{4} At delivery	0.002	0.418	0.950	0.002	0.024	0.388

Discussion: The data shows a trend towards more significant temperature elevations in the continuous LEA group compared to the intermittent LEA group. However, information from this small sample is insufficient to support our hypothesis.

Reference: 1. Philip J, Alexander JM, Sharma SK, Leveno KJ, McIntyre DD, Wiley J. Epidural analgesia during labor and maternal fever. *Anesthesiology.* 1999; 90:1271-5

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 1

SOAP A-31
ASSESSING ADEQUACY OF DEPTH OF GENERAL ANESTHESIA USING THE PATIENT STATE INDEX (PSI) DURING CESAREAN SECTION

L. Hebbar, M. McEvoy, S. Dierdorf;
MUSC, Charleston, SC.

Introduction: Awareness during general anesthesia (GA) is a terrifying experience. The anesthesia Closed Claims report has demonstrated an increase in claims for operative recall, perhaps due an increase in public awareness.[1] The incidence of awareness in the obstetric patient population is higher than the general surgical pool.[2] Past studies using processed EEG (BiSpectral Index; BIS) have demonstrated that the currently recommended GA technique did not consistently provide BIS values associated with a low risk of awareness.[3] We decided to use the PSI as a tool for adequacy of depth of GA using the Patient Safety Array 4000. The advantage of the PSI over the BIS monitor is that it a continuous 4-channel processed EEG reading and has minimal EMG interference. Changes in consciousness depth are indicated by changes in PSI which is numerically represented; numbers closer to 100 represent a more alert state, while lower numbers represent deeper level of consciousness. Based on current literature, numeric values between 25 and 50 represent a desirable depth for GA state.[4]

Methodology: Following hospital Ethics Committee approval, five parturients undergoing c/section under GA as a primary anesthetic were recruited into this on-going study. Patients on medications, which could affect MAC values of anesthetic drugs, were excluded from the study. Following a standard premedication of sodium bicitrate, famotidine and metoclopramide, patient were pre-oxygenated. Standard GA technique for c/section was administered and consisted of induction dose of thiopental 4 mg/kg, succinlycholine 1.5 mg/kg, maintenance with nitrous oxide/oxygen 50/50 and endtidal isoflurane of 0.6%. Following delivery of fetus, anesthesia was maintained with midazolam 2 mg, fentanyl 2 mcg/kg, nitrous oxide/oxygen 70/30 and end-tidal isoflurane 0.4%. Mean blood pressure, heart rate, end-tidal isoflurane and PSI were documented at baseline, intubation, skin incision, every 2 mins until delivery of baby and every 5 mins until end of procedure. Patients were interviewed for any intraoperative recall on postoperative day 1.

Results: PSI values and end-tidal isoflurane concentrations are shown in the Table.

Discussion: Our current anesthetic technique appeared inadequate to reliably produce PSI values between 25-50 which represent a desirable depth for GA. However, none of our patients experienced any intraoperative recall.

Reference:

1. Anesthesiology 1999;90:1053-61
2. Anaesthesia 1991;46:62-4
3. Anaeth Intensive Care 2002;30:36-40
4. Anesthesiology 2002;96(7):82-89

Time Points	PSI +/- SEM
Baseline	97 +/- 0.5
Post Intubation	63 +/- 6
At delivery	54 +/- 2
5 mins after delivery	45 +/- 4
15 mins after delivery	53 +/- 6
Extubation	81 +/- 0.7

SOAP A-32
REDUCING SUPERFICIAL BLEEDING AND PAIN DURING EPIDURAL CATHETER INSERTION

B. Carvalho[1], S. Sarna[1], A. Fuller[1], C. Brummel[2], S. E. Cohen[1];
[1]Stanford University Medical Center, Stanford, CA, [2]Colorado Permanente Medical Group, Denver, CO.

Introduction: Superficial bleeding after labor epidural placement is a common clinical phenomenon. It may potentially loosen the adhesive epidural catheter dressing and therefore increase the risk of catheter displacement. The primary aim of this study was to determine whether performing local anesthetic skin infiltration with epinephrine-containing rather than plain lidocaine reduces this bleeding. Secondary objectives included epidural catheter movement, heart rate or blood pressure changes and whether the addition of sodium bicarbonate to lidocaine reduced pain during skin infiltration.

Methods: After obtaining IRB approval and informed consent, 80 healthy women receiving epidural analgesia during labor were randomly assigned in a double-blind manner to four local anesthetic mixtures (n=20 in each group):

Group A: 2.5 ml Lidocaine 1.5% local infiltration
Group B: 2.0 ml Lidocaine 1.5% + 0.5 ml 8.4% bicarbonate
Group C: 2.5 ml Lidocaine 1.5% + epinephrine 1:200 000 (the epidural test dose solution provided in our epidural kit)
Group D: 2.0 ml Lidocaine 1.5% + epinephrine 1:200 000 + 0.5 ml 8.4% bicarbonate.

Clinical endpoints included superficial bleeding at the catheter site (categorical rating: none, mild, moderate or severe, VAS 0-100 mm and number of dabs required to stop bleeding), pain during skin infiltration (VPS 0-10) and epidural catheter movement (mm). Statistical analyses included appropriate parametric and nonparametric testing with $p<0.05$ considered significant.

Results: Demographic data were similar among the groups. The addition of epinephrine to lidocaine significantly reduced the amount of superficial bleeding (Table). There were no differences in epidural catheter movement (p=0.37) among the groups studied and no catheters fell out during the study period (Table). The solutions containing epinephrine were well tolerated and resulted in no cardiovascular disturbances. The addition of epinephrine did not increase pain on skin infiltration whereas, bicarbonate reduced the pain (VAS 3.6 ± 2.2 vs. 2.6 ± 1.8; P=0.04).

Conclusion: Local infiltration of epinephrine-containing lidocaine prior to labor epidural insertion reduces superficial bleeding. However, this decrease in bleeding did not result in less catheter displacement. Our findings suggest that lidocaine 1.5% with epinephrine 1:200 000 and 8.4% bicarbonate may be the local anesthetic solution of choice for skin infiltration prior to labor epidural placement.

References: BJA 2001; 86: 565-7; Anesth Analg 1998; 86: 379-81; Anesth Analg 2001; 92: 1516-9.

	Group A (n=20)	Group B (n=20)	Group C (n=20)	Group D (n=20)	Statistical Significance
Superficial bleeding at epidural site (%)	86%	68%	50%	45%	P=0.007
Number of dabs*	4 (1-11)	3 (0-7)	1 (0-2)	1 (0-3)	P<0.001
Pain rating (%)					
Mild	50	66	95	95	P<0.001
Moderate / Severe	50	33	5	5	
Catheter Movement (mm)*	0 (-0.5-2)	0 (-1-2)	0 (-0.5-0.5)	0 (-2-3)	P=0.30

*Median (Range)

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 1

SOAP A-33
OBESE PARTURIENTS HAVE LOWER EPIDURAL LOCAL ANALGESIC REQUIREMENTS

M. K. Panni[1], M. O. Columb[2];
[1]Duke University, Durham, NC, [2]South Manchester University Hospital, Wythenshawe, United Kingdom.

Introduction: There are few data comparing local anesthetic requirements for obese and normal parturients. Obesity has been associated with a higher incidence of cesarean section (CS). Higher levels of epidural block have also been found in obese obstetrical patients in proportion to their obesity, which suggests less local anesthetic may be required for them to achieve satisfactory labor analgesia. Obesity, in general, has been linked to increased musculoskeletal pain and difficulty of daily movements, however there are no studies that show obese parturients to have greater pain or local anesthetic requirements in labor. The aim of this study was to estimate the minimum local analgesic concentration (MLAC) of bupivacaine for obese and non-obese parturients.
Methods: Otherwise healthy parturients (N=24) requesting epidural analgesia were enrolled in this up-down sequential study. Women were in active labor (cervical dilatation at 3 to 6 cm) with visual analogue pain score (VAPS) > 30/100mm. Patients with BMI > 30 were allocated to the obese group and BMI <= 30 were allocated to the normal group. The initial epidural dose for both groups was 20mL 0.1%w/v bupivacaine (20mg) with a dosing interval of 0.01%w/v. VAPS <= 10/100mm defined effective analgesia. Doses that were ineffective were followed by rescue doses of 0.1%w/v bupivacaine with 2 mcg/ml fentanyl up to 20mL. This determined whether the epidural catheter was functional, and if not the patient would be rejected from analysis. After completion of the study at 30 min, a standard PCEA infusion of 0.1%w/v bupivacaine with 2 mcg/ml fentanyl was started. MLAC was estimated using up-down reversals and probit regression. Statistical analyses included t-test (Welch modified) and Mann-Whitney U test as appropriate with P<0.05 as significant.
Results: Groups were similar for demographic and obstetric variables except for BMI (P<0.001). Results are shown in Table 1. Local anesthetic requirements were significantly reduced by a factor of 1.5 (95%CI 1.1, 2.1) in the obese group.
Discussion: A contributing factor to obese patients having more difficult labors may be that relatively larger doses of local anesthetic are administered than they require. While very low dose spinals (5mg) have been used to successfully complete CS in obese parturients, it may also be worth considering lowering the dose with which we initiate analgesia in obese parturients.

Table 1. Results for BMI (*SD*) and MLAC (*95%CI*).

Group	BMI	Up-down (%w/v)	Probit (%w/v)
Normal (N=12)	26.4 (+/-4.1)	0.112 (0.102, 0.122)	0.115 (0.099, 0.133)
Obese (N=12)	40.4 (+/-7.1)	0.074 (0.047, 0.102)	0.066 (0.055, 0.080)
P value	<0.001	0.015	0.042

SOAP A-34
FOUR YEAR'S EXPERIENCE OF PERIPARTUM HYSTERECTOMIES AND 90% AVERAGE C-SECTION RATE

M. M. Cardoso, M. C. Rosa, E. Lorenz, V. Ziliotto, A. R. Amaro;
Hospital e Maternidade Santa Joana, Sao Paulo, Brazil.

INTRODUCTION: Maternal haemorrhage is an important cause of maternal death in obstetric patients. The C-section rate in our institution is close to 90%. With such a high incidence of C-section deliveries we would expect a high incidence of bleeding complications. This review summarizes our 4 years' experience with peripartum hysterectomies.
METHODS: Medical records of all patients submitted to peripartum hysterectomy between June 2000 and November 2004 were reviewed.
RESULTS: In that period, there were 55.221 deliveries, 48.866 C-sections (88.5% of the Hospital deliveries) and 39 peripartum hysterectomies (0.07 % of the Hospital deliveries). Regarding parity, 8/39 patients were nulliparous, 15/39 were primiparas and 16/39 were multiparas (14/16 had 2 previous C-sections and 2/16 had 3 previous C-sections). The leading cause of peripartum hysterectomy was acretism (18/39 patients-all of them had a previous uterine surgery). In this subgroup, 12/18 patients had an antenatal diagnosis of placenta previa. Other causes of peripartum hysterectomy included: uterine atony (9/39 patients), placental abruption (6/39 patients), maternal coagulapathy due to HELLP Syndrome (5/39 cases) and uterine rupture (1/39 case). All patients were submitted to a C-section. A subtotal hysterectomy was initially performed in 22/39 patients (a relaparotomy due to continuing bleeding was necessary in 10/22 patients) and total hysterectomy was initially performed in 17/39 patients (a relaparotomy due to bowel perforation was necessary in 1/17 patients; an urinary tract injury that needed an intraoperative urological surgeon repair occured in another patient). Average operating time from delivery to hysterectomy was 137.6 min (15-900min) and the decision to do the hysterectomy occurred during the C-section in 29/39 patients. Spinal anesthesia was the primary anesthetic technique in 27/39 patients (12/27 cases had to be converted to general anesthesia) and general anesthesia was initially performed in 12/39 patients. Intraoperatively blood transfusion was necessary in 32/39. During the hysterectomy, a coagulopathy disorder was present in 25/39 patients. Average volume of crystalloid given was 8.500ml (1500-15.500ml) and the average blood units administered was 18.2units (0-72units). In the postoperative period 32/39 patients were sent to the ICU. The average length of intubation was 23.2hours (2-168hours); ICU stay was 4.1days (1-19days) and the mean hospitalization time was 7.7 days (3-21days). All patients were discharged home. One left the hospital with a colostomy due to a bowel perforation and another with a permanent neurological deficit (intracranial bleeding in a patient with coagulopathy and hypertensive disorder).
CONCLUSIONS: The incidence of peripartum hysterectomy in our Hospital is 0.07%. Although no maternal death occurred in that period, the morbidity of those patients is high.
REFERENCES: Curr Opin Obstet Gynecol;13(6):595-603, 2001.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 1

SOAP A-35
CONVERSION OF EPIDURAL LABOUR ANALGESIA TO EPIDURAL SURGICAL ANESTHESIA FOR INTRAPARTUM CESAREAN DELIVERY

D. C. Campbell, T. Tran, W. McKay;
University of Saskatchewan, Saskatoon, SK, Canada.

INTRODUCTION: One of the advantages of epidural labour analgesia (ELA) is its ease of conversion to epidural surgical anesthesia (ESA) to facilitate intrapartum cesarean delivery (C-D), thereby avoiding general anesthesia (GA). Successful conversion (92-94%) has been previously reported in several small series (1-3) which were all under powered to identify significant risk factors for failed conversion or management strategies to improve overall conversion rates. The purpose of this investigation was to determine risk factors for inadequate ESA and compare subspecialist obstetric anesthesiologists (OB) and generalist anesthesiologists (GEN) anesthetic management of inadequate ESA for intrapartum C-D.

METHODS: Following IRB approval health records of women with ELA requiring C-D over a 3 year period (April 01, 2001 and March 31, 2004) were reviewed. All women had ELA initiated and maintained (PCEA +/- CEI) with 0.08% Ropivacaine + 2 mcg/ml Fentanyl (4). Inadequate ESA was defined as an unsuccessful conversion of ELA without catheter manipulation or no attempted conversion to ESA. A comparison of the management of the inadequate ESA between the OB and the GEN anesthesiologists was undertaken. Data was analyzed using unpaired T-test, Chi Square, Fisher's Exact Probability Test and analysis of variance where appropriate with a $P < 0.05$ considered significant.

RESULTS: 899 health records were identified with 4 excluded (2 continuous spinal analgesia; 2 emergency C-D) with 86.6% (775/895) ELA successfully converted to effective ESA for C-D. There were no statistically significant differences in the demographic profile nor the time from the placement of ELA to C-D between successful conversions vs inadequate ESA. The mean anesthesiologist-administered "top ups" per parturient was significantly higher in inadequate ESA ($0.98 \pm 0.1.2$) vs successful ESA (0.50 ± 0.96) ($P<0.00001$). With inadequate ESA, OB withdrew the catheter back (~1 cm) followed by additional LA significantly more frequently than GEN (58.3% (21/36) vs 5.9% (5/84), respectively; $P<0.0001$), resulting in successful conversion to effective ESA in 85.7% (18/21) OB and 80% (4/5) GEN (P=NS). This resulted in an overall successful conversion rate of 89.1% (797/895). GA was administered by significantly more GEN 42.9% (36/84) compared to OB 8.3% (3/36) ($P<0.05$), with GEN not attempting SAB prior to inducing GA in 75% (27/36) of women with inadequate ESA compared to 0% (0/3) OB ($P<0.05$). The ability to intubate was documented in 94.9% (37/39) with difficult intubation reported in 10.8% (4/37).

DISCUSSION: Successful conversion of ELA to ESA for intrapartum C-D occurred in >85% of cases. Unsuccessful ESA was associated with pre-existing inadequate ELA. Withdrawing the epidural catheter ~1 cm followed by additional LA is effective in converting >80% of previously inadequate ESA to effective ESA, thereby avoiding GA for intrapartum C-D.

REFERENCES: 1. IJOA 11:81-4,2002; 2. IJOA 9:3-6,2000; 3.Brit J Obstet Gynaecol 97:420-4,1990; 4.Anesth Analg 90:1384-9,2000

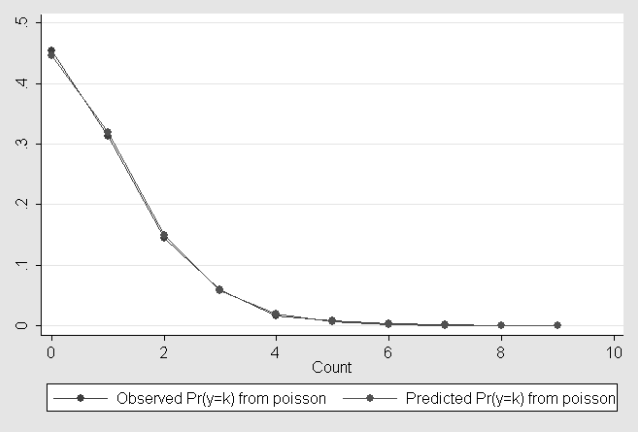
SOAP A-36
THE PROBABILITY OF SUPPLEMENTATION FOR PAIN DURING LABOR EPIDURAL ANALGESIA: IMPLICATION FOR THE ETIOLOGY OF PAIN

P. E. Hess, J. Spiegel, S. Pratt;
Beth Israel Deaconess Medical Center, Boston, MA.

Introduction: Pain increases as labor progresses; however, women describe different degrees of pain. Some women report low levels of pain, others have increasing levels as labor progresses.(1) Severity of early pain is a predictor of greater levels of late labor pain, and a greater severity of pain is a predictor of labor outcome.(2) The requirements for analgesic medications is an accepted surrogate for the amount of pain and has been correlated with labor outcome.(3,4) If the underlying stimulus for pain is different among women, then the probability distribution of analgesic requirements should be different.

Methods: After IRB approval for this observational trial, we evaluated the requirements for supplementation of successful epidural analgesia. All women were term, singleton gestation admitted for labor. Epidural analgesia was provided in all cases by a continuous infusion of 0.04%bupivacaine with 1.7mcg/ccfentanyl and 1:600000 epinephrine. Labor outcome was categorized by NVD=normal vaginal delivery, C/S=cesarean delivery for arrest. Cesarean deliveries for fetal indications were not considered. Supplementation of labor epidural analgesia was counted as the treatment of any episode of breakthrough pain that was successfully resolved. Women who had their epidural catheter replaced, or those with technical complication were removed from analysis. The need for supplementation during labor was tested for fit to several probability distributions.

Results: 2865 women were evaluated, 372 who had C/S, and 2493 who had NVD. Women in the NVD category had a lower overall incidence of supplementation, and had a stochastic timing of requirements. The distribution of supplementation best fit a Poisson probability ($p<0.001$). Women in the C/S category had a higher incidence of supplementation. The observed incidence of supplementation displayed overdispersion. The distribution of supplementation of these subjects fit a Negative Binomial probability ($p<0.001$).



Discussion: The distribution of supplementation of epidural analgesia is statistically different based on the ultimate outcome of labor. Women who have an uncomplicated vaginal delivery have a Poisson distribution, used to describe rare and random events. Women who have a cesarean for arrest of labor is overdispersed and is best describe by a negative binomial distribution; the likelihood of supplementation increases based on previous experience. This demonstrates that the cause of labor pain in these populations is likely different.

Reference:
1-Can.Med.Assoc.J., 130:579, 1984.
2-Obstet.Gynecol, 73:35, 1989.
3-Anesth.Analg., 90:881, 2000.
4-Anesth.Analg. 92:1524, 2001.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 1

SOAP A-37
THE RELATIONSHIP BETWEEN THE DEPTH FROM THE SKIN TO THE EPIDURAL SPACE AND BODY MASS INDEX IN PARTURIENTS

C. P. Clinkscales, M. V. Greenfield, M. Vanarase, L. S. Polley;
The University of Michigan Health System, Ann Arbor, MI.

Introduction: In the United States, according to the sequential National Health and Nutrition Examination Survey reports, the age-adjusted prevalence of obesity had increased to 30.5% in 1999-2000 (1). A large study of urban parturients at the time of delivery demonstrated a similar growing trend in obesity (2). The purpose of our study was to determine if a relationship exists between body mass index (BMI) and the depth from the skin to the epidural space (DS-ES) in parturients.

Methods: After receiving approval from our Institutional Review Board, we retrospectively viewed the electronic anesthetic records for either labor or caesarean section epidural placement of 600 parturients at or beyond the 36th week of gestation. We noted each parturient's age, height, weight, calculated BMI, gestational age, position during epidural placement, lumbar interspace used, technique and size of epidural needle used, depth to the nearest half-centimeter from the skin surface to the epidural space, whether blood or cerebrospinal fluid (CSF) was aspirated, and whether or not the parturient reported a post-dural puncture headache at follow-up.

Results: Six hundred parturients had epidurals placed between September 1 and December 7, 2004. Thirty-four parturients were excluded from the study sample due to incomplete documentation. Of the 566 remaining parturients, median age was 29 and mean age was 29 $\pm$ 5.6 (range 16 to 43). Median BMI was 29.9 and mean BMI was 31.2 $\pm$ 6.4 (range 15.5 to 57.3). In 99% of parturients, the 9 cm Tuohy needle and the loss-of-resistance to normal saline technique were used. Almost 95% of parturients had their epidural space located at either the L2-3 or L3-4 vertebral interspace. The median DS-ES was 5.0 cm, regardless of vertebral interspace used. In 9 parturients, either blood or CSF was aspirated upon presumed epidural space location, and an additional 2 parturients complained of post-dural puncture headache. In a regression model relating only BMI to DS-ES, BMI was shown to be a highly significant predictor of DS-ES (P<0.0001, R^2=0.3407). This suggests that approximately 34% of the variability in DS-ES can be explained by BMI.

Discussion: Our study indicates a linear relationship between BMI and DS-ES. Further, our regression analysis allowed for the construction of a mathematical formula by which to calculate DS-ES relative to BMI: DS-ES=1.76628 + 0.11105(BMI). Clinically, this study will lend guidance to practitioners placing epidurals in obese parturients. Potential limitations to our study include the withdrawal of 38 parturients due to incomplete documentation, and variations in individual anesthesiologists' techniques, including subtle differences in patient positioning and epidural needle insertion angles.

References: (1) JAMA 2002; 288:1723-7.(2) Am J Obstet Gynecol 2002; 187:1189-93.

SOAP A-38
REVIEW OF TRAUMA IN PREGNANCY: THE CONSEQUENCES OF RISK BEHAVIORS

S. K. Patteson, G. L. Whitaker, C. C. Snider, J. E. Armstrong, R. C. Carroll;
University of Tennessee Graduate School of Medicine, Knoxville, TN.

Introduction: We reviewed 170 cases of trauma during pregnancy from 1996 - July 2004 to determine a link between risk behaviors, trauma scores, physiological variables, and maternal/fetal outcomes.

Methods: Injury severity was assessed by Revised Trauma Score (RTS) or admission status. An RTS < 11, or admission to operating room or intensive care units (OR/ICU) classified patients as severely injured. We analyzed trauma scores and physiological variables for predictive value for maternal/fetal outcomes.

Results: Motor vehicle accidents (MVA) comprised 149 cases with only 56 patients utilizing restraint devices. 69 patients were screened for intoxicants, 59% positive for alcohol or illicit drugs, 25% positive for two or more drugs. Intoxicants did not correlate with injury severity or maternal/fetal outcomes. A predictor of 6 maternal fatalities (all MVA, 5 unrestrained) was an RTS <11 or OR/ICU disposition (P<0.0001). Fetal outcomes included 140 alive in-utero, 16 live births, and 14 fatalities (10 unrestrained, all MVA). Fetal fatality correlated with injury severity by RTS <11 or OR/ICU disposition (P<0.0001). 6 fetal fatalities occurred in the non-severe RTS cases, 2 in the 131 cases not admitted to OR/ICU. Both of these patients had emergency C-section deliveries, neither resulting in maternal fatality. Kleihauer-Betke testing was done in 105 out of 170 cases. This included 4 fetal demises with 2 positive, 12 live births with 2 positive, and 89 not delivered with 15 positive. Chi square testing was not significant (P = 0.333). Of the physiological variables, gestational age correlated with fetal outcomes, while aPTT correlated with maternal outcome (Table I).

Discussion: This review of trauma in pregnancy revealed a high percentage of patients with risk behaviors of driving unrestrained or intoxicated. Both Revised Trauma Scores and disposition to OR/ICU were predictors of maternal/fetal outcomes. Lower gestational age correlated with fetal demise. Hematological and coagulation parameters were predictive of outcomes. Intensive prenatal education regarding the consequences of risk behaviors may reduce maternal and fetal mortalities.

Table I. Physiologic and Demographic Variables Correlated With Maternal (Unpaired t-test) or Fetal (ANOVA) Outcomes. Means ± standard deviations. Significant at * P<0.008, ** P<0.0001, maternal outcome (unpaired T-Test). Fetal outcomes #P<0.008, ##P<0.0001 (ANOVA with Fisher's PLSD). Bonferroni correction for multiple testing.

Parameter (N tested)	Maternal Outcome		Fetal Outcomes		
	Survived	Fatality	Not Del.	Live Birth	Demise
Pulse Rate (168)	95 ± 18	89 ± 58	95 ± 18	95 ± 19	94 ± 41
Systolic BP mmHg (168)	126 ± 18	113 ± 46	125 ± 18	143 ± 24#	114 ± 26##
Diastolic BPmmHg (168)	71 ± 20	48 ± 42*	70 ± 20	73 ± 22	59 ± 29
Respiration (167)	21 ± 6	13 ± 17*	21 ± 5	21 ± 10	20 ± 13
PO_2 mmHg (25)	171 ± 130	190 ± 176	171 ± 117	206 ± 227	168 ± 133
PCO_2 mmHg (25)	34 ± 9	48 ± 32	28 ± 6	36 ± 4	45 ± 23
HCO_3 mMo/L (24)	21 ± 3	14 ± 5*	19 ± 3	23 ± 1	19 ± 5
pH (25)	7.398 ± 0.095	7.341 ± 0.368	7.451 ± 0.070	7.407 ± 0.030	7.326 ± 0.257
Hematocrit (%) (166)	34.3 ± 4.2	29.7 ± 7.7*	34.6 ± 4.1	33.0 ± 4.0	31.1 ± 6.3#
Hemoglobin g/dl (166)	11.7 ± 1.3	10.2 ± 2.7*	11.8 ± 1.3	11.3 ± 1.3	10.7 ± 2.2#
aPTT sec (82)	26 ± 4	40 ± 18**	25 ± 3	27 ± 2	34 ± 14
PT sec (82)	13 ± 1	15 ± 2*	12 ± 1	13 ± 1	15 ± 2
INR (82)	1.1 ± 0.2	1.4 ± 0.3*	1.0 ± 0.1	1.0 ± 0.1	1.5 ± 0.4
Maternal Age Years (170)	24 ± 6	23 ± 3	24 ± 6	23 ± 7	25 ± 6
Gestational Age Weeks (165)	23 ± 10	23 ± 11	22 ± 9	35 ± 4##	20 ± 10##

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 1

SOAP A-39
EFFICACY OF THE ADDITION OF INTRATHECAL FENTANYL TO SPINAL ANESTHESIA FOR UTERINE EXTERIORIZATION DURING ELECTIVE CESAREAN DELIVERY

A. J. Malan, D. C. Campbell, J. Martel, S. Biem;
University of Saskatchewan, Saskatoon, SK, Canada.

INTRODUCTION: One of the most uncomfortable times during cesarean delivery (C-D), under spinal anesthesia (SA), occurs with uterine exteriorization, often predicated by the requirement for improved surgical exposure due to a lateral tear of the uterine incision. Although the addition of intrathecal (IT) fentanyl has been associated with improved SA for routine C-D (1), only 3 studies specifically report its impact on exteriorization. Unfortunately, these studies either lacked sufficient power (2), administered IV fentanyl to the control group (3) or did not report sample size (4) to definitively determine the effect of IT fentanyl. The purpose of this prospective, double-blind, RCT was to determine the effect of the addition of IT fentanyl on maternal response to uterine exteriorization during C-D under SA.

METHODS: Following IRB approval and informed consent, 40 women scheduled to undergo SA for elective C-D were randomized to receive either **Fent** (N=20): 1.4 ml 0.75% hyperbaric bupivacaine, 150 mcg (0.3 ml) preservative-free (PF) morphine plus 10 mcg (0.2 ml) of Fentanyl or **NS** (N=20): 1.4 ml 0.75% hyperbaric bupivacaine, 150 mcg (0.3 ml) PF morphine plus 0.2 ml of 0.9% saline. VAS (0-100 mm) for Pain (VASP) was assessed Preoperatively, at Incision, Uterine Exteriorization, Uterine Replacement and PARR. Nausea, vomiting, pruritus, RR and Sp02 were simultaneously evaluated. Neonatal APGARs and cord ABG's were assessed. VAS (0-100 mm) maternal satisfaction was recorded in PARR. Any supplementary intraoperative analgesia was limited to IV fentanyl. Data analysis included 2-tailed unpaired T-Test, Chi Square and Fisher's Exact Probability Test with $P<0.05$ considered significant.

RESULTS: There were no statistical differences in demographics, birth weight, APGARs, cord pH <7.2, time between SA and exteriorization, and pruritus **NS**: 5% (1/20); **Fent**: 15% (3/20).VASP scores were 0/100 in both groups at Pre-op, Incision and PARR. No IV Fentanyl was administered. VASP was significantly higher in the **NS** group at Exteriorization (**NS**: 14.5 ± 13.3 vs **Fent**: 0 ± 0, $P<0.001$) and Replacement (**NS**: 16.7 ± 16.7 vs **Fent**: 0 ± 0, $P<0.001$). Nausea was reported by 30% (6/20) at Exteriorization and 65% (13/20) at Replacement and Vomiting 5% (1/20) at Exteriorization and 30% (6/20) at Replacement in **NS** compared to 0% (0/20) for both outcomes at each uterine manipulation in **Fent** ($P<0.01$). Maternal satisfaction was significantly higher in **Fent**: 99.1 ± 2.8 vs **NS**: 93.6 ± 6.7 ($P<0.003$).

DISCUSSION: The results of this investigation indicate that uterine exteriorization and replacement during C-D are associated with significant nausea, vomiting and discomfort all of which are eliminated by the addition of 10 mcg of IT fentanyl to SA, with no adverse maternal or neonatal effects.

REFERENCES: 1. Anesthesiology 91:1919-27, 1999; 2. Acta Anaesth Scand 41:332-8, 1997; 3. Anesth Analg 95:209-13, 2002; 4. Anesth Analg 78:918-20, 1994

SOAP A-40
EPIDURAL ANALGESIA HAS A FAVORABLE EFFECT ON FUNIC BASE EXCESS COMPARED TO NO ANALGESIA DURING LABOR

M. Schocket, R. Garrison, J. Wiley, S. Sharma;
University of Texas Southwestern Medical Center, Dallas, TX.

Introduction: Severe pain during labor may produce maternal hyperventilation, respiratory alkalosis, and an increase in catecholamine levels which in turn may cause uterine vasoconstriction and reduction in oxygen delivery to the fetus. Therefore effective pain relief during labor should improve fetal oxygen delivery and the intrauterine metabolic environment. In a retrospective matched-pair case-controlled study, we compared neonatal outcome in women who received no analgesia with women who received effective epidural analgesia during labor. We focused our attention on the umbilical artery base excess which appears to reflect the intrauterine environment and is a better index of metabolic acidosis (2).

Method: Following IRB approval, a matched-pair retrospective study was conducted. The maternal and neonatal data was collected over one year period from 110 consecutive healthy nulliparous women who did not receive any type of analgesia during labor. The data was also collected within the same period from 110 consecutive healthy nulliparous women who received functional labor epidural analgesia using conventional techniques. All women had spontaneous active labor at term, singleton cephalic presentation, and uncomplicated vaginal delivery. A p value of ≤ 0.05 was considered significant.

Results: Demographic characteristics of the two study groups were similar with respect to age, height, weight, gestation, and neonatal birth weight. The first and second stages of labor were prolonged in the epidural group, and the incidence of maternal fever, hypotension, and fetal heart rate abnormalities were significantly higher in the epidural group compared to the no-analgesia group. Umbilical artery PCO_2 concentration and base excess values were significantly lower in the no-analgesia group (Table).

TABLE:

Infant outcome	No analgesia n = 110	Epidural analgesia n = 110	p-value
Birth weight, gm:	3265 ± 329	3386 ± 258	0.07
Apgar scores:			
< 7 at 1 min	1 (0.9)	3 (2.7)	0 .313
< 3 at 1 min	1	0	
Umbilical artery blood pH:	7.26 ± 0.07	7.25 ± 0.064	0.355
≤7.00	0	1	
Umbilical blood pCO_2 (mmHg):	52 ± 9	55 ± 9	0.01
Umbilical artery blood pO_2 (mmHg)	23 ± 7	24 ± 13	0.696
Bicarbonate mEq/L	22±2.1	23 ± 2.5	0.001
Base Excess mEq/L	-5.79 ± 2.9	- 4.73 ± 3.1	0.009

Data are presented as mean ± SD, or N (%).

Conclusion: We did not find in the literature any direct comparisons between epidural analgesia and no-analgesia at all during labor in terms of the neonatal outcome. Studies have found epidural analgesia superior to parenternal opioid analgesia in terms of neonatal outcome because parentral opioid during labor is associated with a high risk of neonatal respiratory depression (1,2). In this study we found that effective pain relief using conventional epidural technique compared to even no-analgesia during labor has a favorable effect on funic base excess and does not adversely affect the baby.

References: 1. Br J Obstet Gynaecol 2002; 109: 1344-53.
2. JAMA 1998; 280: 2105-10.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 1

SOAP A-41
CURRENT STATE OF ACADEMIC OB ANESTHESIA: WHAT EXPERIENCES ARE ANESTHESIOLOGY TRAINEES RECEIVING?

M. K. Panni[1], W. R. Camann[2], L. C. Tsen[2];
[1]Duke University, Durham, NC, [2]Brigham and Women's Hosptial, Harvard Medical School, Boston, MA.

Introduction: We undertook a survey of US academic anesthesiology programs to assess the average resident obstetric anesthesia experience.
Methods: A survey was sent to every academic anesthesiology program in the USA (N=120), with multiple follow-up reminders to non-responders. Results: A response rate of 93 out of 120 (78%) was achieved. The surveys received were evenly divided into 3 categories, corresponding to lowest (Group 1) to highest (Group 3) number of deliveries/year. The number of obstetric deliveries ranged from 340 to 15,800, (total of 325,286 deliveries, with a mean of 3,498). The average number of residents and months on OB was 2.6 and 2.7, respectively. The average number of OB anesthesia fellows per institution was 0.231 with a total of 21.5 fellows currently in training, with significantly more fellows in Group 3 than Group 2 ($p < 0.001$) and Group 2 than Group 1 ($p < 0.05$). In institutions with fewer deliveries, anesthesiologists covered the Main OR and OB suites simultaneously more often. The average number of dedicated OB anesthesiologists was 4.28 and average number of OB lectures given was 12/month. The average C/S rate was 27.76% with 5.47% of C/S being performed under general anesthesia. An average of 65.95% of laboring parturients received neuraxial placement for analgesia, with 24.6% of the techniques being CSEs.
Discussion: There were no significant differences among the groups for C/S rate, neuraxial block rate, CSE placement rate, or between groups 1 and 2 in the GA C/S rate. There were significantly fewer GA C/S in group 3 compared to group 1 ($p<0.01$) or group 2 ($p<0.05$). There were no differences in the number of lectures given between the groups. There were no significant differences between the number of OB anesthesiologists comparing groups 1 and 2, however significantly more OB anesthesiologists were in group 3 than group 1 ($p<0.05$) or group 2 (p0.05). There were significantly more residents on OB in Group 3 than group 1 ($p<0.01$) or group 2 ($p<0.01$), but no significant difference in residents between groups 1 and 2 ($p>0.05$).
In summary there were few differences in obstetric anesthesia practice (or OB practice in terms of C-section rate) between larger and smaller institutions. As expected, larger units had greater numbers in staffing when they reached 3700 deliveries (Group 3), however there appeared to be little difference in educational exposure of residents in terms of lectures or months of OB completed.

SOAP A-42
ETHNICITY CONTRIBUTES TO DIFFERENCES IN PAIN PERCEPTION DURING LABOR

E. M. Lockhart[1], A. S. Habib[2], C. Clifford[1], H. A. Muir[2];
[1]Vanderbilt University Medical Center, Nashville, TN, [2]Duke University Medical Center, Durham, NC.

Introduction: We have previously reported that patient ethnicity contributes to pain perception surrounding labor and delivery. A multi-center clinical trial to examine ethnic differences in pain perception in an obstetric population is ongoing.
Methods: Patients were recruited in the OB clinics at both institutions or at presentation to L & D (barring active labor). Antepartum: questionnaires were administered to assess demographics, coping skills, and labor experience expectations. Intrapartum: questionnaires using multiple scales to assess pain perception levels were administered at predetermined time points: 1) L & D admission; 2) first request for analgesia (IV analgesia) and 3) request for epidural. Data were compiled from the two centers and a multivariate model using verbal pain scores as the outcome variable was developed. The model included variables which were thought to potentially contribute to pain scores: age, ethnicity, parity, cervical dilation, birth weight, oxytocin use, and antepartum expectation of the of labor pain. Pain was measured on a scale of 0 - 10.
Results: 396 patients were recruited. 334 patients (147 African American and 186 Caucasian) completed all phases of the study and reported their race. Differences in reported pain scores during labor were observed between Caucasian and African-American groups at all time points examined (Table). In all instances, the African American participants reported higher levels of pain than their Caucasian counterparts.

Pain Assessment Time	Verbal Pain Score (± SD)	
	African-American	Caucasian
L&D admission	4.06 (3.97)	2.54 (3.09)
1st Analgesia	7.91 (1.76)	6.23 (2.09)
Epidural Request	8.53 (1.61)	7.23 (2.24)

In the multivariate model, ethnicity ($p<0.0001$), parity (primiparous vs. multiparous ($p=0.0002$), and cervical dilation($p<0.0001$) significantly influenced the observed variability in the verbal pain scores between the two groups at admission. Age, birth weight, and expectation of pain were not significant. At the time of epidural request, only race influenced the variability noted in the verbal pain scores. ($p=0.0026$). Our model was not applied to the 1st analgesia time point, as the vast majority of our patients chose to have epidural analgesia as a first option.
Conclusion: Parity and degree of cervical dilation, but most of all ethnicity appear to contribute to observed differences in pain perception during labor and delivery.
Supported in part by the Vanderbilt GCRC (M01 RR 00095)

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 1

SOAP A-43
EFFECTIVENESS OF LOCAL ANESTHETIC TECHNIQUES IN IMPROVING POST CESAREAN SECTION ANALGESIA-A QUALITATIVE SYSTEMATIC REVIEW

K. Hussain, P. Angle;
Women's College Campus Hospital, Toronto, ON, Canada.

Introduction: In an attempt to improve the quality of postoperative analgesia local anesthetic techniques, such as, wound infiltration and nerve blocks have been employed in a variety of abdominal operations. However, with the exception of inguinal hernia repair, there is little consensus over their efficacy. The purpose of this qualitative systematic review was to assess the effectiveness of these techniques in improving post cesarean section analgesia.

Methods: The authors independently sought reports of randomized controlled trials examining the effectiveness of wound infiltration and/or nerve blocks, in which post cesarean section pain or the need for supplementary analgesia was an outcome. Electronic search strategies were used to identify eligible studies without language restriction in, MEDLINE (1966-2004), EMBASE (1980-2004) and Cochrane Data Base of Systematic Reviews and Central Register of Controlled Trials 2004. Major text books of anesthesia and journals of the last five years were hand searched for relevant studies. The reference list of retrieved articles was also searched. The last electronic search was conducted in April 2004. Each study was assigned a quality score using the Jadad scale [1].

Results: Eleven* randomized controlled trials were found eligible for inclusion. They were divided into two groups on the basis of their study design. Five trials (n=264) examined the effectiveness of surgical wound infiltration, with single or repeated doses of local anesthetics. The latter being delivered by means of a wound catheter. With the exception of one, all of these studies reported a beneficial effect as denoted by either, reduced visual analogue pain scores or narcotic consumption. Quality scores ranged from 2~4. Another six trials (n=320) were identified which examined the effectiveness of nerve blockade in supplementing post cesarean analgesia. Out of these, five studies carried out bilateral ilioinguinal nerve block and the last one performed abdominal nerves blockade. With the exception of one all other trials examining efficacy of ilioinguinal nerve block found a beneficial analgesic effect. Two studies were able to show a reduction in pain up to 24 hours. The study utilizing abdominal nerves block also reported a significant improvement in postoperative pain as compared to controls. Quality score of these studies ranged from 2~4.

Discussion: Overall the results of this qualitative systematic review suggest that incisional wound infiltration and nerve blocks provide additional post caesarean analgesia. As demonstrated in one of the trials, if movement associated pain had been assessed in other studies as well, improvement in postoperative pain might have been more evident. We recommend further well- designed trials to evaluate the effectiveness of these local anesthetic techniques where long acting neuraxial opioids are administered as the primary mode of analgesia.

References: [1] Controlled Clinical Trials-196;17:1-12.

* Available from authors.

SOAP A-44
EFFECTS OF SUPPLEMENTAL OXYGEN ADMINISTRATION ON THE INCIDENCE OF NAUSEA/ VOMITING DURING REGIONAL ANESTHESIA FOR CESAREAN DELIVERY

T. W. Phillips, S. R. Hart, D. Broussard, W. D. Sumrall;
Ochsner Clinic Foundation, New Orleans, LA.

Introduction: Oxygen has been used to reduce peri-operative nausea and vomiting. For instance, in one study, the administration of an inspired $Fi0_2$ of 80% during general anesthesia in non-obstetric patients decreased the incidence of nausea and vomiting by almost half compared to a group given an $Fi0_2$ of 30%[1]. Most women having a cesarean delivery do so under regional anesthesia. Whereas it is customary to provide supplemental oxygen prior to delivery, most practitioners do not continue oxygen administration after delivery of the infant unless there is arterial desaturation. The purpose of this study is to determine whether continued supplemental oxygen administration following delivery reduces the incidence of intra- and post-operative nausea and vomiting with cesarean delivery under regional anesthesia.

Methods: The study was approved by the IRB and written informed consent was obtained from ASA physical class 1-3 parturients, aged 18-35 years, undergoing cesarean section with regional anesthesia. After volume loading, metoclopramide, and oral sodium citrate administration, parturients were given spinal or epidural anesthesia, under a standardized protocol. Supplemental oxygen at 40% FiO_2 was administered to all women via a clear non-rebreathing mask until delivery of the infant. At that point women were randomized to receiving either 70% oxygen or medical air (FiO_2 21%) until the end of the procedure. The women, as well as the physicians caring for them, were blinded by an FDA approved device created by our bio-medical department as to whether air or oxygen was administered. The incidence of nausea and vomiting were determined intra-operatively and for 24 hours thereafter. A power of statistical analysis determined that 200 mothers should be studied in order to detect a 50% difference (Fisher's Exact Test) in the incidence of nausea and vomiting between the 2 groups with 80% power and an α of 0.5.

Results: Seventy-two women have been studied thus far. The intra-operative incidence of nausea was 32% for women breathing medical air and 19% in the oxygen group. The intra-operative incidences of vomiting in the air and oxygen group were 13% and 2%, respectively. Twenty-nine percent of women given air and 30% given oxygen reported postoperative nausea. In the air group, 16% of women vomited postoperatively as compared to 14% in the oxygen group.

Discussion: Based on this interim analysis, our data suggests that there may be little benefit in continuing supplemental oxygen during the entire case in order to prevent post-operative nausea and vomiting. However, the same may not be true during the intra-operative period where there was a six-fold reduction in the incidence of vomiting with oxygen administration. This difference did not achieve statistical significance at the time of the interim analysis.

References: [1]Anesthesiology 1999; 91:1246-52

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 1

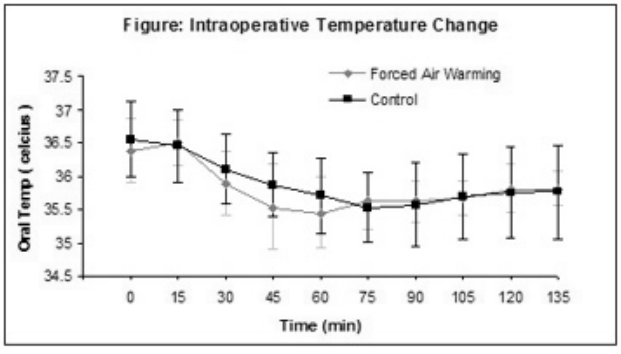
SOAP A-45
DOES FORCED AIR-WARMING REDUCE HYPOTHERMIA AND SHIVERING FOR PATIENTS UNDERGOING CESAREAN SECTION WITH SPINAL ANESTHESIA?

A. J. Butwick, S. S. Lipman, L. Andes, S. E. Cohen, B. Carvalho;
Stanford University Medical Center, Stanford, CA.

Introduction: Perioperative shivering occurs in up to 85% of patients undergoing cesarean section (CS) under regional anesthesia.[1] A previous study with epidural anesthesia showed that forced-air warming (FAW) reduces shivering and hypothermia during CS.[2] We tested the hypothesis that intraoperative lower body forced air-warming prevents maternal hypothermia and reduces shivering in patients undergoing CS with spinal anesthesia.

Methods: Following IRB approval and informed consent, 30 healthy parturients undergoing elective CS with spinal anesthesia were enrolled. All patients received hydroxyethyl starch (500 ml) intravenously as a preload, and spinal anesthesia (12 mg IT bupivacaine with 10 µg fentanyl and 200 µg morphine). Patients were randomly assigned in a double-blind manner to two groups (n=15 per group): FAW unit with lower-body warming cover (Bair Hugger®) set at 43 ºC, or Control (identical cover applied with FAW unit turned off). All patients received one warmed cotton blanket placed over the upper thorax and arms. An investigator blinded to group allocation assessed the following maternal parameters at 15 minute intervals until discharge from the post-anesthetic care unit: oral temperature, shivering (Wrench score[3]), thermal comfort scores[2], pain and nausea scores, blood pressure and spinal block height. Neonatal cord gases and Apgar scores were also recorded. Hypothermia was defined as an oral temperature ≤35.5 ºC. If patients became hypothermic, then FAW was instituted irrespective of study group.

Results: Maternal demographics, block height and surgical duration (46 ± 15min) were comparable in the groups. Overall, maternal temperature decreased by 1.3ºC ± 0.4, with no differences between groups (Figure; p=0.88). Similarly, the incidence and severity of shivering, maternal thermal comfort, and side-effects did not differ between groups. Neonatal well-being, as assessed by cord gases and Apgar scores, was normal and similar in the groups (p=NS).



Discussion: Slower induction with epidural anesthesia prior to CS allows time for warming of patients with FAW before surgery.[2] In contrast, our results suggest that FAW is unable to compensate for the initial hypothermia associated with spinal anesthesia for CS. Further research may determine whether pre-warming or additional warming devices better attenuate hypothermia and shivering in patients undergoing spinal anesthesia for CS.

References: 1. *Anesth Analg* 2004; 98:203-4. 2. *Anesth Analg* 2002; 94:409-14. 3. *BJA* 1997; 79: 541-2

SOAP A-46
A SURVEY OF LABOR PATIENT-CONTROLLED EPIDURAL ANESTHESIA PRACTICE IN CALIFORNIAN HOSPITALS

B. Carvalho, P. Wang, E. T. Riley, S. E. Cohen;
Stanford University Medical Center, Stanford, CA.

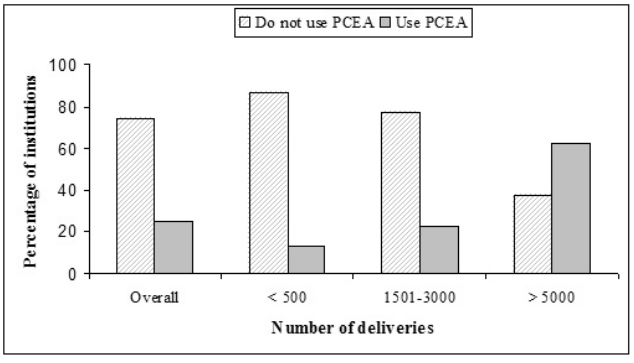
Introduction: Patient-controlled epidural analgesia (PCEA) offers many advantages over continuous epidural infusions for labor analgesia including reduced amount of local anesthetic utilized, improved analgesia and parturient satisfaction, and fewer physician interventions. However, practioners have been slow to adopt this technique, first described in 1988. No previous studies have determined labor PCEA use in the United States. The aim of this study was to investigate labor epidural and PCEA practices in Californian hospitals.

Methods: Following IRB exemption approval, an online survey was created using a commercially available web-based survey instrument, freeonlinesurveys.com®. An anonymous survey was sent via e-mail to 230 California Society of Anesthesiologists (CSA) affiliated anesthesiologists chosen at random from the CSA database. Only one anesthesiologist per hospital was sent the survey to determine their institutions' labor analgesia practices. Data were collected over a two month period (July-August 2004) with two e-mail reminders sent 2 and 6 weeks after the initial request. Analyses included descriptive and inferential statistics using appropriate parametric and nonparametric testing with $p<0.05$ considered significant.

Results: We received 133 replies from the 230 survey requests sent i.e. a 58% response rate. The median labor epidural rate among the hospitals surveyed was 65% (Range 0-95%). Overall, only 25% of the Californian hospitals surveyed use labor PCEA, with greater use among hospitals with larger number of deliveries (Fig 1). Sixteen percent of hospitals not using PCEA, were currently in the process of adopting it. Reasons given for not using PCEA included cost, clinician preference, safety concerns and the inconvenience of change. Bupivacaine 0.125% with fentanyl 2 mcg/ml was the most common epidural solution, with only 16% of hospitals using bupivacaine concentrations <0.1%. Only 30% of institutions used standardized protocols for epidural infusions and PCEA settings.

Conclusion: Despite the potential advantages PCEA offers over continuous epidural infusions for labor analgesia, it has not been widely adopted in hospitals throughout California. The use of labor PCEA should be encouraged to improve maternal analgesia and satisfaction as well as reduce physician workload.

Figure 1: Labor patient-controlled epidural analgesia (PCEA) utilization among Californian hospitals



Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 1

SOAP A-47
RESUSCITATION OF PARTURIENTS: A CRITICAL KNOWLEDGE SURVEY AMONG PHYSICIANS

L. C. Andes[1], B. Carvalho[1], E. Riley[1], A. Fuller[1], C. Brummel[2], S. Cohen[1];
[1]Stanford University Medical Center, Stanford, CA, [2]Colorado Permanente Medical Group, Lafayette, CO.

Introduction: "Why Mothers Die 2000-2002", a UK maternal outcomes database, reported that over 50% of maternal deaths have some aspect of substandard care and concluded that most would be preventable.(1) Catastrophic events leading to cardio-respiratory arrest may necessitate the resuscitation of pregnant women in both large and small obstetric units. The objective of this preliminary study was to evaluate the current state of knowledge about resuscitation of parturients among anesthesiologists and obstetricians.

Methods: An IRB-approved survey with 12 questions was distributed anonymously to 60 medical residents and faculty in the anesthesia and obstetric departments at an academic medical center (>5000 deliveries/year). Survey questions were designed to ascertain if any of four critical knowledge areas were deficient: need for left uterine displacement (LUD), standard ACLS algorithms (ACLS), maternal physiology (MP), and the recommendation to perform cesarean section in parturients (>20 weeks gestation) after 5 min of unsuccessful resuscitation for cardiac arrest (5CS).(2,3) Data were analyzed using SPSS statistical package with $p<0.05$ considered significant.

Results: Two questions were eliminated before data analysis, one for a printing error, and the other due to disagreement between specialties as to the correct answer. Overall, 59 subjects (54% anesthesiologists and 46% obstetricians) completed the test. Residents comprised 56%, attendings 40%, and medical students 4% of the study population. Anesthesiologists performed better than obstetricians with regard to overall test scores, as well as in knowledge of ACLS and MP (Table; $p<0.05$). Scores for LUD and 5CS were similar in both groups. Mean scores were lowest on the questions relating to 5CS (≥40% incorrect answers; Table). There was no difference between attendings and residents in overall score or any of the individual areas tested (p=NS).

Discussion: Our results demonstrate inadequate awareness by both groups of the benefits of early cesarean delivery in parturients who have arrested. We believe that both obstetric and anesthesia departments should require ACLS certification for residents, with education regarding the special considerations in pregnant women. Further evaluation of other specialties that may be involved in resuscitation of parturients is planned.

References: 1.'Why Mothers Die 2000-2002'; November 2004, CEMACH; 2.'ACLS for Experienced Providers: Cardiac Arrest Associated with Pregnancy', 143-151, 2003, AHA. 3.Clin Obst & Gyn 2003;46:679-687.

Test Results

Test	Anesthesiologists	Obstetricians
Overall Score	81±16*	69±17
LUD	89±22	82±25
ACLS	83±27*	65±36
MP	88±22*	67±29
5CS	60±41	57±36

Values are % correct answers (mean ± SD)

SOAP A-48
EVALUATION OF THE PLATELET FUNCTION ANALYZER (PFA-100®) VS.THE THROMBOELASTOGRAM (TEG) IN THE PARTURIENT

Y. Beilin, I. Arnold, S. Hossain;
Mount Sinai School of Medicine, New York, NY.

Introduction: Thrombocytopenia is a relative contraindication to neuraxial anesthesia, especially when the platelet count is < $100{,}000 \cdot mm^{-3}$. The platelet function analyzer (PFA-100®) is a bedside test of coagulation designed to evaluate platelet function. It measures the time required for whole blood to occlude a membrane impregnated with either epinephrine (EPI) or adenosine 5'diphosphate (ADP). The results are reported as median closure time (CT-EPI or CT-ADP) in seconds. The thromboelastogram (TEG) measures whole blood clotting and the maximum amplitude (MA) correlates with platelet count and function. The purpose of this study is to evaluate if there is 1) a correlation between the platelet count and CT, 2) a difference in CT between parturients with a platelet count ≥ $100{,}000 \cdot mm^{-3}$ vs. those with a platelet count < $100{,}000 \cdot mm^{-3}$, and 3) a correlation between the CT and the MA. A correlation between the platelet count and the PFA-100® or between the CT and the MA would suggest that the PFA-100® may be helpful in the clinical situation when evaluating the parturient with thrombocytopenia who requests labor neuraxial analgesia.
Methods: We evaluated blood drawn from 172 healthy term parturients for platelet count, CT, and MA. A correlation between the platelet count and the CT, between the platelet count and MA, and between the CT and MA were sought using the Spearman rank correlation coefficient (r). The Wilcoxon rank-sum test was used to assess if there is a statistically significant difference in CT or MA with a platelet count ≥ $100{,}000 \cdot mm^{-3}$ vs. a platelet count < $100{,}000 \cdot mm^3$. $P<0.05$ was considered significant.
Results: There were 18 patients with a platelet count < $100{,}000 \cdot mm^{-3}$. We were unable to detect a significant correlation between the CT-EPI and platelet count (r = - 0.1, p =0.21) and the CT-ADP and platelet count (r = -0.02, p 0.83). We failed to find a statistically significant difference between the CT-EPI or CT-ADP in those with a platelet count ≥ $100{,}000 \cdot mm^{-3}$ (CT-EPI = 141 sec, CT-ADP = 99 sec) vs. those with a platelet count < $100{,}000 \cdot mm^{-3}$ (CT-EPI = 152 sec, CT-ADP = 93 sec). We also did not find a correlation between the CT and the MA. We found a significant correlation between platelet count and MA (r = 0.33, p = < 0.001), and we found a difference in MA, that did not quite reach statistical significance, between those with a platelet count ≥ $100{,}000 \cdot mm^{-3}$ (MA= 69) vs. those with a platelet count < $100{,}000 \cdot mm^{-3}$ (MA= 68) ($p = 0.06$).
Conclusion: CT does not correlate with the platelet count or MA in the parturient, but the TEG does. Therefore the TEG may be a better tool to evaluate the parturient with thrombocytopenia.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 1

SOAP A-49
ADMISSION PATTERN AND OUTCOME OF PARTURIENTS TO INTENSIVE CARE

N. Tan, C. S. Grange;
The John Radcliffe Hospital, Oxford, United Kingdom.

Introduction: Although maternal mortality in the UK has been well documented, maternal morbidity remains difficult to measure. Parturient admission to Intensive Care Unit (ICU) may be considered a valid outcome measure of severe maternal morbidity. Our 11-year retrospective review aimed to determine the intensive care admission pattern, intervention and outcome of parturients at the John Radcliffe Hospital, Oxford (University/Tertiary referral centre with 6000 deliveries/year).

Method / Results: We reviewed hospital records of 60 parturients admitted to ICU during 1993-2004 (2 patients were admitted twice and 2 patients were excluded due to missing records). The ICU admission rate was 0.07% of all deliveries with 80% of pregnancies resulting in a live birth (gestational age range 8-41weeks). The majority of women (60.3%) had no pre-existing medical or obstetric history. Major indications for admission were hypertensive disease of pregnancy (50.0%) and hemorrhage (20.8%). Diagnosis at admission is documented in table (14 patients had 2 primary diagnoses). The mean ICU admission was 2.8 days (SD+/-4.45) and mean hospital stay was 18.8 days (SD+/-16.3). 94.8% of patients required invasive monitoring, 60.3% needed ventilatory support, 34.5% required inotropic support and 8.6% required hemofiltration. 95% of patients remained well at 1-year post ICU admission. Of the 3 patients who died, 2 patients died during their ICU admission (one from amniotic fluid embolus, one from intracerebral hemorrhage secondary to HELLP syndrome). The remaining patient with known ischemic heart disease died 8 months post ICU admission from an acute myocardial infarction.

Discussion: Our ICU admission rate remains lower than previously reported in UK.[1,2] Possible reasons include extensive input from a physician led obstetric unit of all high risk parturients and a obstetric high dependency unit which can treat and invasively monitor less critically ill patients. Our maternal mortality remains comparable to other units.

References:

1: IJOA 1996;5:221-224
2: IJOA 1996;5:79-84

Diagnosis	Number of patients
Hypertensive disease of pregnancy	29
Hemorrhage	12
Sepsis	8
Emboli	3
Cardiac	6
Neurological	2
Acute fatty liver of pregnancy	3
Others	5
Diagnosis uncertain	4

SOAP A-50
FETAL AND MATERNAL EFFECTS OF BOLUS OF PHENYLEPHRINE OR METARAMINOL DURING SPINAL ANESTHESIA FOR CESAREAN DELIVERY

M. M. Cardoso, E. T. Yamaguchi, A. R. Amaro, R. Mezzetti, M. A. Torres;
Hospital e Maternidade Santa Joana, Sao Paulo, Brazil.

INTRODUCTION: Metaraminol and phenylephrine are the α-agonists most commonly used to treat maternal hypotension during C-section. Although there are pharmacological differences in relation to their α1 and β1 activity and a number of studies comparing each one of them with ephedrine (1,2), there is no direct comparisons between the use of these two agents during C-section. This study evaluated the maternal and fetal effects of the use of bolus of metaraminol or phenylephrine to control hypotension during spinal anesthesia for C-section.

METHODS: After IRB approval, 40 healthy patients, who were not in labor and scheduled for elective C-section were studied. After a preload of 10ml/kg of Lactate ringer, patients were submitted to spinal anesthesia with 15mg of 0.5% hyperbaric bupivacaine and 40μg of spinal morphine. Baseline systolic arterial blood pressure (BP) and heart rate (HR) were defined as the mean of three successive measurements 1 min apart after the end of the preload. The study was double blinded and patients were randomly allocated to receive: Metaraminol Group (n=20), a 0.2mg bolus of metaraminol for reductions of BP greater than 10% and a bolus of 0.4mg of the drug for reductions greater than 20%; Phenylephrine Group(n=20), a 40 or 80μg of phenylephrine for reductions of BP greater than 10 or 20%, respectively. BP was measured at 1 min intervals beginning 1 minute after spinal injection. Left uterine displacement was maintained until delivery. Apgar scores were assessed at 1 min and 5 min and umbilical artery pH was measured. Statistical analysis was performed with Mann-Whitney and Chi-square tests as appropriate. $P<0.05$ was considered statistically significant.

RESULTS: The groups were similar regarding anthropometric variables and neonatal outcome (Umbilical artery pH, pCO_2, BE and Apgar scores at 1 and 5 minutes). The maternal variables are in table 1. One patient from the Metaraminol Group was excluded from the study due to violation of the protocol.

DISCUSSION: Both metaraminol and phenylephrine can be safely used to treat maternal hypotension during spinal anesthesia for C-section. Probably the small pharmacological differences between these two agents are not clinically important.

REFERENCES:

1.Anesthesiology 95(2)307-13,2001;
2.Anesthesiology 97(6)1582-90, 2002.

Table 1. Maternal variables (number of patients)

	Phenylephrine (n=20)	Metaraminol (n=19)
Tachycardia	3	4
Bradycardia	6	2
Hypertension	3	2
Hypotension 10%	17	13
Hypotension 20%	9	6
Nausea	5	1
Vomiting	1	0

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 1

SOAP A-51
RISK FACTORS FOR TRANSFUSION IN OBSTETRIC PATIENTS

J. T. Ratliff, B. M. Scavone, R. Patel, C. M. Robles, R. McCarthy, C. A. Wong;
Northwestern University Feinberg School of Medicine, Chicago, IL.

Introduction: There is relatively little data examining risk factors for blood product transfusion in the obstetric population (1). Balancing the potentially catastrophic risk of not being prepared for transfusion with the expense of routine type and screen or crossmatching can pose a dilemma. The purpose of this study was to ascertain incidence of transfusion in the obstetric population, as well as prevalence of specific risk factors within transfused patients.

Methods: Following IRB approval, all obstetric patients who received blood products during 2002 and 2003 were identified through blood bank records, and their medical records reviewed to evaluate the prevalence of risk factors for hemorrhage (e.g., chorioamnionitis, multiple gestation, placenta previa, etc). Patients were excluded if they presented for D&C or D&E procedures, or received transfusions $\geq$ 7 days post delivery.

Results: 27 of 14,813 patients who delivered vaginally required transfusion. This corresponds to a transfusion rate of 0.18% (95% CI = 0.12 - 0.26), or 1 transfusion for every 555 vaginal deliveries. 44 of 3844 patients who delivered by Cesarean section required transfusion. This corresponds to a transfusion rate of 1.15% (95% CI= 0.84-1.54), or 1 transfusion for every 87 Cesarean deliveries. Of those obstetric patients transfused, 10% had no identifiable risk factors, 36% had 1 risk factor, 31% had 2 risk factors and 24% had $\geq$ 3 risk factors. The prevalence of specific risk factors is shown in the Table.

Discussion: This study demonstrates that the majority of all obstetric patients requiring blood transfusion presented with identifiable risk factors. These data suggest that it may be possible to predict those obstetric patients at risk, and to establish criteria for crossmatching in this population. Further studies are warranted to determine which patients would most benefit from blood screening and/or crossmatching.

Reference: 1. Obstetrical and Gynecologic Survey 50: 470-81, 1995.

Table

Risk Factor	% of those transfused
chorioamnionitis	25
multiple gestation	20
prior uterine scar no labor	15
placenta previa	14
placental abruption	12
accreta/percreta	10
magnesium therapy	9
prior CS, VTOL	7
IUFD	7
PIH	7
other	11

CS = Cesarean section, VTOL = vaginal trial of labor, PIH = pregnancy induced hypertension, IUFD = intrauterine fetal demise

SOAP A-52
THE EFFECT OF EPIDURAL ANESTHESIA WITH AND WITHOUT FENTANYL ON INFANT BREAST FEEDING: A PROSPECTIVE, RANDOMIZED, DOUBLE-BLIND STUDY

Y. Beilin, J. Wieser, G. Martin, H. Bernstein, I. Arnold, J. Zahn, I. Holzman;
Mount Sinai School of Medicine, New York, NY.

Introduction: Breast milk is considered the best source of nutrition for the newborn. Controversy exists as to the impact of maternal epidural opioid analgesia on the neonate. The purpose of this study was to determine if epidural fentanyl impacts on the newborns ability to breastfeed.

Methods: Women who previously breastfed a child, who planned to breastfeed this child, and who were receiving labor epidural analgesia, were randomized to one of three groups based on the amount of epidural fentanyl they received during labor: 1) no fentanyl; 2) $\leq$150 µg fentanyl (intermediate group), and 3) >150 ug fentanyl (high group). On postpartum day one, the woman assessed her baby's ability to breastfeed, and a lactation nurse observed the mother breastfeeding her child and determined if the child was experiencing breastfeeding difficulty. Also, on postpartum day one, a pediatrician assessed the baby using the neurologic and adaptive capacity scoring system (NACS) to determine if there was any evidence of neonatal depression. All women were contacted at 6 weeks postpartum to determine if they were still breastfeeding. Data were analyzed with the chi-square test. $P<0.05$ was considered significant.

Results: There were 60 patients randomized to the no fentanyl group, 59 to the intermediate fentanyl group, and 58 to the high fentanyl group. At 24 hours post delivery, overall, 24 (14%) women stated that their baby was having breastfeeding problems. Of the 24, more were in the high fentanyl group (12, 21%) than in the intermediate fentanyl group (6, 10%) or the no fentanyl group (6, 10%), p=0.09. There were 14 patients (9%) who were not breastfeeding at 6 weeks; 1 in the no fentanyl group, 3 in the intermediate fentanyl group and 10 in the high fentanyl group (p=0.005). If a woman reported a problem at 24 hours she was more likely not to be breastfeeding at 6 weeks (29%) then if she did not report a problem (6%) (p=0.004). At 24 hours post-delivery, overall, the lactation consultants reported that 59 (41%) patients were having difficulty with breastfeeding. Of the 59, 20 were in the high fentanyl group, 20 in the intermediate fentanyl group, and 19 in the no fentanyl group (p=1.0). There was a significant difference in NACS scores with a median score of 35, 34, and 32 in the no fentanyl, intermediate fentanyl, and high fentanyl group, respectively (p=0.03).

Discussion: A Woman who received >150 µg of epidural fentanyl was more likely to report difficulty with breastfeeding on postpartum day one and to have stopped breastfeeding at 6 weeks as compared to a woman who received less fentanyl or no fentanyl, although the incidence of breastfeeding problems were small. Further study is needed to fully elucidate these findings.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 1

SOAP A-53
THE EFFECT OF ADDING EPINEPHRINE TO AN ULTRA-LOW DOSE EPIDURAL SOLUTION AFTER COMBINED SPINAL EPIDURAL ANALGESIA

A. Vasudevan, S. D. Pratt, P. E. Hess;
Beth Israel Deaconess Medical Center, Boston, MA.

Introduction: During labor epidural analgesia, many women experience breakthrough pain (BTP). Various medications and strategies have been proposed to reduce BTP, including combined spinal-epidural technique (CSE) and adding supplemental medications such as intrathecal morphine.(1) Recently, epinephrine has been shown to reduce the median local anesthetic concentrations required to initiate labor analgesia.(2) We evaluated whether epidural epinephrine (1:600,000) to a low dose labor epidural reduced BTP.

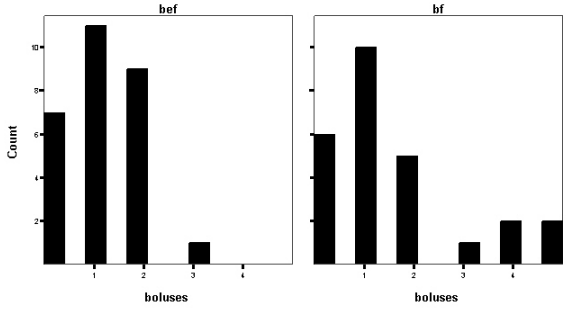
Methods: IRB approval and written consent. Term parturients received CSE technique with 12.5mg fentanyl and 2mg bupivacaine. Subsequent epidural analgesia was either 0.04%bupivacaine with 1.7mcg/cc fentanyl at 15 cc/hr (Group BF), or the same solution with epinephrine 1:600000 at 15 cc/hr (Group BEF). Episodes of breakthrough pain during subsequent epidural analgesia compared using Mann-Whitney test. Statistical significance set to $p<0.05$. Power analysis performed using Poisson probability distribution, with alpha=0.05, and power=0.08.

Results: 54 women completed the study (60 enrolled, BF=26 BEF=28). Age, height, weight, parity and neonatal weight were similar (p=NS for all). The median cervical at placement of CSE was 4cm in both groups (p=NS). The duration of labor was similar (4hr9min vs. 4hr46min, p=NS). Women who received BF had 1.6±1.5 episodes of BTP vs. 1.1±0.9, p=0.5. The rate of breakthrough pain was BF=0.40±0.35 episodes per hr. vs. BEF=0.25±0.22, p=0.11. A trend toward fewer women with recurrent BTP (3 or more episodes) BF=19% vs. BEF=3.6% did not reach statistical significance, p=0.08. The number of patients randomized to a future study is 133 for comparison of rate of BTP, and 45 for comparison of recurrent BTP.

Discussion: After a CSE, the addition of epinephrine 1:600000 to an ultra-low dose epidural solution resulted in a 38% reduction in breakthrough pain; however, this was not statistically significant due to the sample size of the study. Using Poisson probability to calculate power, we estimate that future studies will have to have larger groups.

Reference: 1-Anesth.Analg., 97:247,2003. 2-Anesthesiology, 96:1123, 2002.

Figure1: Distribution of boluses during epidural analgesia.



SOAP A-54
PHARMACOKINETIC SIMULATION OF REMIFENTANIL FOR LABOR ANALGESIA

P. Flood, A. Datta;
Columbia University, New York, NY.

Introduction: Remifentanil is the ideal opioid for labor analgesia, in theory. In practice, studies have reported mixed success. Because of its quick onset, rapid, predictable non-organ based degradation and lack of accumulation, remifentanil has the potential to take on any desired pharmacokinetics based on its delivery regimen. We hypothesized that the high incidence of maternal side effects associated with remifentanil use in labor is due to suboptimal delivery paradigms.

Methods: We used Entrez-Pubmed (key words: remifentanil, labor) to identify all clinical series and trials in English, published between 1999 and January 2005 that studied more than one patient. Using the pharmacokinetic modeling program Stanpump and a record of uterine contractions from a de-identified woman in active labor, we predicted the plasma and effect site (CNS) levels of remifentanil that would result from the administration paradigms described in the studies. For studies that utilized a component of PCA, we assumed that a bolus would be administered on the up slope of a contraction if it did not occur during the lock-out period.

Results: We identified 10 reports of remifentanil use of labor analgesia. Five trials reported maternal side effects including hemoglobin-oxygen desaturation, sedation nausea, vomiting and pruritis. The simulated CNS remifentanil concentrations exceed that known to cause respiratory depression in all studies (up to 10ng/ml). The one study that was stopped prematurely due to ineffective pain relief and maternal side effects had predicted low remifentanil concentrations (1). However, the maximal remifentanil concentrations were not predictive or reported side effects.

Discussion: Remifentanil, when given as a bolus results in high blood and effect site levels that rapidly diminish. This is a problem in labor because the onset is not as fast as the development of the peak of the contraction and uterine contractions can not be readily anticipated. The peak drug level does develop faster than the mother can build up CO2 level in the blood and thus is at high risk of hypoventilation or apnea. The rapid offset of remifentanil in combination with longer lockout intervals leads to low drug levels and inadequate analgesia. Used as an infusion, remifentanil levels reach the desired equilibrium within 5 minutes. Transient peak levels are less worrisome for causing side effects. We suggest that PCA using increasing and decreasing infusions of remifentanil would be safer for the mother and better, more predictable pain relief.

1. Olufolabi AJ, Booth JV, Wakeling HG et al. A preliminary investigation of remifentanil as a labor analgesic. Anesth Analg 2000;91:606-8.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 1

SOAP A-55
A COMPARISON OF ANALGESIC REQUIREMENTS AND POSTOPERATIVE RECOVERY: ELECTIVE VS. UNPLANNED CESAREAN DELIVERY

B. Carvalho, A. Saxena, S. Sarna, A. Fuller, E. T. Riley;
Stanford University Medical Center, Stanford, CA.

Introduction: Studies examining the effects of various analgesics and anesthetics on postoperative pain following cesarean delivery (CS) conventionally use the scheduled CS population. This limits the number of subjects post-CS pain studies can be conducted on. We are unaware of any studies comparing post-operative analgesic requirements and recovery profiles in woman undergoing elective compared to unplanned CS following labor.
Methods: Following IRB exemption approval, we conducted a retrospective chart review of the last 200 cesarean deliveries undertaken at Stanford University Hospital, California. We examined the records of 100 patients who underwent scheduled CS under spinal (1.6 ml intrathecal bupivacaine with 10 mcg fentanyl and 200 mcg morphine) and 100 patients that had CS following labor under epidural anesthesia (10-25 ml epidural 2% lidocaine top-up with 4 mg morphine after cord clamping). We recorded pain scores, analgesic consumption, time to first analgesic request, side effects and length of stay. Data was collected over a two month period (July-August 2004).
Results: We found no difference between scheduled CS and CS following labor in respect to postoperative pain scores (Figure) and analgesic consumption (Table) for up to five days following CS. There were no differences in respect to side effects such as nausea, vomiting or pruritus ($p>0.05$). Posthoc power analysis indicated we had 92% power to detect a clinically significant difference (30% reduction in postoperative opioid analgesic consumption) between the two groups ($P<0.05$).
Conclusion Postoperative pain, analgesic consumption and side effects were similar in patients undergoing either scheduled CS with 200 mcg intrathecal morphine or CS following labor with 4 mg epidural morphine. These results indicate that these neuraxial morphine doses provide similar postoperative analgesia. Unplanned CS can be a viable surgical model to investigate analgesia and recovery following CS.
References: BJA 2003; 91:690-4; Anesth Analg 2002; 95:436-40

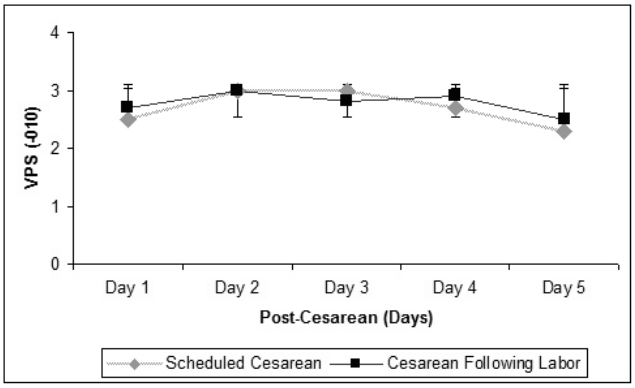


Table: Analgesics consumed during the five day post-Cesarean period

Analgesics Used	Scheduled Cesarean	Cesarean After Labor	Statistical Significance
Oral Opioids (mg)*	82 ± 51	94 ± 54	P = 0.58
IV Morphine (mg)	0.7 ± 2.6	0.5 ± 2.7	P = 0.60
Ibuprofen (mg)	1921 ± 2319	2118 ± 2326	P = 0.24

Values are presented as mean ± SD; *Oral opioids consists of hydrocodone and oxycodone converted to IV morphine equivalents in a 7.5:10 ratio.

SOAP A-56
CONTINUOUS SPINAL ANAESTHESIA IN HIGH RISK PARTURIENTS UNDERGOING ELECTIVE CAESARIAN SECTION: AN OBSERVATIONAL STUDY

S. M. Whittaker, A. S. Bullough;
The Great Western Hospital, Swindon, United Kingdom.

Introduction: Continuous spinal anaesthesia (CSA) has regained a place in the anaesthetist's armoury. However, in obstetric anaesthesia, little data has been published since withdrawal of FDA approval for microcatheters in 1992. There are 3300 deliveries/annum at the Great Western Hospital, Swindon, a 25% caesarean section rate and an 8 % high-risk obstetric patient population. The aims of this observational study were to identify high-risk patients suitable for CSA, develop hospital CSA guidelines, monitor CSA success rate, monitor maternal satisfaction rates and identify post-operative complications at day 1 and day 14.
Methods: Recruitment was over a nine-month period between March and November 2004. High-risk obstetric patients undergoing elective caesarean section were selected and counselled for CSA. Using a 22G pencil point spinal needle (Kendall) and 28G microcatheter in each case, 2.0-2.5mls of 0.5% heavy bupivacaine with 0.3mg diamorphine were injected intrathecally using the supplied 1.0ml glass syringe. The microcatheter was removed at the end of surgery. A form was completed on the day of surgery detailing the ease of insertion and immediate complications. Follow-up at day 1 included documenting post-operative complications, patient satisfaction rates and consent for the day 14 telephone follow-up.
Results: 8 of 9 CSAs were inserted on the first attempt (1 case on the second attempt). 8 of 9 caesarean sections were completed with CSA use only (1 required supplementation with entonox and intravenous alfentanil). Follow-up (**day 1: day 14**) revealed - PDPH (**0:0**), pruritis (**4:0**), nausea / vomiting (**1:0**), new backache (**0:0**), cauda equina symptoms (**0:0**) and other signs or symptoms (**0:0**). 8 of 9 patients were satisfied with their experience (1 patient had an unrelated anaphylactoid reaction to cefuroxime).
Discussion: CSA has seen a renaissance as a useful anaesthetic technique in high-risk patients. Advantages cited are excellent control of segmental spread and duration; effectiveness of small doses of local anaesthetic and decreased cardiovascular side-effects. There is a paucity of CSA usage data in high-risk obstetric patients undergoing an elective caesarean section except for several case reports. Smith et al 2003 (1) reported a CSA success rate of only 63% in a musculoskeletal cohort. We have been using 28G spinal catheters, in orthopaedic patients for over 3 years and have extended this success to high-risk obstetric patients. We find the 28G microcatheter easy to use (100% success rate for insertion), effective and reliable (one case of failed top-up), with a minimal side-effect profile at day 1, no persisting side- effects at day 14 and a high maternal satisfaction rate. This short series suggests a place for CSA in selected high-risk obstetric patients undergoing elective caesarean section. Yet further work and larger patient numbers are needed to clarify this.
References: (1) IJOA, **12**, pp 17-22, 2003.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-20050500-00041.pdf by guest on 19 April 2024

POSTER REVIEW 1

SOAP A-57
A SYSTEMATIC REVIEW OF PREGNANCY OUTCOMES FOLLOWING BARIATRIC SURGERY FOR MORBID OBESITY

R. Wissler;
University of Rochester, Rochester, NY.

Introduction: Bariatric surgery is the most effective therapy for morbid obesity (BMI > 40). The incidence of morbid obesity and the utilization of bariatric surgery are both increasing, including women of reproductive age (1). OB anesthesiologists will be providing care for an expanding population of these patients. A definitive prospective study of pregnancy outcomes following bariatric surgery does not exist.
Methods: Primary Search: Medline database, 1966 -12/1/04: ("bariatric surgery" or "gastric bypass" or "gastroplasty" or "anastomosis, Roux-en-Y" or "biliopancreatic diversion" or "gastroenterostomy") AND (31 Medline parameters related to pregnancy), yield = 71 citations. Secondary search: primary articles reviewed for additional references, yield = 55 additional citations. 126 articles were read for content. Preliminary Study Group: 47 articles describing pregnancy outcomes (maternal and/ or fetal) after bariatric surgery. Articles deleted for non-English language (n=5), insufficient data (n=3) and data duplication (n=2). Jejuno-ileal bypass is a historical technique in bariatric surgery (2), and is excluded (16 articles). Current bariatric procedures include; gastroplasty, gastric banding, gastric bypass and biliopancreatic diversion. Patients treated with these current bariatric techniques have been combined into one Final Study Group, with 21 articles (published in 1982 through 2004). These articles describe 846 pregnant women (ages 19-49) with 1105 pregnancies after bariatric surgery, from ten US states and six other countries. These articles are case reports (n=9), or retrospective comparisons between pregnant women after bariatric surgery and preoperative or nonsurgical controls (n=12). Groups are compared by z-test with $p<0.05$.
Results: With current bariatric surgical procedures:
1. Fertility improves after weight loss from bariatric surgery, analogous to weight loss with other modalities (3).
2. Two obesity-associated pregnancy complications, hypertension and diabetes mellitus, are significantly decreased after bariatric surgery (27.1% to 7.5% and 12.5% to 6.1%, respectively).
3. The overall Cesarean section rate following bariatric surgery is 27.1%, and does not differ from the preoperative control group (27.2%).
4. Case reports of pregnancies following bariatric surgery describe:
a. deficiencies of iron, vitamin B12, folate and/or fat-soluble vitamins
b. gastrointestinal necrosis following mesenteric herniation (n=1).
5. The ideal interval between bariatric surgery and conception, and the ideal dynamics of maternal weight during pregnancy remain undefined. Successful outcomes have been reported with either bariatric surgery in unrecognized early pregnancy, or maternal weight loss during pregnancy.
Discussion: Based on the existing retrospective data, weight loss after bariatric surgery is usually associated with fewer complications in subsequent pregnancies. Patients with a history of bariatric surgery should have close surveillance for nutritional deficiencies during pregnancy and lactation. Unfortunately, there is a lack of information concerning OB anesthesia care in pregnancies following bariatric surgery.
References:
1. N Engl J Med 350:1075-9, 2004
2. J Am Coll Nutr 21:365-71, 2002
3. Hum Reprod 13:1502-5, 1998

SOAP A-58
A SURVEY OF SUBARACHNOID AND INTRAVENOUS TEST-DOSE PRACTICES IN EPIDURAL AND COMBINED SPINAL EPIDURAL OBSTETRIC ANESTHESIA

B. B. Clyne, P. H. Pan, R. D'Angelo;
Wake Forest University School of Medicine, Winston-Salem, NC.

Introduction: The practice of subarachnoid (SA) and intravenous (IV) test-dosing is controversial and varies among obstetric anesthesiologists. It has been suggested that test-doses are unnecessary and that the fractionated dosing of epidural solution along with an awareness of risks is sufficient to prevent toxicity. The purpose of this survey was to assess SA and IV test-dose practices of obstetric anesthesiologists associated with epidural (EA) and combined spinal epidural (CSE) analgesia in obstetrics.
Methods: After IRB approval an e-mail list was compiled from the *SOAP* directory and individually e-mailed by our institution. Survey questions included physician demographics, SA and IV test-dose practices with EA and CSE analgesia, preferred medications, and if they had observed serious CNS or CV local anesthetic toxicity during the past 10 years.
Results: Of the 636 surveys sent, 167 physicians (26%) responded. Of responders, the average work experience was 15 years and 60% were from academic practices, 36% from private practices and 4% were residents or in the military. 82% of responders routinely perform CSE on laboring patients. With EA, 84% perform a SA test-dose: 55% use lidocaine 45mg + epi 15mcg, 14% use 0.25% bupivacaine 7.5mg, 11% use lidocaine 40mg, and 15% use fractionated doses of the labor epidural solution. Twenty percent who perform a SA test-dose also perform a separate IV test-dose and 30% use no IV test-dose. With CSE, 42% perform a SA test-dose: 60% use lidocaine 45mg + epi 15mcg, 21% use lidocaine 40mg, and 14% use 0.25% bupivacaine 7.5mg. Seven percent who perform a SA test-dose also perform a separate intravenous test-dose and a total of 71% utilize either a combined or separate IV test-dose. Eighty-three percent of responders immediately begin the epidural infusion, whether or not a test-dose is utilized.
Sixteen anesthesiologists reported witnessing a serious CNS or CV complication from an IV catheter in an obstetric patient during the past ten years. Of these, 14 utilized an IV test-dose: 9 used a combined test-dose with lidocaine 45mg + epi 15mcg while 5 administered a separate IV test-dose with lidocaine 100mg.
Discussion: With EA analgesia, the majority of obstetric anesthesiologists use a combined SA-IV test-dose consisting of lidocaine 45mg + epi 15mcg. With CSE analgesia, the majority, 58%, do not perform either a SA or IV test-dose. Of those who have witnessed serious IV toxicity, 88% utilized an IV test-dose. Thus, it appears that the utilization an IV test-dose does not entirely prevent serious toxicity and while a variety of testing practices continues, the most important aspect of patient safety is vigilance and the treatment of every dose as a potential IV dose.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 1

SOAP A-59
TRAUMA IN PREGNANCY: DO LOCAL FEATURES MAKE A DIFFERENCE?

C. E. Restrepo[1], O. L. Giraldo[2], W. A. Palacio[3], G. A. Rodriguez[3], N. I. Socha[4], N. Fernandez[5];
[1]Clinica Las Americas & UPB Anesthesia Program, Medellin, Colombia, [2]Hospital Regional de Rionegro, Medellin, Colombia, [3]HSVP, Medellin, Colombia, [4]CUB/ISS & UPB Anesthesia Program, Medellin, Colombia, [5]ISS, Medellin, Colombia.

Introduction
Trauma is a leading cause of non-obstetrical death[1], usually associated with road traffic accidents, but in some places where violence is a daily problem this becomes the first cause. There are no data in our country about this condition; the only South-American work is a Brazilian experience[2]. Our aim was review our local trends in the main trauma center in the city and propose a national record form for these patients.

Methods
We conducted a 14-year retrospective review of clinical records of pregnant women admitted with any kind of trauma diagnosis. Cases were identified by the perioperative hospital database.

Results
41 patients were evaluated. The mean age was 24.5 years (15-39 years). Gestational mean age was 21.9 weeks (6-39 weeks) with most victims being in the third trimester (43.9%). The trauma mechanism and the localization of the injury are shown in the table:

Mechanism	n	(%)
Violence	25	(61)
Road-Traffic	11	(27)
Poisoning	2	(4.9)
Snake-bite	2	(4.9)
Other	1	(2.4)
Localization	n	(%)
Joints	15	(37)
Abdominal	14	(34)
Head Injury	10	(24)
Thorax	10	(24)
Uterine	6	(15)
Ocular	3	(7.3)
Spinal-Cord	2	(4.9)
Vascular	2	(4.9)

Among the violent injuries 56% were victims of knife wounds, 36% gunshot wounds, 4% hammer-like wounds and domestic violence 4%. Twenty-seven patients underwent surgical exploration, being exploratory laparotomy (44%) the most common procedure. There were 5 caesarean sections in this survey (18.5%: 3 for maternal indications and 2 for foetal indications). There was one maternal death due severe head injury and 9 foetal deaths mainly from placental abruption. Only 5% of the patients received prophylaxis against premature labor. Nobody was premedicated for acid aspiration. General anaesthesia with inhalation agents was used in 85%.

Conclusions
Pregnant women in our city cannot escape violent trauma, which explains the difference between our series and another countries. This register will help us to create a National Pregnancy Database in order to improve the care of this catastrophic event.

References
[1] Shah KH. J Trauma 1998; 45:83-86.
[2] Corsi TR. Injury 1999; 30: 239-243.

SOAP A-60
MATERNAL AND FETAL HAEMODYNAMICS DURING SPINAL ANAESTHESIA FOR CAESAREAN SECTION USING PROPHYLACTIC PHENYLEPHRINE

V. Bythell[1], W. J. Wight[1], V. Ashton[1], N. Steen[2], S. C. Robson[1];
[1]Royal Victoria Infirmary, Newcastle upon Tyne, United Kingdom, [2]University of Newcastle upon Tyne, Newcastle upon Tyne, United Kingdom.

Introduction: Several studies have evaluated the effects of spinal anaesthesia on maternal and fetal haemodynamics and fetal acid-base status. Few to date have extensively evaluated these parameters with current optimal management of maternal blood pressure. We have conducted a prospective observational study of maternal and fetal haemodynamics and fetal outcome following single shot spinal anaesthesia using prophylactic phenylephrine infusion to control maternal blood pressure.
Methods: Following ethical committee approval, 60 healthy women scheduled to undergo elective caesarean section at 39 weeks gestation were enrolled into the study. In addition to non-invasive maternal blood pressure (BP) and heart rate measurement, maternal cardiac output (CO) and umbilical artery (UA) pulsatility index were measured by Doppler ultrasound by the same person using the same equipment (ALOKA SSD2000 Scanner) at the following time intervals: prior to anaesthesia, 5, 10, and 15 minutes post spinal injection. The primary fetal outcome measure was UA blood gases, which were measured as soon as possible after delivery. Spinal anaesthesia was performed in the sitting position with 12.5 mg bupivacaine and 300 μg diamorphine. Mothers were not formally fluid preloaded; an intravenous infusion of Hartmann's solution was commenced prior to spinal anaesthesia. A prophylactic infusion of phenylephrine was commenced according to our protocol[1] immediately after the spinal injection, and the rate adjusted by the anaesthetist according to subsequent maternal blood pressure recordings. Degree of correlation between measures of maternal haemodynamics and UA pH and base excess were quantified using Pearson's correlation coefficient.
Results: All women achieved adequate anaesthesia for LSCS. There was one conversion to general anaesthesia due to surgical complications, after the study period had elapsed. Mean pre-anaesthetic maternal systolic BP and CO were 121 mmHg and 8.2 $Lmin^{-1}$ respectively and were not significantly altered during the study period. Mean UA pulsatility remained constant throughout and the mean UA pH was 7.30. The mean UA base excess was -1.6 $mmolL^{-1}$. There was no correlation between measures of maternal haemodynamics and UA pH; however, there was one umbilical arterial sample with a base deficit of -9.0 $mmolL^{-1}$ and an umbilical arterial pH below 7.2, which was associated with a 5 min period of maternal hypotension.
Conclusions: The mean UA pH was higher than we have found in previous studies using ephedrine as treatment rather than prophylactic phenylephrine for the management of maternal hypotension[2]. However, occasional severe hypotension associated with fetal acidaemia still occurs when prophylactic phenylephrine infusions are used. Further work should focus on prevention of this problem. We did not identify any overall correlation between fetal status as measured by umbilical artery blood gases and any measure of maternal haemodynamic status.
References: 1. Anaesthesia 2003; 58 (3):288-289. **2.** Br J Anaesth. 1996 Jan;76(1):61-5

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 2

SOAP A-61
EFFECT OF 2-CHLOROPROCAINE ON BLOOD COAGULATION IN PREGNANCY

M. Kaynar[1], S. Datta[2], B. Kodali[2];
[1]Beth Israel Deaconess Medical Center, Boston, MA, [2]Brigham and Women's Hospital, Boston, MA.

Amide local anesthetics produce dose dependent decrease in maximum amplitude (MA) on Thrombelastography.® 2-Chloroprocaine is the only agent belonging to the ester category that is used commonly in obstetric emergencies. There is no study, which has evaluated its effect on blood coagulation. The objective of this study is to determine the effect of 2-Chloroprocaine on the blood coagulation in healthy parturients at term pregnancy using Thrombelastograpy® technique.

Methods: After IRB approval, 5 ml of blood was drawn into a buffered citrated tube. Two pre-calibrated Haemoscope dual channel TEG® analyzers (model 5000) were used for this study (4 channels). One ml of citrated blood was added to each of the 4 tubes containing 35 uL celite. 330 uL of this activated blood was added to each of the pre-warmed cups of TEG analyzers containing 20 uL of 0.2 M calcium chloride. 30 uL of normal saline was added to channel 1 (control). Varying amounts of normal saline was added to 3% 2-Chloroprocaine to create three serial concentrations of 2-Chloroprocaine. 30 uL of these study solutions were added to the other three cups of TEG analyzers containing blood to provide final concentrations of 2-Chloroprocaine 7.8, 2.6, and 1.3 mM respectively. 7.8 mM is equivalent to agent to blood ratio of 1:11 parts. Thrombelastograph® variables were obtained and were analyzed using one-way analysis of variance (ANOVA) for repeated measures with Bonferroni's post hoc test. A value of $p<0.05$ was considered significant (*).

Results: **N=10 parturients at term gestation. Mean(SD)**

Sample	R (mm)	K (mm)	MA (mm)	α degrees	Lysis 30 (%)
0.9%	6.1 (1.31)	2.1 (0.47)	70.3 (3.86)	75.87 (3.34)	1.1 (1.27)
1.3 mM	5.9 (1.29)	1.8 (0.27)	71.7 (3.05)	78.6 (1.98)	0.2 (0.27)
2.6 mM	6.4 (2.63)	2.2 (0.57)	68.3 (3.45)	76.6 (5.21)	7.9 (14.08)
7.8 mM	**15.9 (3.7)***	**4.8 (0.75)***	**53 (8.68) ***	**62.6 (2.94)***	**16.6(12.25)***

Discussion: Our study showed that 2-Chloroprocaine results in decreased coagulation as well as enhanced lyses. These changes occurred at a lower concentration than that were reported for lidocaine (18.5 mM). (1-3) The trend towards increased lysis was observed in this study even at lower concentrations of 2-Chloroprocaine (2.6 mM). This is an important finding in the light of 2-Chloroprocaine being less potent than lidocaine in its local anesthetic effect. If further studies confirm that 2-Chloroprocaine is associated with more lysis than amide local anesthetics, then we are indeed fortunate that we do not use this ester agent as commonly as other amides.

Reference: (1) Anesth Anal 1996;82:766. (2) Brit J Anesth 2005;94:117 (3) Eur J Anaesth 2000;17:373

SOAP A-62
DOES PREMATURE RUPTURE OF MEMBRANES INCREASE THE NEED FOR CESAREAN DELIVERY IN WOMEN WITH PRETERM RUPTURE OF MEMBRANES BETWEEN 24 AND 34 WEEKS GESTATION?

S. Contag, B. Brost, W. Watson, G. Vasdev;
Mayo Clinic, Rochester, MN.

Introduction: The national cesarean delivery (CD) rate has increased substantially as a result of standard of care indications as well as increased restrictions in the use of VBAC in order to protect maternal and infant well being. Women with SROM are often induced for medical indications or electively to decrease the risk of infection. We propose to assess the risk of cesarean delivery by labor method in women with preterm PROM.

Methods: After IRB approval, all women managed at our institution who had a SROM at 24 to 34 weeks gestation between January 1992 and December 2003 were identified using a prospectively maintained maternal and infant database. Groups were analyzed by the method of labor into spontaneous labor and those undergoing medical or elective induction of labor. Maternal and infant variables were obtained and evaluated using Chi square analysis, logistic regression and an odds ratio that was obtained with a 95% confidence interval. A p-value <0.05 was considered statistically significant.

Results: There were 992 patients and 1,188 infants. Women with spontaneous labor were more likely to deliver infants at a later gestational age and higher birth weight than those with induction of labor. The mean and median gestational age at time of PROM was 31.1 and 32.0 weeks respectively. The odds ratio for having a CD in patients with SROM decreased significantly between 24 and 34 weeks gestation (OR 0.35 95%CI 0.23-0.55). There was a significant increase in the risk of a CD among patients with elective (OR 1.83, 95%CI 1.37-2.43, $p<0.0001$) and medically indicated induction (OR 4.72, 95%CI 2.70-8.52, $p<0.0001$) versus spontaneous labor. Endotracheal intubation was required in 197 newborns, 34.62% at 24-31 weeks, 4.48% at 32-33 weeks and 2.43% at 34 weeks gestation at time of rupture. There was a 6.19 (95%CI 1.85-21.67) OR for a newborn with infectious complications to be intubated

Discussion: Regression between gestational age and mode of onset of labor showed that the OR of CD at 34 weeks compared to 24 weeks of gestation was significantly lower. Elective induction of labor is associated with a risk of CD that is twice that observed in women with spontaneous onset of labor. The very nature of the complications frequently associated with medically indicated induction increases the risk of CD over fourfold. In women with preterm PROM, maternal and fetal risks of continuing pregnancy should be considered in light of the increased risk of CD with elective or medically indicated induction of labor.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 2

SOAP A-63
ASSESING COMPETENCE IN NEURAXIAL ANESTHESIA PROCEDURES : AN APPLICATION OF THE CUSUM METHOD

C. G. Arzola, S. E. Cerda, R. E. Montaño;
Universidad de Chile, Santiago, Chile.

Introduction: Evaluation of competence in anesthestetic procedures should be an important issue in Anesthesia Residency Programs. We describe the construction of learning curves using the cumulative sum method (CUSUM) to assess proficiency of residents in neuraxial anesthesia

Methods: In a prospective fashion all procedures performed by residents between March-December 2004 are registered in ad-hoc database. Two attempts of neuraxial anesthesia are allowed, success or failure are categorized continuously along the time. Competence intervals are build from acceptable and unnacceptable failure rates (15% and 30%).

Individual curves are depicted for each resident using CUSUM. Competence is defined as the decrease and permanence below 2 intervals (Figure 1). The number of procedures needed to achieve competence is estimated from each curve, and correlation of failure with patient, procedure or resident characteristics is obtained. Statistics: Logistic regression, $p< 0.05$ is considered significant.

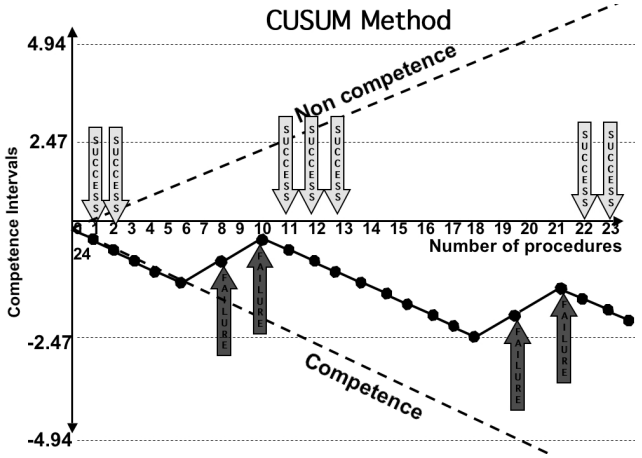


Figure 1

Results : 1162 procedures performed for 13 residents are analyzed. Using CUSUM definition , competence is obtained by 77% (10) of residents, whom needed 59 procedures to achieve proficiency. 23% do not obtain competence in this study. Total failure rate is 12.1% being 11.75% in the competent group and 19.3% in those who did not get competence. Correlation analysis did not demonstrate association between failure rate and type of procedure (CSE, spinal or epidural), year of Residency (CR 2 or CR3) , or type of Surgery (Ob or Gyn). Only BMI shows a significant correlation with failure rate in the total sample (OR 1.9 IC95% 1.3-2.8 , p value 0.001).

Discussion: CUSUM is a valuable tool for training in Anesthesia , because objective assesment of competence is obtained. Failure rates did correlate with individual curves in competent and non competent residents in this study. Increasing number of procedures or early staff intervention should be mandatory in the non competent residents and BMI is strongly associated with failure and demands special approach of residents and staff.

References :

1) The Construction of Learning Curves for Basic Skills in Anesthetic Procedures: An Application for the Cumulative Sum Method. De Oliveira Filho GR et al , Anesthesia-Analgesia 2002;95:411-6

SOAP A-64
PREVENTION OF HYPOTENSION FOLLOWING CSE ANESTHESIA FOR C SECTION : A COMPARATIVE STUDY OF SMALL DOSES OF HYPERBARIC OR ISOBARIC BUPIVACAINE

S. E. Cerda;
Universidad de Chile, Santiago, Chile.

Introduction: Hypotension is the most common complication of neuraxial anesthesia for C Section, reaching rates near 60% in different series. Lowering dosage of LA has been described as a valuable method to reduce their incidence , but quality of blockade may be compromised. We describe the effect of small doses of bupivacaine in this clinical setting

Methods: Local Ethics Committee approval, and written informed consent were obtained After 10 ml/kg Ringer pre-hydration and baseline NIBP determinations (3), 120 patients scheduled to undergo elective CS received a CSE in the left lateral position and were randomly allocated to one of 6 dose - baricity groups.

Coded vials containing 3.75 - 5.0 or 6.25 mg of isobaric or hyperbaric (8% dextrose) bupivacaine were provided (Biosano Lab). Fentanyl 25 mcg and epinephrine 50 mcg , were added up to a 3 ml total volume, as the spinal component of the CSE anesthesia.

Serial NIBP at 1 -2 and 5 minutes intervals was measured until 60 minutes

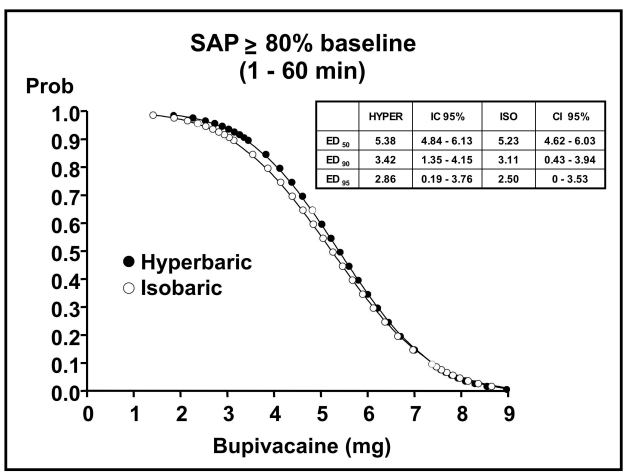
Primary endpoints: SAP > 80% baseline between 1-60 minutes post CSE

Secondary endpoints: IV ephedrine $\leq$ 6 mg between 1- 60 minutes post CSE, incidence of nausea and vomiting , umbilical cord BE and pH

Statistics: one way ANOVA, Fisher´s Exact test, and probit analysis , $P< 0.05$ was considered significant.

Results: A dose dependent decrease in the number of patients who mantain SAP > 80% baseline, with minimal differences between HYPER or ISO Groups (Fig 1) was observed. ED 95 for this criteria was significantly higher for HYPER than ISO bupivacaine in the three Group revealing the importance of baricity and spinal spread in keeping stable SAP. Less than 5% of patients required more than 6 mg of IV ephedrine to mantain SAP >80% baseline when less than 5 mg of bupivacaine were administered. Nausea and vomiting shows a dose dependent increase in incidence ($p<0.05$). Cord pH and BE were normal in all Groups.

Discussion: Hypotension is prevented using small doses of bupivacaine in the spinal component of CSE for CS. It is important to note that both, satisfactory anesthesia and hemodynamic stability are possible with this approach.



Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 2

SOAP A-65
MENISCUS CHANGE IN THE EPIDURAL CATHETER AS A TEST CONFIRMING CORRECT PLACEMENT

M. N. Riesner, M. V. Greenfield, L. S. Polley;
The University of Michigan Health System, Ann Arbor, MI.

Introduction: The meniscus test (MT) is a rapid, noninvasive test which has been used to confirm correct epidural catheter placement (1,2). The test is performed by observing a normal saline (NS) meniscus and air bubbles while physically manipulating the catheter. Because it does not rely on response to medication, it is simple and safe to perform on any parturient. The aim of our study is to confirm that a fall in meniscus correlates with correct catheter placement, with the eventual goal of comparing agreement between the MT and pharmacologic test dose (PTD). We report preliminary findings from the first large study in parturients.

Methods: Following IRB approval and informed consent, 261 parturients at ≥36 weeks gestation requesting lumbar epidural catheter placement for labor analgesia or elective cesarean section were recruited. After initial aspiration of the catheter for blood or cerebrospinal fluid, 1ml of air followed immediately by 1ml of sterile NS was injected. The end of the catheter was: [A] raised ≥30cm above the site of insertion and observed for a rapid fall in meniscus, [B] lowered ≥30cm below the insertion and observed for NS backflow, which stopped or slowed spontaneously, and [C] observed at the skin interface for air bubbles. A 3ml 1.5% lidocaine with 1:200,000 epinephrine PTD was given and results recorded. In addition to maternal and fetal vital signs, catheters which provided inadequate analgesia and/or required replacement were noted.

Results: Initial aspiration detected 10 intravascular placements. Meniscus fall was not observed in 35 patients, three of whom did not attain adequate levels of analgesia. Three intravascular placements detected by the PTD were not identified by the MT. No intrathecal placements were detected by either test. 250 of 261 patients had adequate levels of analgesia defined by ≥T10 level. Six patients had levels ≤T10 and 5 levels were not recorded. Sensitivity of the MT (Part A) was 87% for determining correct placement; positive predictive value was 99%. Specificity of the MT (Part A) was 50% for determining correct placement; negative predictive value was 9%.

Discussion: The PTD has recognized limitations and tests only for intravascular and intrathecal placements (3,4). Previous studies on the PTD cite a false positive rate of 2-12% in laboring women, making it nonspecific in this group (3,4). The MT has the unique advantage of directly testing for catheter placement. Observation of a falling meniscus predicts correct catheter placement. Lack of observation of a fall, however, does not necessarily correlate with incorrect placement. Our preliminary findings suggest that, used in conjunction with the PTD, results from the MT can be a useful tool to help confirm correct epidural catheter placement.

References:

(1)S Afr Med J 1995;85:531-534.
(2)Anaesth 1982;37:426-427
(3)Can J Anaesth 1987;34:601-605.
(4)Anesth Analg 1999;88:1073-1076.

SOAP A-66
EXIT TO ECMO FOR A FETUS WITH PERICARDIAL TERATOMA AND SEVERE HYDROPS

K. K. Wilkins[1], A. Brennan[2], M. V. Greenfield[1], N. K. LaRocca[1], L. S. Polley[1];
[1]The University of Michigan Health System, Ann Arbor, MI, [2]National Health Service, Leeds, United Kingdom.

Introduction: The ex utero intrapartum technique (EXIT) procedure has been used in the management of a range of fetal conditions (1-3) and allows preservation of utero-placental circulation at the time of delivery. While placental support provides fetal gas exchange, a definitive airway can be secured or extra corporeal membrane oxygenation (ECMO) can be initiated. We describe the first EXIT-to-ECMO procedure used in the management of a fetus with pericardial teratoma and severe hydrops.

Case: A 23-year-old parturient, 168cm, 100kg, G3P1, 32 weeks gestation with polyhydramnios, fetal intracardiac mass, and progressive fetal hydrops was transferred for urgent cesarean section for decreased fetal movement and biophysical profile score 2/10. Prior fetal ultrasound examination demonstrated a 5x6 cm intrapericardial mass with right atrial compression, bilateral pleural effusions, pericardial effusion, and hypoplastic lungs. After placement of a radial arterial line and rapid sequence induction, general anesthesia was maintained with 2-3% end-tidal isoflurane. Ten mg ephedrine and 500 mg phenylephrine in divided doses maintained systolic BP>100mmHg. The fetus was completely delivered by breech extraction and simultaneous attempts were made to intubate (successful) and obtain peripheral intravenous access (unsuccessful). ECMO cannulation was difficult; the delivery-to-ECMO interval was 50 minutes and included abdominal paracentesis. Isoflurane was then decreased, oxytocin infusion initiated, and uterine tone restored. Estimated blood loss was 1500ml and the remainder of the maternal postoperative course uneventful. The neonate remained hemodynamically unstable (HR 60-80 bpm) and was transferred to the neonatal ICU where ECMO support was withdrawn on postpartum day four and the child expired.

Discussion: Pericardial teratomas are rare primary cardiac tumors, typically benign, which may result in cardiac tamponade and intrauterine death. The prognosis with hydrops is grim; fetal survival is <10%. A multidisciplinary team decided on The EXIT-to-ECMO procedure to attempt fetal salvage. The anesthetic management of the EXIT-to-ECMO procedure is paramount. To maintain uteroplacental perfusion, deep volatile anesthesia with 2-3 MAC isoflurane provides good uterine relaxation. However, maternal blood pressure must also be maintained for placental perfusion. Careful titration of volatile anesthetic, intravenous fluids, and vasopressors are required to accomplish both goals. Women undergoing EXIT procedures experience greater blood loss than elective cesarean section controls (4); therefore, prompt restoration of uterine tone is vital. Our case was particularly challenging because the fetus had a breech presentation and was extremely edematous. Partial delivery was therefore impossible and exposure to room air likely caused cord vessel constriction and compromised oxygen delivery. Both intubation and ECMO cannulation were difficult due to marked generalized edema. In summary, we present an EXIT-to-ECMO procedure for the management of fetal pericardial teratoma with severe hydrops.

References: (1) Seminars in Neonatology 2003;8:207-214. (2) Curr Opin Pediatr 2002;14:453-458. (3) Am J Obstet Gynecol 1997;177:870-4. (4) Am J Obstet Gynecol 2002;186:773-777.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 2

SOAP A-67
COMBINED SPINAL AND EPIDURAL ANESTHESIA - INCIDENCE OF "DY-TAP" 26-G GERTIE MARX NEEDLE

R. S. Ravindran, I. Trinh;
Indiana University School of Medicine, Indianapolis, IN.

Introduction: Combined spinal and epidural (CSE) anesthetic technique is commonly used to provide quick and effective pain relief during labor and delivery. It combines the reliability and quick onset of anesthesia of a spinal block with the longer duration of action of continuous epidural block. Sometimes, due to several reasons, penetration of subarachnoid space is not possible with the spinal needle (dry-tap). The incidence of dry-tap can vary with the use of different types of spinal needles as well as the length of the spinal needle. In this study we wanted to document the incidence of dry-tap using 26-gauge Gertie Marx spinal needle.
Methods: We evaluated the incidence of dry-tap in 205 consecutive patients who received CSE analgesia. The CSE kit we used (Arrow AK-05560) consisted of a 17guage- 8.89 cm Tuohy epidural needle and a 26 gauge 12.4 cm Gertie Marx spinal needle. The spinal needle protruded 1.5 cm beyond the tip of the Tuohy needle. Several residents did the CSE procedure. They documented whether the dural puncture was successful or not. If there was no return of CSF, the epidural catheter was threaded into the epidural space and continuous infusion epidural anesthesia was continued.
Results: 205 parturients received CSE anesthesia. In six patients there was no successful penetration of the arachnoid membrane. In those patients, the epidural catheters were placed without difficulty and they all had satisfactory pain relief. The body weight and height of those patients (who had dry-tap) were not different from those who had successful spinal tap.
Discussion: In one study (1) the authors noted a 24.5% failure rate when they performed CSE using an 8.75 cm Weiss epidural needle and a 27-g 11.71 cm Whitacre spinal needle, with a 12 mm protrusion distance. In another study they noted a failure rate of 5% using an 18-gauge Tuohy epidural needle and 27-g Whitacre spinal needle with a protrusion length of 15 mm. In our study using 17-gauge Tuohy epidural needle and 26-gauge Gertie Marx spinal needle with a protrusion length of 15 mm resulted in a 3 % failure rate. Several factors contribute to the occurrence of dry-tap. These include lateral insertion of the epidural needle, usage of spinal needle that is too thin, and also usage of the spinal needle that does not protrude long enough. With the protrusion length of 15 mm, greater success can be anticipated (3). With the use of Gertie Marx 26-gauge spinal needle that has the protrusion distance of 15 mm, we noted a failure rate of only 3%.
Reference:
l) Anesthesiology 1995:83:528-534.
2) Reg Anesth Pain Med 1998:23:390-394.
3) Reg Anes 1995:19: 169-174[[Unsupported Character - Codename]]

SOAP A-68
TRANSCUTANEOUS ACUPOINT ELECTRICAL STIMULATION USING THE RELIEFBAND® FOR THE PREVENTION OF INTRAOPERATIVE AND POSTOPERATIVE NAUSEA AND VOMITING IN WOMEN UNDERGOING CESAREAN SECTION UNDER SPINAL ANESTHESIA

A. S. Habib, N. Itchon-Ramos, H. A. Muir, T. J. Gan, The Duke Women's Anesthesia Research Group;
Duke University Medical Center, Durham, NC.

Introduction:
Intraoperative and postoperative nausea and vomiting (PONV) have been reported in up to 56-80 % of women undergoing CS under regional anesthesia (1, 2). Transcutaneous acupoint electrical stimulation (TAES) at the Neiguan (P6) acupuncture point is effective in the treatment of pregnancy induced nausea and vomiting (3), and for the prophylaxis of PONV following general anesthesia. This modality was reported to be particularly effective in the prophylaxis against nausea (4-6). This study was designed to test the hypothesis that TAES at the P6 point is effective in reducing intraoperative and PONV in females undergoing CS under spinal anesthesia (SA).
Methods:
94 women scheduled to undergo CS under SA were enrolled. Patients were randomly allocated to receive an active ReliefBand® at the P6 point (Acustimulation Group) or the dorsum of the wrist (Placebo Group). The ReliefBand® was applied 30-60 minutes before the start of CS. For blinding purposes, the ReliefBand® was covered with an opaque piece of gauze which was taped to the wrist. All patients were requested to wear the ReliefBand® for 24 h following surgery. Each patient received a spinal injection of 1.4-1.6 ml of bupivacaine 0.75 % plus dextrose 8.25 % with 20 mcg fentanyl and 200 mcg morphine. Data were collected intraoperatively and postoperatively in PACU (time 0), 6 and 24 hours by research personnel unaware of the patients randomization. Fisher's exact test and chi-squared procedures were performed for comparisons among the treatment groups. $P < 0.05$ was accepted as statistically significant.
Results:
Three patients were excluded due to protocol violation. The two groups were similar with respect to age, weight, height, ASA status, race, parity, history of PONV or motion sickness, smoking status, duration of surgery, blood loss, intraoperative fluids, intraoperative IV fentanyl, intraoperative IV ephedrine, treatment for pruritis, and consumption of oxycodone/acetaminophen tablets for postoperative analgesia. Efficacy data are summarized in the table.
Discussion:
The use of TAES using the ReliefBand® did not result in a significant reduction in the incidence of intraoperative or PONV following CS under SA.
References:
1.Reg Anesth 1992; 17: 126-30.
2.Anaesthesia 1996; 51: 871-3.
3.Anesth Analg 2001; 92: 629-35.
4.Anesthesiology 2002; 97: 1075-81.
5.Anesth Analg 2004; 99: 1070-5.

Intraoperative and postoperative nausea and vomiting, need for rescue, and complete response

	Acustimulation Group (n=47)	Placebo Group (n=44)
Intraoperative Nausea	14 (30 %)	19 (43 %)
Intraoperative Vomiting	6 (13 %)	4 (9 %)
Intraoperative Antiemetic	11 (23 %)	8 (18 %)
Postoperative Nausea	11 (23 %)	18 (41 %)
Postoperative Vomiting	12 (26 %)	16 (37 %)
Postoperative Antiemetic	16 (34 %)	17 (39 %)
Postoperative Complete Response	24 (51 %)	15 (34 %)

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 2

SOAP A-69
A RANDOMIZED CONTROLLED DOUBLE-BLIND TRIAL OF THE EFFICACY OF SUFENTANIL ADDITION TO ROPIVACAINE EPIDURAL ANESTHESIA FOR CESAREAN SECTION

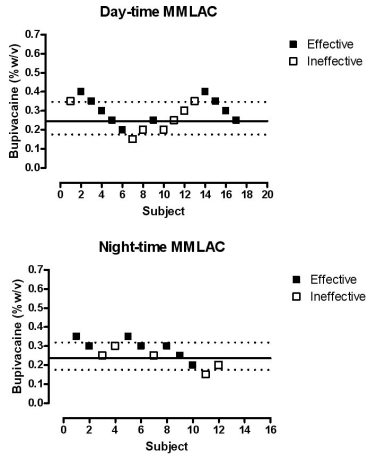
M. Heesen;
Bamberg Hospital, Bamberg, Germany.

Introduction. Epidural addition of sufentanil has been reported for cesarean section. However, the optimal dose has not yet been described (1-3). This prospective double-blind trial evaluated the efficacy of 10 and 20 µg sufentanil addition to epidural ropivacaine 0.75% for elective cesarean section. **Methods.** After approval of the ethics committee and written informed consent 60 healthy parturients were randomly assigned to one of three treatment arms. A standardized preoperative fluid load was given, consisting of an initial 1-litre preload of Ringer's solution over 20 - 30 minutes. Epidural anaesthesia was performed in the sitting position with a 18-gauge (G) Tuohy needle at the L3-4 interspace, using the loss of resistance technique. The catheter was threaded 3-4 cm cephalad. Five minutes after a test dose of 3 mL ropivacaine 0.75% the main dose of 13 ml of the study drug was administered: 9 mL ropivacaine were given in addition to 4 mL NaCl 0.9% (control group), 2 mL (10 µg) sufentanil plus 2 mL NaCl 0.9% or 4 mL (20 µg) sufentanil. If necessary additional epidural ropivacaine was injected before surgery. Primary outcome parameter was time to achieve sensory block at T4. Loss of sensation was assessed with pin prick by a blinded study nurse using a short bevelled blunt 23-G needle repeatedly and bilaterally at 5-minute interval. Pain intensity was measured by means of visual analogue scale (VAS). Incidence of maternal side-effects (hypotension, bradycardia, nausea, vomiting, shivering, pruritus) and neonatal outcome (APGAR score, neurologic and adaptive capacity score, umbilical cord blood-gas values) was also recorded. **Results.** Time to reach the sensory block was 21± 8 min in the control group,15± 5 min in the 10 ug sufentanil group, and11± 4 min in the patients treated with 20 µg sufentanil. This difference was statistically significant for both sufentanil doses (P<0.001 each). The VAS scores at delivery were significantly reduced (P=0.028) only by 20 µg sufentanil (32± 35 mm in the plain ropivacaine versus 9± 19 mm in the 20 µg sufentanil groups). The total dose of ropivacaine was significantly lower (P=0.005) in patients receiving 20 µg sufentanil (100.5 ± 15.0 mg) compared to those treated with plain ropivacaine (118.5 ± 17.3 mg). The incidence of maternal side-effects and neonatal outcome did not differ between the groups. **Discussion.** The onset time of the sensory block was significantly shortened by the addition of both, 10 µg and 20 µg sufentanil whereas only 20 µg sufentanil reduced the pain at delivery compared with plain ropivacaine. Our results suggest that addition of 20 µg sufentanil improved the epidural anesthesia with ropivacaine 0.75% for cesarean section. **References.** 1. J Clin Anesth 3, 371, 1991; 2. Anesthesiology 65, A396, 1986; 3. Anesthesia 42, 1156, 1987.

SOAP A-70
CHRONOBIOLOGY OF MOTOR BLOCK DURING LABOR

H. J. Lacassie[1], A. S. Habib[1], A. J. Olufolabi[1], H. A. Muir[1], M. O. Columb[2];
[1]Duke University, Durham, NC, [2]South Manchester University Hospital, Wythenshawe, United Kingdom.

Introduction: Diurnal variation has shown duration of labor to be shorter at night-time compared to day when analgesia with epidural ropivacaine[1], intrathecal sufentanil[2] and fentanyl[3] are used. However, the issue of chronobiology may be confounded by the effect of progress of labor, which is intimately related[4] to analgesic requirements.
Objective: To assess diurnal variation in motor block chronobiology during labor by estimating MMLAC for epidural bupivacaine.
Methods: After written informed consent, to date, 29 of 34 ASA 1 or 2 parturients, with singleton term pregnancies in vertex presentation, ≤ 7 cm and requesting epidural analgesia have been be enrolled to two groups in this prospective observational controlled trial. Parturients commencing epidural analgesia between 08:00-16:00 hrs were defined as 'day-time' and those between 20:00-04:00 hrs as 'night-time'. Subjects received a 20 mL bolus through the epidural catheter of bupivacaine at a concentration determined by the MMLAC[5] model. Baseline and 30 min after injection, measurements of pain and muscle strength with the Bromage score[6] were recorded with the primary outcome as be motor strength of the lower extremities at 30 minutes. MMLAC was estimated using up-down and probit analysis. Further analyses included *t*-test and Mann-Whitney *U* test with $P<0.05$ as significant.



Results: Demographic, hemodynamic and obstetric data were similar. MMLAC *(95%CI)* results of the sequences (Figure) were; day-time 0.246%w/v (0.175-0.347) and night-time 0.236%w/v (0.175-0.319). The ratio *(95%CI)* for night-time:day-time was 0.96 (0.61-1.51).
Discussion: Presently there is no convincing evidence (*P*=NS) for diurnal variation in epidural bupivacaine requirements for motor block in labor. Considerations include; (1) absence of any chronobiological effect for motor block with epidural local anesthetics, (2) the MMLAC model is not sensitive enough to detect differences and (3) previously reported chronobiological effects[1-3] may be more pharmacokinetic than pharmacodynamic. We are continuing to study this further.
References:
(1) Debon R: *Anesthesiology* 2002; 96: 542-5.
(2) Debon R: A*nesthesiology* 2004; 101: 978-82.
(3) Lee S: *Anesthesiology* 2004; 100: A-1227.
(4) Capogna G: *Brit J Anaesth* 1998; 80: 11-13.
(5) Lacassie HJ: *Anesth Analg* 2002; 95: 204-8.
(6) Bromage P: *Epidural Analgesia.* WB Saunders, Philadelphia. 1978, 144.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 2

SOAP A-71
OPEN LABEL COMPARISON OF EPIDURAL NEOSTIGMINE IN PARTURIENTS UNDERGOING ELECTIVE CESAREAN SECTION

V. H. Ross[1], P. H. Pan[1], M. D. Owen[1], M. H. Seid[2], J. C. Eisenach[1];
[1]Wake Forest Baptist Medical Center, Winston-Salem, NC, [2]Lyndhurst Gynecologic Associates, Winston-Salem, NC.

Introduction: Intrathecal neostigmine has been shown to produce analgesia when administered alone or in combination with local anesthetics, but the emetic and sedative side effects prohibit clinical use. Recently, epidural neostigmine (EN) has been reported to produce modest post cesarean (C/S) analgesia[1] and labor analgesia[2] without nausea. However, the effects of EN on fetal heart rate (FHR) and uterine contractility remain unknown. This open label study was conducted to assess the maternal and fetal effects of two EN doses administered preoperatively to parturients undergoing elective C/S.

Methods: After IRB approval and informed consent, 12 healthy, term parturients undergoing elective C/S with epidural anesthesia were enrolled. Baseline maternal vital signs and FHR were recorded and 15 ml/kg LR was infused intravenously. A multiport catheter was inserted 4-5 cm into the epidural space at L3-4 or L4-5 via a 17-guage Tuohy needle with loss of resistance to air. A 3 ml test dose using 2% lidocaine and 5 µg/ml epinephrine was administered and if negative after 5 min, 6 patients received 40 µg EN (Group 40µg) and 6 patients 80 µg EN (Group 80 µg) in 2 ml saline. FHR, uterine contractions, maternal vital signs and sensory levels were recorded systematically for 20 min, as well as, the presence of pain, nausea, pruritus and sedation using a 0-10 verbal scale. For C/S anesthesia, patients received 3% 2-chloroprocaine by incremental epidural injection. Intraoperative and postoperative vital signs, pain, nausea, pruritus, sedation and narcotic administration were recorded for 24 hr.

Results: Twelve patients were enrolled and completed the study. Patients were demographically similar. The 3 ml test dose produced a median pin-prick dermatomal level of T11 bilaterally. Following EN, 9/12 subjects exhibited hypesthesia to pinprick with a median maximum dermatome level of T8. FHR tracings were reviewed by an obstetrician blinded to the neostigmine dose.[3] All tracings before and after neostigmine were reassuring with no fetal bradycardia, decelerations, or alteration in long term beat-to-beat variability. One patient in each group experienced mild nausea after EN rated 1/10. All APGAR scores were >7 and >8 for 1 and 5 min, respectively for both groups. Maternal blood pressure, heart rate, pain, pruritus and sedation were not altered by EN before, during or after surgery, however, 4/6 patients in Group 80 µg and 0/6 in Group 40 µg experienced nausea intraoperatively ($p<0.05$). Narcotic requirements were similar intra and postoperatively.

Conclusion: The preoperative administration of EN, 40 and 80 µg, did not alter FHR, uterine contractions or maternal vital signs. However, 80 µg EN produced a higher incidence of intraoperative nausea following the local anesthetic dose for surgical anesthesia.

Reference:

1. Anesth 2004;100:381-5 2. Anesth 2004;101:439-44 3. Int J Gyn Obstet 1995;51:65-74

SOAP A-72
MASSIVE OBSTETRIC HAEMORRHAGE: A SURVEY OF OBSTETRIC UNITS IN THE UK

J. McCheyne, Z. Arfeen, P. R. Evans, U. Misra;
City Hospitals Sunderland, Sunderland, United Kingdom.

Introduction: Haemorrhage remains one of the most common direct causes of maternal mortality [1, 2]. The aim of this survey was to look at the facilities available in obstetric units in the United Kingdom to manage massive obstetric haemorrhage.

Methods: After approval from the Obstetric Anaesthetists Association we posted a survey to all lead obstetric anaesthetists in the UK. There were 14 questions requiring yes or no answers assessing unit practices and facilities for the management of massive haemorrhage.

Results: 182 out of 243 were returned giving a 75% response rate. 94.5% of units had haemorrhage guidelines. 40% of units had haemorrhage drills to practice their guidelines. 86% of units had a blood bank on site. 93% included O negative blood in their guidelines. 86% could get their O negative blood in 2-3 minutes. 64% had a haemorrhage trolley with the necessary equipment. 38.5% owned a rapid transfuser/warmer.

11% of units had used a cell saver in obstetrics. Only 1 unit owned a cell saver, 42% shared a cell saver and 13% planned to buy one.

When asked about management of a caesarean section patient at *known* high risk of haemorrhage, 77.5% of units would have a consultant obstetrician present and 86% consultant anaesthetist. 21.5% of such cases would receive a general anaesthetic.

A high dependency unit (HDU) was only available within 50% of obstetric units. 70% of units said they could manage invasive monitoring. Many units added that their obstetric patients would have to go to the main HDU in the hospital to manage invasive monitoring.

Discussion: There is no accepted minimum standard of equipment and protocols for resuscitation from maternal haemorrhage in the UK.

The recently published Confidential Enquiry into Maternal and Child health [3] recommends that all units should have a massive haemorrhage protocol and regular drills for all grades of staff. Our survey demonstrates that compliance with the latter needs improvement (40%). It also recommends that women at high risk of haemorrhage should have consultants in attendance and be delivered in centres able to provide immediate access into blood products, intensive care and other interventions. Our survey found that high dependency care is only available in 50% of obstetric units that responded.

In conclusion there is a wide variation in the facilities available in UK hospitals to provide care for massive obstetric haemorrhage.

References

1. BMJ 2001;322:1089-93.
2. Why Mothers Die. 1997-99
3. Why Mothers Die. 2000-02 http://www.cemach.org.uk/publications/CEMDreports/cemdrpt.pdf

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 2

SOAP A-73
A COMPARISON OF TWO SITTING POSITIONS FOR PLACEMENT OF CSE ANESTHESIA FOR CESAREAN DELIVERY

M. Hernandez-Aquino, D. J. Birnbach, L. Garcia, A. Toro, S. Ranasinghe;
Jackson Memorial Hospital, Miami, FL.

Introduction: Combined spinal anesthesia (CSE) is gaining popularity as a technique for cesarean delivery because it allows fast onset of a dense surgical block plus the ability for prolongation in the event of extended surgery. The parturient is often placed in the sitting position to facilitate placement of CSE. The sitting position, however, can be accomplished with the patient either perpendicular or parallel to the long axis of the OR table. If there is delay following injection of the spinal medication, the block might not raise to the necessary level, so positioning for this technique may become more important. The aim of this study was to compare two different sitting positions for women receiving CSE for elective cesarean delivery.

Methods: Following IRB approval 42 healthy women at full term gestation undergoing elective repeat cesarean deliveries were enrolled in this prospective, randomized study. Patients were randomized to one of two groups based on position during placement of CSE and were evaluated for characteristics of the block and patient comfort. They were also evaluated for requirement of nursing assistance for positioning during placement of the block. Group 1 sat parallel (modified position) and Group 2 sat perpendicular (conventional position) to the OR table. CSE was performed at the L3-4 ± 1 interspace and all patients received a standard spinal dose following which the spinal needle was removed and the epidural catheter inserted and taped. The duration of the procedure from start of epidural to completion of patient re-positioning was timed.

Results: There were no significant differences in regards to maternal height or weight, level of training of the anesthesiologist, gestational age, or failed blocks. One patient, in Group 2 was excluded from analysis due to unintentional dural puncture with the epidural needle.

	Group 1 n=21	Group 2 n=20	p value
Time to complete block (sec)	398.4	451.2	<0.001
Trendelenberg position used to supplement level	1 (4.8%)	5 (25%)	<0.001
Epidural supplementation needed to achieve T4 block	1 (4.8%)	9 (45%)	<0.001
Nursing assistance necessary for positioning	1 (4.8%)	17 (85%)	<0.001

Discussion: CSE takes longer than single shot spinal anesthesia, in a large part because of the extra time necessary for insertion of the epidural catheter. When performing CSE, the extra time taken for the block and patient repositioning when using a conventional positioning was associated with an increased need to alter the position of the table or to administer more epidural medication in order to achieve a T4 block. The modified position allowed the initiation of CSE without the extra support of an additional individual.

SOAP A-74
PRELIMINARY DEVELOPMENT OF THE CHILDBIRTH PAIN BELIEFS SCALE

J. M. Mhyre, L. Kane Low, M. V. Greenfield, D. A. Williams;
The University of Michigan Health System, Ann Arbor, MI.

Introduction: Cognitive-behavioral models hypothesize a role for cognitive factors in the experience of pain. Beliefs about childbirth pain may guide women's expectations for pain and pain relief, mediate their actual experience of pain and pain relief, and impact the process by which women evaluate their childbirth by comparing their expectations with their actual experience. A scale to measure women's beliefs about pain during childbirth may be helpful in identifying subgroups of women for whom quality pain management services are particularly important for maternal satisfaction.

Methods: Following IRB approval, a purposeful sample of five nulliparas and 11 multiparas were recruited from obstetric and nurse midwifery clinics to participate in two focus groups. Thirteen participants were in their third trimester of pregnancy, and three were less than three months post-partum. Focus groups using semi-structured questions lasted two hours, and were taped and transcribed. Content analysis of the transcripts was conducted independently by an anesthesiologist and by a nurse midwife to identify themes that represent beliefs about childbirth pain. Discrepancies between the two analyses were resolved through a peer debriefing process.

Results: Five themes relating to beliefs about the meaning of childbirth pain were identified: 1) Benefit: the belief that pain indicates progress toward birth or that pain will yield personal growth, 2) Harm: the belief that pain indicates damage or dysfunctional labor or will lead to negative personal consequences, 3) Normal: the belief that pain is integral to the process of birth, 4) Sacrifice: the belief that pain should be accepted to accomplish a greater good, and 5) Priorities: the belief that other issues will overwhelm any physical pain. Five more themes relating to the management of childbirth pain were identified: 1) Solicitude: the belief in the helpfulness of solicitous responses and encouraging information from labor supporters, 2) Medication: the belief in the appropriateness or helpfulness of medications to manage pain, 3) Emotion: the belief in the effects of emotions on the pain experience, 4) Control: the belief that labor physiology and the pain experienced are under personal control, and 5) Self-efficacy: the belief in one's ability to perform pain coping behaviors or to birth with a minimal amount of pain. Between six and eight quotes from the focus groups were used to illustrate each of these themes.

Conclusions: This phase of scale development provided evidence of the variety of beliefs women have about childbirth pain. Future scale development tasks include exploratory factor analysis, confirmatory factor analysis, tests for reliability, and validation. Once finalized, the Childbirth Pain Beliefs Scale may be used to evaluate how women's beliefs about pain and pain management may affect clinical options for pain relief in labor.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 2

SOAP A-75
LOCAL ANESTHETICS AND OBSTETRIC OUTCOME: BUPIVACAINE VS. ROPIVACAINE VS. BUPIVACAINE. A PROSPECTIVE RANDOMIZED DOUBLE BLIND STUDY

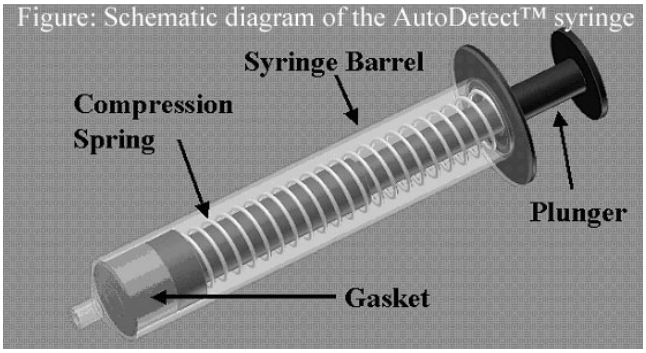
Y. Beilin, N. R. Guinn, I. Arnold, J. Zahn, H. Bernstein;
Mount Sinai School of Medicine, New York, NY.

Introduction: Bupivacaine is the most commonly used local anesthetic (LA) for labor epidural analgesia because of its long duration of action and relative motor sparing effect as compared to other LA. Bupivacaine is manufactured as a racemic (50:50) mixture of its levo and dextro isomers. In general, the levo form is less cardiotoxic than the dextro form. Two LA, ropivacaine and levobupivacaine, have been developed as a pure levo enantiomer, and therefore may be less cardiotoxic than bupivacaine. However, these two LA are more costly than bupivacaine and the incidence of cardiotoxic reactions to LA in the parturient is extremely rare. Therefore, many anesthesiologists do not perceive an advantage to switch from bupivacaine to one of these two LA. However, ropivacaine and levobupivacaine may also produce less lower extremity motor block than bupivacaine. Lower extremity motor block should be avoided during labor, if possible, because patients with more motor block may have a smaller incidence of normal spontaneous vaginal deliveries. The purpose of this study is to determine if there is any difference in obstetric outcome among parturients who receive labor epidural bupivacaine, ropivacaine, or levobupivacaine.
Methods: Nulliparous women requesting labor epidural analgesia with a cervical dilation < 5 cm were enrolled in this prospective randomized double-blind study to receive either epidural bupivacaine, ropivacaine, or levobupivacaine for the entire labor. Labor analgesia was initiated with 15 mL of an infusion solution of 0.0625% of the assigned LA with fentanyl 2 mcg/cc. Additional doses of the assigned LA was administered as needed, with the goal to use as small a dose as possible to maintain analgesia. Mode of delivery and motor block with the Bromage score (0 = no motor block, 1 = unable to raise extended leg, able to move knees and foot, 2 = unable to raise extended leg or knees, able to move foot, 3 = complete motor block of lower limb was recorded. Differences among groups were analyzed with chi square tests. $P < 0.05$ was considered significant.
Results: We enrolled 143 patients, 55, to the bupivacaine group, 54 to the ropivacaine group, and 34 to the levobupivacaine group. We did not find a difference in obstetric outcome among the groups with a vaginal delivery rate of 66%, 65%, and 68% in the bupivacaine, ropivacaine and levobupivacaine groups, respectively. However, more patients had a motor block in the bupivacaine (71%) than in the ropivacaine (52%) or the levobupivacaine group (44%), $p<0.05$.
Discussion: Thus far, there is no difference among the epidural local anesthetics bupivacaine, ropivacaine, and levobupivacaine in obstetric outcome, despite a significant difference in motor blockade. We plan on enrolling a total of 360 patients.

SOAP A-76
EVALUATION OF A NEW LOSS OF RESISTANCE SYRINGE FOR EPIDURAL PLACEMENT

B. Carvalho[1], E. T. Riley[1], S. Sundar[2];
[1]Stanford University Medical Center, Stanford, CA, [2]Indigo Orb, Inc., Milpitas, CA.

Introduction: Loss of resistance (LOR) technique is the most common method for detection of the epidural space. This subjective LOR is detected using continuous or intermittent pressure on the syringe plunger with the operator's thumb. A new LOR syringe, the AutoDetect™ syringe, is a modified Portex Pulsator™ LOR syringe with an internal compression spring, alleviating the need for operator thumb pressure. This LOR syringe has previously been evaluated in an animal model.[1] This study evaluates the AutoDetect™ syringe for detection of the epidural space in laboring women.
Methods: After IRB approval and informed consent, ten healthy laboring women requesting labor epidurals were enrolled in this unblinded prospective study. All the epidurals were inserted in the sitting position at interspace L2/3 or L3/4 using a 17G Tuohy needle. LOR was detected using the AutoDetect™ syringe loaded with 5 ml normal saline. Experienced attending anesthesiologists inserted all the epidurals. After location of the epidural space, a 19G closed-tip, spring wound, flexible, single orifice epidural catheter (Braun™) was inserted 5 cm into the epidural space and aspirated for blood or cerebrospinal fluid. Initial analgesia was provided with 15 ml of 0.125% bupivacaine plus 10 µg sufentanil. Data recorded included patient demographics, LOR depth, number of attempts, and any difficulties with epidural placement. Results are reported as mean ± standard deviation.
Results: The study cohort's BMI was 31±5 and mean skin-to-epidural space depth was 5±1 cm. The epidural space was found on the first pass in 7 of 10 subjects and 3 passes or less in 9 of 10 subjects. One patient had a difficult block with multiple attempts. We experienced no false LOR during any epidural placements and all epidurals delivered successful analgesia. We had no dural punctures or post dural-puncture headaches.
Conclusion: The AutoDetect™ syringe was reliable in detecting the epidural space in laboring women. We experienced no dural punctures or complications with this technique. This objective LOR syringe may be useful as a teaching aid to demonstrate the principles of LOR. This study demonstrates the feasibility of this new LOR syringe, however, future studies with larger numbers of patients are needed to determine if this syringe leads to less dural punctures, increases epidural success or decreases insertion time.
References: 1. Anesth 2004;100, A72



Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 2

SOAP A-77
DOES PREGNANCY LOWER GENERAL ANESTHETIC REQUIREMENTS?

R. Y. Gershon, C. Kerssens, K. E. Stack, S. Goswami, P. S. Sebel;
Department of Anesthesiology, Emory University School of Medicine, Atlanta, GA.

Introduction: It is generally accepted that progesterone decreases anesthetic requirements during pregnancy. Pregnant women have a heightened sensitivity to neuraxially administered local anesthetics [1]. Isoflurane MAC decreases by 28% by the end of the first trimester [2]. Additionally, nerve fibers are more sensitive to local anesthetic agents in both pregnant and chronically administered progesterone models, but not after acute treatment. The movement response to surgery (MAC) is now known to be mediated entirely at the spinal cord level. This study was designed to determine the effect of pregnancy on the hypnotic component of general anesthesia and its relation to memory function.

Methods: Following IRB approval, 35 consenting women undergoing cesarean section (CS, n = 11), postpartum tubal ligation (PT, n = 13), or laparoscopic tubal ligation (LT, n = 11) were studied. A venous blood sample established serum progesterone levels in all groups. All patients received thiopental (4 mg/kg) plus succinylcholine (1-1.5 mg/kg) for induction of anesthesia plus 10-15 mg morphine preinduction or postdelivery. Anesthesia was maintained in all with N_2O /O_2 (2l/1l) and isoflurane at 0.2% end tidal concentration, but only after delivery in patients undergoing cesarean section (0.75 to 1.0% end tidal before delivery). Additional neuromuscular blockade was given as needed. At a steady state 0.2% end-tidal concentration, patients were repeatedly played 16 words for 10 minutes. Approximately 2 hours after recovery, they were interviewed and tested for memories using the process-dissociation procedure in combination with a word stem completion task [3].

Results: There were no intergroup differences in demographic data except duration of anesthesia (LT > PT = CS, $p < 0.05$). Progesterone levels differed significantly across the three patient groups ($p<0.0001$) while BIS did not (see Table 1). None of the patients recalled the intraoperative period nor were presented words recognized reliably. Word stem completion showed a tendency toward preserved memory, particularly in the LT-group, but statistical significance was not established.

Table 1: Mean ± SD

	Serum (ng/ml) Progesterone	End tidal (%) Isoflurane	BIS during word presentation
CS	69.3 ± 14.4	0.20 ± 0.025	77.4 ± 9.9
PT	13.4 ± 6.6	0.21 ± 0.015	78.3 ± 7.4
LT	1.9 ± 2.0	0.21 ± 0.011	77.3 ± 9.9

Discussion: Elevated progesterone levels do not decrease anesthetic requirements for hypnosis or exert an effect on memory function.

References: [1] Abouleish EI: *Anesth Analg* 1986; 65: 897-900. [2] Gin T, Chan M: *Anesthesiology* 1994; 81: 829-832. [3] Lubke GH, Kerssens C, Gershon RY, Sebel PS: *Anesthesiology* 2000; 92: 1029-1034.

SOAP A-78
THE EFFECTS OF MATERNAL OBESITY ON THE SUCCESS OF EXTERNAL CEPHALIC VERSION

B. C. Brost[1], J. Scardo[2], R. Newman[3];
[1]Mayo Clinic College of Medicine, Rochester, MN, [2]Spartenburg Regional Medical Center, Spartenburg, SC, [3]Medical University of South Carolina, Charleston, SC.

Introduction: To evaluate the effects of maternal anthropometrics on the success rates of external cephalic version.

Methods: Data was prospectively collected on women with breech presentation electing to undergo external cephalic version. Maternal height, weight, and body mass index were obtained and/or calculated for each woman. Maternal characteristics were analyzed as both dichotomous and continuous variables using logistic regression to obtain odds ratios and 95% confidence intervals. A p-value of <0.05 was considered statistically significant.

Results: External cephalic version was attempted in 71 women with successful version in 40 of the women (56.3%). Mean maternal weight ($p=0.91$), height ($p = 0.48$), and body mass index ($p = 0.66$) were not statistically different between women with successful and failed external cephalic version. Odds ratios for maternal anthropometrics as continuous variables were 0.966 (CI 0.984 - 1.043) for weight, 1.100 (CI 0.947 - 1.278) for height, and 0.963 (CI 0.896 - 1.043) for body mass index.

Discussion: Maternal size and weight do not significantly affect the success rate of external cephalic version. Women should not be denied an attempt at external version solely on the basis of maternal height, weight, or body mass index.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 2

SOAP A-79
ADDITION OF LIPOPHILIC OPIOIDS TO BUPIVICAINE-MORPHINE MIXTURE FOR CESAREAN SECTION REDUCES INTRAOPERATIVE AND EARLY POSTOPERATIVE PAIN

E. Lujan, B. W. Mecklenburg, S. D. Birmingham, J. W. Heil, N. S. Tarant, S. S. Kaczynski, R. Green;
Naval Medical Center, San Diego, San Diego, CA.

Introduction: Spinal anesthesia is common for elective cesarean section. A combination of local anesthetic and opioid is frequently utilized[1]. Intrathecal morphine has an onset of up to 120 minutes and can provide post-operative pain relief for up to 24 hours. The addition of a lipophilic opioid potentially provides additional intraoperative and early postoperative analgesia with its more rapid onset[2, 3]. No consensus exists on the ideal combination of intrathecal opioids for this population. Our objective is to determine if lipophilic opioids, added to bupivicaine and morphine, provide improved intraoperative and early postoperative analgesia in the elective caesarian section population.

Methods: A prospective, randomized double blind study was performed, enrolling 93 patients receiving spinal anesthesia for elective cesarean section. The control group (C) received bupivicaine, morphine (.10 mg), and normal saline (.4 ml). The fentanyl group (F) received bupivicaine, morphine (.10 mg), and fentanyl (20 mcg). The sufentanil group (S) received bupivicaine, morphine (.10 mg), and sufentanil (5 mcg). Our primary outcome measure was intraoperative and postoperative pain control. This was assessed using a 100-point Verbal Numeric Rating Scale (VNRS) and time to first analgesic request. Secondary outcome measures included need for intraoperative analgesic treatment and pain VNRS at 24 hours. Pertinent demographics, rescue medications, APGAR scores, and adverse events were recorded. Data analysis was accomplished using descriptive and inferential statistics.

Results:

	C	F	S	p
*Patients with intraoperative pain (%)	44	13	15	.015
Need for intra-op analgesic (%)	30	7	11	.061
*Duration of Effective Analgesia (min)	286	424	433	.030
Intraoperative Pain (VNRS)				
Skin Incision	.7	0	.14	.318
*Uterine Incision	3.1	0	3.1	.042
*Uterine Exteriorization	4.7	1.7	2.97	.013
Uterine Interiorization	11.7	2.7	4.6	.137
*Pain at 3 hours post spinal (VNRS)	27	16	13	.038
Pain at 24 hours post spinal (VNRS)	31	24	28	.693

* Statistically significant among groups using Fisher's Exact Test or Kruskal-Wallis rank test
Values expressed as mean unless otherwise labeled

Discussion: Patients receiving intrathecal lipophilic opioids in addition to bupivicaine and morphine had a statistically significant lower incidence of intraoperative pain. The need for treating this pain (patient request or provider judgment) approached statistical significance (p = .061). The addition of lipophilic opioids resulted in a lower VNRS three hours after spinal placement and a longer duration of effective analgesia (time to first supplemental analgesic administered). Pain scores at 24 hours were similar among the three treatment arms.

References:
1. Anesthesiology; 91:1919-27. 1999
2. Anesth Analg; 78:918-20. 1994
3. International journal of Obstetric anesthesia; 6:43-48. 1997

SOAP A-80
INITIATING AN OBSTETRIC ANESTHESIA COLLABORATION TO REDUCE MATERNAL AND NEONATAL MORTALITY AND MORBIDITY IN GHANA

A. J. Olufolabi[1], M. D. Owen[2], V. H. Ross[2], J. Thorp[3], F. Boni[4];
[1]Duke University, Durham, NC, [2]Wake Forest Hospital, Wake Forest, NC, [3]Monklands Hospital, Lanarkshire, United Kingdom, [4]Korle Bu Hospital, Accra, Ghana.

Introduction: Ghana is a West African country with 20 million inhabitants. It is an English speaking, peaceful and religious society with a stable government. It is famous for gold, cocoa, and historically, slave trade. Maternal mortality in Ghana is 540 deaths/ 100,000 live births[1] from acute hemorrhage, sepsis, preeclampsia, obstructed labor and non-hemorrhagic anemia. Four anesthesiologists representing the SOAP international outreach committee, Kybele (a non-profit medical organization) and the Obstetrics Anaesthetists' Association visited Ghana in November 2004 at the invitation of Korle Bu's Anesthesiology Department to seek information and identify opportunities for collaboration to reduce maternal and neonatal death and suffering.

Methods: The preliminary visit consisted of a tour of 3 hospitals: Korle Bu Teaching hospital, Accra; Central Regional hospital, Cape Coast and Ridge Hospital, Accra.
Staffing, training standards, facilities, equipment availability, the conduct of anesthesia, and the case mix were observed. The group participated in a 1 day anesthesia seminar on maternal mortality and a 3 day pediatric seminar on neonatal resuscitation. There was very active discussion with anesthesia, obstetric, pediatric, nursing and administrative staffs regarding future collaboration and needs in order to reduce maternal and neonatal mortality. The group also discussed plans concerning a future medical student exchange program.

Results: Sixty delegates from southern Ghana attended the courses. The seminars were highly evaluated and the participants requested that this be an annual event. Cultural and local issues impacting health care were identified. There are significant shortages in anesthesia and nursing personnel. For example, there are only 10 qualified anesthesiologists in Ghana with 6 in Korle Bu, the primary teaching center. Many doctors who train emigrate abroad. Countywide anesthesia is provided primarily by nurse anesthetists or doctors with 1-2 years of post-graduate training. Anesthesia equipment such as pulse oximeters, capnographs, and oxygen analyzers are generally limited, except in the district hospital where modern equipment and facilities are underutilized due to staffing shortage. The teaching hospital has 12,000 deliveries/year and 10-15 cesarean sections/day. Labor analgesia is not routinely provided. Halothane general anesthesia is used in 50 % of cesarean sections. Training in regional anesthesia for obstetrics is suboptimal due to staffing and supply shortages.

Conclusion: A 5 year strategic plan was developed regarding how anesthesiology personnel in Ghana can be better trained in obstetric anesthesia. SOAP and OAA members will be recruited for participation in future on-site training missions. The training priorities will be safe anesthesia for cesarean section, the management of obstetric emergencies and neonatal resuscitation.

Reference: United Nations Children's Fund 2004: http://www.unicef.org/sowc04

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 2

SOAP A-81
A COMPARISON OF EPIDURAL ROPIVACAINE WITH LIDOCAINE FOR CESAREAN SECTION (C/S)

A. Sakr, A. Shorshtein, S. Cohen, M. Gantner, P. Blanchfield;
UMDNJ-RWJMS, New Brunswick, NJ.

Introduction: Our practice has been to initiate epidural block with lidocaine, fentanyl and epinephrine for C/S. In this study, we compared the new long acting ropivacaine with lidocaine to determine if ropivacaine can be introduced for routine use for epidural anesthesia for C/S.

Methods: Following IRB approval 88 parturients scheduled for C/S with epidural anesthesia were included. The patients were randomly allocated: GI 45 patients received ropivacaine 0.75 % with fentanyl 5 mcg/ml; and epinephrine 5 mcg/ml. GII 43 patients received lidocaine 2% with fentanyl 5 mcg/ml and epinephrine 5mcg/ml. Both groups received the anesthetic solution by gravity technique [1] into the needle via 22 inches extension tubing before insertion of the "Braun" 18 g closed-end catheter (B. Braun Medical Inc.) 5 cm into the epidural space. Following a standard lumbar epidural approach, all patients received 3,5,5&5ml of the anesthetic solution administered by gravity through the needle, followed by catheter insertion and administration of 3 ml via the catheter to a total of 21 ml. Values are mean±SD, $p<0.05$.

Results: Groups did not differ in age, weight or height, previous neuraxial blocks, distance of epidural space from the skin, time to T6-S5 sensory level, additional local anesthetic dose required, incidence of pruritus, sedation, nausea, vomiting, hypotension, and overall satisfaction. APGAR scores of babies in G I & II were high & similar at both 1&5 min. All patients had satisfactory treatment for C/S and post C/S pain.

Conclusions: These data show that the addition of epinephrine and fentanyl to epidural ropivacaine solution administered for C/S by gravity technique via the needle is associated with longer time to incision, but without prolonging the duration of surgery, and with no effect on time to T6 sensory level, quality of the block and overall satisfaction when compared to lidocaine. This epidural ropivacaine technique may be applied routinely for our elective C/S.

Table 1. Characteristics

Group	Time to incision (min)	Time to T6-S5 sensory level (min)	# pts requiriring additional dose n (%)	Duration of surgery (min)	Overall satisfaction (0-10)
Group I Ropivacaine	42.6 ± 9	21.8 ± 3.3	6 (13.3)	**87.6 ± 20	9.84 ± 0.4
Group II Lidocaine	*33 ± 8	14.3 ± 4.8	7 (16.3)	98.5 ± 15.2	9.81 ± 0.7

*GI < II, $p<0.0001$, **GI < GII, $p<0.003$, Fisher's exact test

SOAP A-82
IMPACT ON OBSTETRIC OUTCOME OF THE INTRODUCTION OF PATIENT-CONTROLLED EPIDURAL ANALGESIA WITH BACKGROUND INFUSION COMPARED WITH CONTINUOUS EPIDURAL INFUSION TECHNIQUE

N. E. Hayes, A. O'Neill, E. Gaughan, J. Loughrey, M. Geary;
Rotunda Hospital, Dublin, Ireland.

Introduction: The optimal method of delivery of maintenance labour epidural analgesia is not known. Patient controlled epidural analgesia (PCEA) with low-dose background infusion has been shown in one study to result in fewer epidural rescue interventions[1] but this has not been a universal finding[2]. PCEA techniques have been associated with reduced analgesic requirement[3], which may decrease instrumental delivery rates. We compared the effect of PCEA (5ml bolus q15min/prn) with background infusion ($6ml.hr^{-1}$), versus continuous infusion epidural analgesia (CIEA) at $10ml.hr^{-1}$ with the same solution (bupivicaine 0.1% and fentanyl $2\mu g.ml^{-1}$) for nulliparous women. Our outcome measures were instrumental delivery rates, analgesic consumption and frequency of rescue epidural reinforcement. There were no other changes in the anaesthetic, obstetric or midwifery practice in our unit during the study period.

Methods: A retrospective review of the hospital database prior to and after the introduction of PCEA with background infusion was conducted to assess obstetric outcome. A chart review for a sample of parturients in each group was also conducted to examine analgesic consumption and rates of rescue intervention between PCEA with background infusion and CIEA.

Results: The groups were demographically similar. There was no statistically significant difference in obstetric outcome between PCEA and CIEA (Table). There was a reduction in the frequency of rescue reinforcement by anaesthetic and midwifery staff and a trend towards reduction in the average hourly dose of bupivacaine.

	CIEA	PCEA	*P* value
Nulliparous with epidural (*n*)	1268	1177	
Maternal age (years)	26.9	26.9	NS
Induction rate (%)	29.6	27.3	NS
Instrumental delivery rate (%)	35.8	37	NS
Caesarean section rate (%)	23.1	23.3	NS

NS: non-significant

Discussion: PCEA with background infusion did not affect obstetric outcome. Decreasing the number of rescue interventions reduces anaesthetic and midwifery workload in maintaining acceptable epidural analgesia on a busy labour ward. However, this technique has not reduced instrumental delivery rates in nulliparous women at our hospital. We conclude that PCEA with background infusion is an acceptable method of epidural analgesia maintenance.

References:

1. Anesth Analg 1994; 79:80-84
2. Anesth Intensive Care 1992; 20:15-20
3. Br J Anaesth 1994; 73:619-623

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 2

SOAP A-83
INADEQUATE EPIDURAL STUDY

R. S. Agaram, J. Douglas;
B.C Women's Hospital, Vancouver, BC, Canada.

Introduction: Studies indicate that approximately 10% of epidurals inserted for labor analgesia provide inadequate pain relief[1-3]. Most of these studies have not considered multiple factors, and do not specifically look at pain relief soon after the initiation of the block. We undertook this study to determine the association of several factors associated with inadequate pain relief when labor epidural analgesia was initiated. We defined an epidural as inadequate when it failed to provide adequate pain relief 30 minutes after the initial dose of local anesthetic or did so only with an extra dose.

Methods: This is a prospective observational study. It was approved by the University and Hospital Ethics Committees. The minimum sample size was estimated at 160 labor epidurals with at least 20 inadequate. Epidurals were inserted and managed as determined by the individual Anesthesiologist. The data collected included BMI, parity, induction/ augmentation of labor, past history of failed epidural, back abnormalities, experience of Anesthesiologist, presence of paresthesia, difficulty with insertion, method of loss of resistance, total dosage and volume of drugs used to initiate the block. Adequacy of analgesia was assessed thirty minutes after the initial dose of local anesthetic. Parturients whose pain relief could not be assessed at thirty minutes due to progression to second stage, delivery, inadvertent dural puncture or accidental intravascular catheter placement were excluded.

Results: To date data has been collected on 183 consecutive labor epidurals. 34 were inadequate - overall incidence of 18.5% (14.7% for experienced Anesthesiologists). Interim analysis indicates that inexperience, parity, labor induction and difficulty with insertion increase the incidence of inadequate relief following initiation of the epidural. We will conduct a multivariate regression analysis when data collection is complete.

Discussion: Our definition of an inadequate epidural is more stringent than used in previous studies, and we specifically looked at analgesia resulting from the initial dose of local anesthetic. This may be the reason for the higher incidence of inadequate pain relief in our study. We did not specify the method of insertion of the epidural or the drugs used to ensure that the results of this study were externally valid. Epidurals which do not provide adequate analgesia for labor are more likely to fail when used for an operative delivery[4], necessitating the use of spinal or general anesthesia. Such situations result in increased risk for the parturient. The incidence of inadequate analgesia in labor epidurals can be minimized when the nature of association of the factors studied with inadequate pain relief is clearer.

References:

1. Can J Anesth 1998; 45(8) 719-723
2. IJOA 1998; 7: 220- 275
3. IJOA 1998: 7; 5-11
4. IJOA 2002; 11: 81-82

SOAP A-84
TEACHING NEW ROBOTS OLD TRICKS FOR EPIDURAL PLACEMENT USING A VIRTUAL REALITY SIMULATOR

R. Glassenberg[1], J. Glassenberg[2];
[1]Northwestern University, Chicago, IL, [2]University of Illinois, Champaign, IL.

Introduction: Is it possible for robots to perform epidurals? With the widespread use of regional anesthesia in obstetrics, there are concerns whether enough anesthesiologists will be available to relieve labor pain: 1) fewer residents are entering the specialty. 2) aging populations use most of the resources devoted to medical care. If mannequins are being used to train resident to perform general anesthesia, now a rare event in obstetrics, is it possible to train robots on simulators? **Methods:** 10 experts were asked to rank a list of 20 skills needed for epidural replacement. The top 5 were: 1) identification of the correct level 2) proper needle angle3) needle redirection 4) recognition of ligamentum flavum 5) detection of loss -of- resistance. A computer-generated simulation was programmed with a 3-D model of the lumbar spine consisting of skin, ligaments, muscle, bone, and spinal cord. Force required to penetrate the tissue ranges from 3.6 N for the skin to 6.0 for the ligamentum flavum. Skin to epidural space ranges from 4 to 10 cm. A robot was then trained to interact with the virtual reality simulator by means of a microphone and an electro-mechanical force feedback linkage. Similar to a resident, the robot has the bad habit of uttering “oops” when it accidentally drops the needle-syringe assembly. The computer responds by changing the virtual spine from the flex to the extended position, making epidural placement more difficult, thereby teaching the robot to behave more appropriately. After 5 failed attempts, the computer responds with “are you sure you know what you’re doing?” **Results:** A plot of time required for correct placement vs. number of trials follows a typical negative exponential curve as the robot learns to correct for mistakes by means of an artificial intelligence feedback loop. **Conclusion:** Industrial robots currently perform dangerous assembly line jobs such as welding and painting, which require repetitive motions. These machines are poorly suited to perform complicated variable tasks. Smaller robots handle instruments that have appropriately scaled moments of inertia such as needles and syringes and can be trained to adjust to the great variability in human anatomy**.**

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 2

SOAP A-85
WHAT IS THE APPROPRIATE BASAL RATE FOR EXTREME LIGHT PCEA INFUSIONS FOR LABOR ANALGESIA?

E. J. Goodman, S. D. Dumas, D. H. Sunwoo;
University Hospitals of Cleveland, Cleveland Heights, OH.

Introduction: Low dose bupivacaine infusions for labor have grown in popularity because of the excellent analgesia they provide with minimal motor block[1,2]. Solutions of 0.06% bupivacaine solutions have been termed "ultra-low" dose[2]. We have chosen to call our solution, which contains 30% less local anesthetic, "extreme-light" dose. We report initial results in a study comparing three basal rates for PCEA using such a solution.
Methods: After IRB approval and informed consent, all participants received as their initial epidural medication 10ml of 0.125% bupivacaine, 0.0005% fentanyl and 1:600k epinephrine. A solution of 0.044% bupivacaine, 0.000125% fentanyl and 1:800k epinephrine was used for the boluses and for the background infusion. Patients were randomized to receive 4, 9 or 14 ml/hr as their basal rate (group 4, 9 or 14, respectively). A 10ml demand bolus and 10min lockout time were used. Motor block was assessed using a modified Bromage scale.
Results: A total of 33 women have been included in the study. Our key findings are summarized in the table below. Half of the patients in group 4 and none in the other groups had to be removed from the study because of rescue doses that they required. Satisfaction scores in group 4 were still high because the scores represented overall satisfaction with their care. Motor involvement was rare in all groups. Sensory levels were most likely to climb in group14, while anesthesia providers were more likely to be called back in group 4. The incidence of pruritis was high and the likelihood of hypotension was low in all groups.
Conclusion: We conclude that the 9ml/hr (group 9) basal rate was most likely to provide an anesthetic that did not need to be supplemented, while not causing a rising sensory level.
Reference: 1. Anesth Analg 2003;97:1439-45.
2. Annual SOAP meeting 2003;A4.

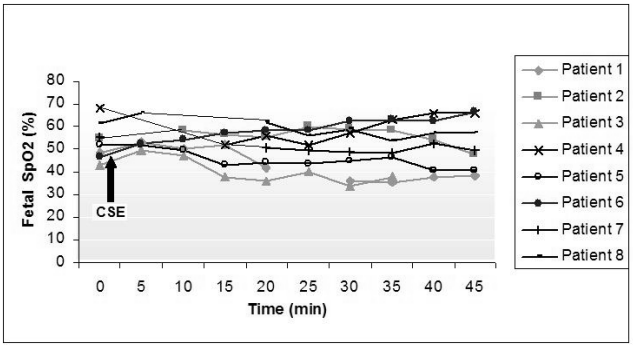
Results for Different Basal Rates (ml/hr)

	4	9	14
n	10	15	8
# primipara	3	4	2
# with no 2 hr check	3	7	0
# with any motor block at 2 hr	1/7	1/8	2/8
# sensory level climbed	2/7	2/8	6/8
# called anesthesia team unexpectedly to room (excluding perineal dosing)	6/10	1/15	2/8
# with pruritis	6	11	4
# with hypotension	1	0	0
Avg. satisfaction (0-10 verbal scale)	8.2	9.0	9.3

SOAP A-86
THE EFFECT OF COMBINED SPINAL EPIDURAL LABOR ANALGESIA ON FETAL OXYGEN SATURATION

A. J. Fuller[1], B. Carvalho[1], C. Brummel[2], M. Durbin[3], M. Tingle[1], E. T. Riley[1];
[1]Stanford University, Stanford, CA, [2]Colorado Permanente Medical Group, Lafayette, CO, [3]Cenltral Anesthesia Service Exchange, Sacramento, CA.

Introduction: Combined spinal epidural (CSE) for labor analgesia has been associated with fetal heart rate (FHR) changes.[1] Fetal oxygen saturation (FSpO2) is an emerging technology for intrapartum fetal monitoring. The objectives of this study were to determine if there were changes in FSpO2 after induction of analgesia via CSE and whether fetal bradycardia after CSE is associated with changes in FSpO2.
Methods: After obtaining IRB approval and informed consent, we enrolled thirteen women in active labor. FSpO2 was monitored using the Nellcor N400/FS14 system. The CSE was placed in the lateral position using a needle-through-needle technique. Sufentanil 5mcg and 0.9cc of 0.25% bupivacaine were administered intrathecally. Continuous FSpO2, FHR, and maternal oxygen saturation were recorded at baseline and for 45 min after CSE. Maternal BP, pain scores, and uterine contraction patterns were also measured. Data were analyzed using appropriate statistical methods with $P<0.05$ considered significant. A priori power analysis indicated that 40 patients were required to detect a statistically and clinically significant difference in FSpO2. However, we terminated the study early following 24 months of difficulty in recruitment because of patient reluctance to have the FSpO2 probe inserted.
Results: Of the thirteen patients enrolled, eight completed the study protocol. We were unable to perform CSEs in two patients and obtain adequate FSpO2 readings in three patients. In the eight successful evaluations, mean FSpO2 capture before and after CSE were 70% (SD 30.5) and 80% (SD 16.5) respectively.
There were no significant changes in FSpO2 after the CSE (Δ FSp02 of 2.0 % (SD 7.4); p=0.46; Fig. 1). Baseline FSpO2 was 53.3 % (SD 8.6) and 51.2 % (SD 7.6) after the CSE. We observed no significant changes in FHR (p=0.82). Maternal BP and uterine contraction pattern were similar before and after the CSE (p>0.05). Three patients had mild fetal variable decelerations not associated with FspO2 changes.
Conclusions: CSE did not result in any deleterious effects on the fetus as measured by FSpO2. No significant fetal bradycardias were observed, therefore the relationship between FHR changes and FspO2 could not be fully evaluated and larger numbers are needed to completely understand this relationship.
References:1. IJOA 2004: 98: 1153-9; 2. Am. J. of Perinatology 2002: 19 (3): 119-125; 3. Am. J. of Ob/Gyn 2000: 183(5): 1049-57.



Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 2

SOAP A-87
HYPNOSIS FOR CHILDBIRTH: A PATIENT SATISFACTION QUESTIONNAIRE

J. Mörch-Siddall, E. Hawney;
Royal Victoria Infirmary, Newcastle upon Tyne, United Kingdom.

Introduction: Amongst pregnant women there is a demand for hypnosis for childbirth. Hypnotherapists are often unqualified and unregulated, books available to women and the therapy delivered may not reflect the reality of giving birth. A recent review[1] supported the use of hypnosis for labour but highlighted no common method of delivery. We have designed an antenatal hypnotherapy course, delivered by a consultant anaesthetist qualified in medical hypnotherapy, to reflect the experiences of women giving birth in our unit. We present the results of a satisfaction questionnaire.

Method: A hypnotherapy course for labour was written, and given in 4 one hour sessions, weekly, from 32 weeks, in groups of 3 to 5 and self referred. Twelve post-natal questionnaires were sent by email. The women were asked how they found the sessions, whether they were useful, whether they used the hypnosis in labour, whether they used hypnosis postnatally and for general comments.

Results: Ten questionnaires were returned fully completed (>70% response rate). Four women had normal deliveries, 2 women had elective cesarean sections, 3 women had vacuum extraction and 1 woman had a class 3 cesarean section. All found the sessions relaxing and enjoyable and the self-hypnosis easy to learn. Six women felt it improved their sleep, both ante and postnatal. Two women found it relieved backache. All found it useful in the initial phase of labour, 3 felt it enabled them to stay at home longer presenting at >6cm. One woman used only hypnosis and N_2O/O_2 and found it 'incredibly helpful', 2 women were 9cm before requiring diamorphine and found the technique 'empowering' and the pushing phase 'more exciting and enjoyable than painful'. One woman (induction) said 'it stopped me crawling the walls before my epidural'. All expressed 'being more in control' during delivery.

Conclusion: Women can leave hospital with feelings of inadequacy if labour has not been 'normal', hypnosis can improve satisfaction by allowing favourable reinterpretation of the birth. It rests the locus of control back with them. It is self administered, cheap has no side effects and improves patient satisfaction.

References

1. CynaAM, McAuliffe GL, Andrew MI Hypnosis for pain relief in labour and childbirth: a systematic review Br J Anaesth 2004;93:505-5011

SOAP A-88
EPIDURAL LEVOBUPIVACAINE FOR EMERGENCY CESAREAN SECTION

N. Bolad, M. Moore, G. O'Sullivan, F. Reynolds;
St Thomas' Hospital, London, United Kingdom.

Introduction: Although epidural anesthesia is slow in onset, it can provide a rapid option for emergency cesarean section, if a functioning epidural catheter is in situ. Although 0.75% ropivacaine is relatively safe and reliable for this purpose,[1] it is expensive. We therefore wished to examine whether levobupivacaine, 0.5 or 0.75% might be a viable alternative.

Method: After ethical approval, women receiving epidural labor analgesia were informed about the study and asked to take part *if* they required cesarean section. Sixty-three consenting women were randomly allocated to receive bupivacaine 0.5% (Bup) or levobupivacaine 0.5 (L0.5) or 0.75% (L0.75), in an initial dose of 15 ml, with supplements to a maximum dose of 30 ml. Sensory block to cold, motor block (modified Bromage score), arterial pressure, ephedrine dose (6-mg boluses given if blood pressure <80% of baseline) and symptoms were recorded regularly, and pain scores (0-10, verbal numerical scale) were recorded at incision, delivery and peritoneal closure. Power calculation suggested that 16 were needed in each group to detect a 7-min difference in onset to T4. Mann Whitney and χ^2 tests were used as appropriate.

Results: There were no significant differences between treatments (table). Levobupivacaine 0.5% appeared quicker in onset, but in four cases the block never attained T4.

Conclusion: Elective cesarean section patients are heterogeneous and difficult to study. The lack of dose effect with levobupivacaine may reflect inhibition of its vasoconstrictor effect at high concentration.[2] According to this study, levobupivacaine offers no advantage over bupivacaine 0.5% when augmenting an epidural for cesarean section.

References

1. Anaesthesia 2004; 59: 988-92.
2. Br J Clin Pharmacol 1978; 6**:** 63-8.

Results

		BUP	L0.5	L0.75
Bupivacaine in labor	(mg) [range]	113 [10-286]	89 [12-230]	101 [18-263]
Sensory block to T4	(n)	22/22	17/21	20/20
Time to T4 (min)	median [range] mean	20 [5-40] 18	15 [5-30+] 14	15 [5-40] 18
Onset (n)	>20 min	4	6	4
	>30 min	1	4	3
Motor block 2 or greater	(n)	10	14	11
Ephedrine needed	(n)	12	12	11
Supplement needed (n)	epidural	5	9	9
	GA	2	1	1
Pain score >0	(n)	4	3	3
Symptoms (n)	emesis	6	2	5
	shivering	10	4	7
	sedation	4	5	2

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 2

SOAP A-89
OBSTETRIC HEMORRHAGE AND MATERNAL MORTALITY: IMPROVEMENT IN OUTCOME THROUGH SYSTEMATIC CHANGE

I. P. Lowenwirt, D. W. Skupski, G. S. Eglington;
NY Hospital Med Ctr Queens, Flushing, NY.

Introduction: Obstetric hemorrhage and cesarean hysterectomy (C-Hyst) rates have increased because of increasing rates of cesarean delivery (CD) and subsequent complications placenta previa, placenta accreta and uterine rupture during vaginal birth after cesarean. Two maternal deaths due to obstetric hemorrhage in 2000-2001 at our hospital prompted systematic change. Our objective was to provide a clinical pathway for obstetrical patients at high risk for hemorrhage.

Methods: Beginning in early 2001, systematic change was instituted through a multidisciplinary task force including personnel from anesthesiology, neonatology, nursing, the blood bank, maternal-fetal medicine (MFM), administration, physicians of the trauma team and the OR staff. A rapid response team was formulated using the cardiac arrest team as a model. Protocols for assessment and management of patients at high risk for obstetric hemorrhage were developed and popularized and included antenatal consultation with MFM, senior gynecologic surgeons and anesthesiology; ultrasound for index of suspicion of accreta; twice weekly type and screen; weekly autologous blood donation; erythropoietin, iron and vitamin therapy; planned CD at 36 weeks after amniocentesis for fetal lung maturity; use of the Cell Saver; intraoperative consultation with the Trauma Team as necessary; planned C-Hyst in the main OR for patients who agree, PACU and SICU transfer as needed. Mock drills of the rapid response team on all shifts occur quarterly. Chi-square analysis was used.

Results:

Obstetric Hemorrhage 2000-2004

Year	Total Births	Cesarean Births	OB Hemorrhage Cases	Cesarean Hysterectomies	Mortality
2000	2718	516	3	1	1
2001	3111	801	8	5	1
2002	3337	903	8	5	0
2003	3393	932	14	4	0
2004	3367	968	18	6	0

There was a significant difference in mortality between the time periods of 1/2000-6/2001 vs. 7/2001-12/2004 (p=0.03) using the number of cases of obstetric hemmorhage as the denominator. There was a substantial increase in the number of deliveries overall and in cases of obstetric hemorrhage over the years of the study. Placenta accreta with prior CD accounted for 14/21 (66.7%) cases of C-Hyst..

Conclusions: The increase in obstetric hemorrhage cases occurred in large part because of the previous and continuing increase in the rate of CD. The increase in obstetric hemorrhage cases combined with the decrease in mortality is evidence that the systematic approach to care shown here is effective in preventing maternal mortality.

SOAP A-90
EPHEDRINE AND PHENYLEPHRINE IN SPINAL INDUCED HYPOTENSION: MYTH AND REALITY

A. Vuffray[1], C. Crochetière[1], N. Bureau[2], E. Villeneuve[1], J. Lacroix[1];
[1]Ste Justine Hospital, Montreal University, Montreal, PQ, Canada, [2]Ste Justine Hospital, Montreal, PQ, Canada.

Introduction: The best drug in the treatment of spinal induced hypotension during C-section is still controversial. A recent meta-analysis using neonatal blood gases as primary outcome, shows ephedrine (E) and phenylephrine (P) to be equivalent(1). We wanted to know which of these two vasopressors would be more effective in treating hypotensive events (HE). Prompted by methodological concerns for blinding, we also looked at how accurately clinicians providing patient care might guess which drug was given.

Methods: After ethics committee approval and informed consent, healthy singleton parturients presenting at term for an elective C-section were enrolled in a prospective, randomized, double blind study, comparing (E) 10 mg versus (P) 100 µg. After their spinal (1,6 ml bupivacaine 0,75%, fentanyl 15 µg, morphine 150 µg), subjects meeting at least one of the required criteria for HE: 20% reduction in systolic blood pressure (SBP), SBP ≤ 90 mmHg or nausea/vomiting, were randomized to E or P treatment. Blood pressure was measured every minute from the time of the spinal injection. Recording stopped 15 minutes after initial randomization (first HE) or at the time of cord clamping. Secondary variables included: time between HE, total amount of vasopressors, lowest SBP, maximum differential SBP, and umbilical cord gases. Demographic data between the hypotensive and non hypotensive patients will be compared. Results will be analysed on an intent-to-treat basis using ANOVA for parametric variables and Chi-square for non parametric. Sample size calculations were based on the following values: $\alpha = 0.05$, $\beta = 0.20$, and a 25% decrease in event rate.

Results: Of the 154 patients enrolled, 91 were randomized (59% incidence of hypotension). One more patient with HE is needed to complete the study. A preliminary table of accuracy of clinician's guesses compared to the actual drug given, was obtained with the help of an observer uninvolved in research data analysis. To preserve blinding, results were expressed as right or wrong guesses without revealing the actual drugs given in each case.

	# Guesses (%)
Right	56 (76,7)
Wrong	14 (19,2)
Don't know	3 (4,1)
Total	73 (100)

Discussion : Given that clinicians cannot identify the vasopressor in one case out of four, we feel confident that blinding has been effectively applied. We are looking forward to further data analysis, once all 92 patients have been recruited.

References : Lee A. *Anesth Analg* 2002; 94 : 920-6

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 2

SOAP A-91
INFLUENCES ON ANALGESIC CHOICES FOR LABOR ANALGESIA AMONG FIRST TIME MOTHERS

R. B. George, D. McKeen;
QE II Health Sciences Centre, Halifax, NS, Canada.

Introduction: Obstetrical analgesia relieves pain and anxiety associated with labor benefiting the mother and fetus. The pain control method chosen is likely influenced by culture, friends, prenatal and intra-partum caregivers. Hospital practices during labor may have a significant impact on analgesia choice. The purpose of this study was to determine what the parturients felt was the single greatest influencing factor that determines the choice of epidural analgesia.

Methods: With REB approval, all primiparous, singleton gestation, cephalic, laboring women between 34 and 42 weeks who requested epidural analgesia were approached during a one month period. Once epidural analgesia was established consenting patients received the questionnaire. They were lost to follow-up if there was no response after 6 weeks.

Results: Of the 140 women recruited, 116 replied (83% response rate). Only three (2.6%) patients saw an anesthesiologist prior to admission. The majority of patients received information regarding labor analgesia management from their friends and family (83.5%) and prenatal classes (75.7%). Thirty percent had no intention of receiving or preferred to avoid an epidural prior to labor.

During labor, patients were informed of pain management options by the labor nurse in 92.2% of the cases. An epidural was the most commonly offered analgesic technique (84.3%) followed by comfort & relaxation measures (77.4%) and hydrotherapy (60.9%).

Prior to their epidural 27% of patients received parenteral narcotics. The majority of women were aware of the major and minor complications associated with epidurals.

One hundred percent of the participants felt they were responsible for the choice of labor analgesia and 96.5% were satisfied with their choice. On a scale of 1-5, friends and family were the greatest influences (median=4, mode=5) on the choice of an epidural, while the anesthesiologist, obstetrician, and family physician were each the least influential (median=1, mode=1). However, 55.8% of patients felt a meeting with an anesthesiologist prior to labor would be a benefit.

Discussion: Friends and family are the most influential to parturients selecting a labor epidural. Labor is more painful than expected. At our institution epidural analgesia is the most commonly offered method of pain management. Many women who preferred to avoid an epidural prior to labor had a change of opinion. The majority of primiparous women wish to see an anesthesiologist prior to labor.

Table 1

Age	29 ± 10 years
EGA	39.7 ± 2.8 weeks
Cervical Dilation at Epidural Insertion	4.3 ± 3.6 cm
Oxytocin Augmentation	91 (82.7%)
Cesarean Section	26 (23.6%)
Ethnicity	
· Canadian	108 (93.1%)
· African Canadian	3 (2.6%)
· Other	5 (4.3%)
Post Secondary Education	88 (75.8%)

SOAP A-92
POST DURAL PUNCTURE HEADACHE: EXPERIENCE FROM A WEST AFRICAN OBSTETRIC UNIT

O. O. Nafiu[1], R. A. Salaam[2], E. O. Elegbe[2];
[1]University of Michigan, Ann arbor, MI, [2]Korle Bu Teaching Hospital, Accra, Ghana.

Introduction: Post dural puncture headache (PDPH) is an unfortunate complication of spinal anaesthesia. While there are fairly conclusive data about the incidence and aetiology of PDPH in developed countries[1], there is a dearth of data from developing countries. We describe the frequency and severity of PDPH in parturients undergoing caesarean section under spinal anaesthesia in a West African teaching hospital.

Methods: Data were collected prospectively on 96 ASA I-II consenting mothers who had spinal anaesthesia for caesarean section. All blocks were performed by one investigator while the second investigator conducted the review and management of patients with PDPH. All patients were pre-loaded with 500-1000 ml Ringers lactate and sub-arachnoid (SAB) block was performed using 22, 25 or 26 gauge Quincke needles. All needles were inserted with the bevel oriented laterally. Patients were followed up for 3 days post-operatively. PDPH was assessed using a Visual Analogue Scale (VAS).

Results: A total of 96 parturients were studied. There were 58 (60.4%) emergency and 38 (39.6%) elective cases. SAB was performed with 25G needles in 46 patients (47%), 26G needles in 38 patients (39.6%) and 22G needles in 12 patients (12.5%). PDPH occurred in 8 patients (8.3%). Characteristics of patients with PDPH is shown in Fig.1. Fifty percent of the PDPH occurred in patients in whom 22G needles were used. Most patients graded their headache as mild, while 3 patients had moderate headaches. All were managed with analgesics and liberal fluids. No patient needed an epidural blood patch.

Conclusion: This is the first attempt to study PDPH in parturients in West Africa where regional anaesthesia is still unpopular. The incidence of PDPH in our patients is similar to that usually reported from developed countries before the widespread use of pencil-point needles.[1] Unfortunately, non-cutting needles are too expensive for most health services in our region. The relatively low incidence of PDPH in our patients may be related to lateral bevel orientation of the spinal needles. We are however aware that these rates could be improved with the use of small-caliber, pencil-point needles.

References

1. Shutt LE, Valentine SJ, Wee MY, Page RJ, Prosser A, Thomas TA. Spinal anaesthesia for Caesarean section: Comparison of 22G and 25G Whitacre needles with 26G Quincke needles. *Br J Anaesth* 1992: 69:589-594

Characteristics of PDPH

Study No. of Patients	Age (yrs)	Spinal Needle	Post-op. Onset (days)	Duration (hrs)	VAS	Need for Medication
10	30	25G	1	22	1	NO
24	26	25G	1	72	3	YES
58	17	26G	2	11	3	YES
66	23	26G	2	48	2	NO
70	30	22G	1	48	3	NO
77	24	22G	1	72	7	YES
81	33	22G	1	72	5	YES
83	31	22G	1	90	4	YES

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER REVIEW 2

SOAP A-93
COMBINED-SPINAL-EPIDURAL (CSE) ANESTHESIA FOR CESAREAN SECTION: ARROW VERSUS B BRAUN EPIDURAL CATHETER

A. Sakr, A. Shorshtein, S. Cohen, R. Samet, P. Stricker;
UMDNJ-RWJMS, New Brunswick, NJ.

Introduction: Espocan Tuohy 17 g epidural needles, Pencan 25 g spinal needles followed by B. Braun epidural catheters are used routinely for CSE for cesarean delivery (C/S) & post-C/S epidural-PCA analgesia. A more recently introduced FlexTip Plus® 19 gauge open Arrow catheter (Arrow International Inc) was associated with low incidence of inadvertent blood vessel cannulations & paresthesias during insertion [1]. We compared B. Braun catheter and Arrow catheters to determine which is better for routine CSE for C/S.

Methods: Following IRB approval 105 ASA I-II pts scheduled for elective C/S with CSE anesthesia were included. Epidural space was located at L_{2-3} or L_{3-4} interspace with loss of resistance to air technique using midline approach in lateral or sitting flexed position. Pencan 25g spinal needle was then inserted, 10 mg ropivacaine w/100mcg epinephrine and 25 mcg fentanyl were injected intrathecally and the spinal needle was removed. Pts were randomized to one of two groups: Group I: 53 pts had 18 gauge "Braun" (B. Braun Medical Inc.) closed-end tip catheter placed 5 cm in the epidural space. Group II: 52 pts had 19 gauge Arrow FlexTip Plus® open-end tip catheter placed 4 cm in the epidural space. Catheters were placed below insertion site for 30 sec, the adapter was connected. Aspiration was followed by injection of a 3 ml test dose of lidocaine 1.5 % w/epinephrine 5 mcg/ml. All catheters were looped 5 cm downward and secured applying Mastisol glue and transparent dressing, after asking the pt to unflex their back. Catheters were applied to reinforce the block for C/S when needed and for post-C/S epidural-PCA analgesia up to 54 hrs.

Results: Groups did not differ in age, weight, height or parity, the distance of epidural space from skin, time to incision and duration of surgery. Surgical removal of catheter was not necessary in either group**.** Overall satisfaction was 9.4 ±1.1 vs. 9.8 ± 0.8 ($p<0.001$) for Groups I and II respectively. All pts had satisfactory treatment for C/S and post C/S pain.

Conclusion: Our OB pts were more satisfied with the **"**Arrow" catheter (compared to "B Braun" catheter), which was associated with less transient severe paresthesia, and less blood vessel puncture upon insertion.

Reference:

1. Banwell et al. Can J Anaesth 45: 370, 1988

Table 1-Epidural Catheter Position & Complications

Group	H/O previous block n(%)	Difficultly with insertion n(%)	Paresthesia (>4/10) n(%)	Cath entered epidural vessel n(%)	Cath Dural Puncture n(%)	Cath Occlusion n(%)	Cath Reinsertion n(%)
I Braun	24 (45.2)	2 (3.7)	19** (35.8)	10*** (18.6)	0 (0)	0 (0)	5 (9.4)
II Arrow	36* (67.9)	6 (11.6)	5 (9.8)	0 (0)	0 (0)	0 (0)	0 (0)

G II>I, *p<0.02, GI>II, **p<0.0001, GI>II, ***p<0.003; Fisher's exact test

SOAP A-94
KYBELE: OBSTETRIC ANESTHESIA OUTREACH TO TURKEY 2004

T. W. Breen[1], M. D. Owen[2], S. Sahin[3], S. Ucer[4], M. M. Sedensky[5];
[1]Duke University Medical Center, Durham, NC, [2]Wake Forest University, Winston-Salem, NC, [3]Uludag University, Bursa, Turkey, [4]High Point University, High Point, NC, [5]University Hospitals of Cleveland, Cleveland, OH.

Introduction: Kybele is a nonprofit organization with the mission of improving childbirth safety and comfort in developing countries through physician and public education. In September 2004, 8 anesthesiologists visited Turkey and dispersed to 10 hospitals for approximately 1 week. The goal of the visit was to evaluate the effectiveness of a coordinated short term teaching effort in promoting and sustaining country wide advancement in obstetric anesthesia care. This report describes the impact of the visit and suggests how to improve future programs.

Methods: Turkish teaching institutions were invited to host a visiting anesthesiologist; each organized a separate program for their guest. Host hospitals varied widely in obstetric practice, case load, man power and research efforts. Visiting doctors presented formal lectures and bedside teaching on numerous aspects of obstetric anesthesia. Upon return, Kybele developed a questionnaire to evaluate the program using open ended questions and a 5-point scale. The questionnaire was translated into Turkish and sent to participating hospitals 2 months after the visit. Answers were translated into English and summarized.

Results: All questionnaires were returned. Host hospitals evaluated their experience with the guest anesthesiologist as either excellent (8/10) or good (2/10). All visiting anesthesiologists were judged flexible and knowledgeable about obstetric anesthesia. 7/10 hospitals made changes in their clinical practice as a result of the program, 6/10 hospitals reported help with research and manuscript writing and all hospitals have maintained contact with their guest. Hospitals varied in their expectations of optimal stay; 3/10 hospitals would have preferred a 3-4 week stay, 3/10 a 2 week stay, 2/10 a 1 week stay and 2/10 a < 1 week stay. Suggestions to improve future programs included: earlier communication with the guest anesthesiologist, more help with research, a longer stay and the opportunity to visit the guest anesthesiologist's hospital. Finally, Kybele team members appeared on the front page of a major national newspaper[1] and on 3 separate national television programs.

Discussion: Many anesthesiologists are interested in teaching abroad but find the customary one month volunteer cycle preclusive. The 2004 Kybele program indicates that a 1-2 week intervention can impact host institutions. The degree of media coverage also suggests that issues of regional anesthesia and cesarean are of national public interest. A bilingual host country coordinator is essential in facilitating organization and the media is an invaluable tool in promoting the advantages of regional anesthesia for childbirth. Future efforts may incorporate meetings and workshops in the training effort, however, direction interaction between a host hospital and guest anesthesiologist remains pivotal.

Acknowledgments: Sponsored by SOAP, OAA, WFSA, The Baxter International Foundation, B. Braun, Kybele and Iontek, Ltd.

Reference: http://www.sabah.com.tr/2004/09/29/gun101.html

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER REVIEW 2

SOAP A-95
CHANGE IN CERVICAL LENGTH WITH CERCLAGE PLACEMENT

B. C. Brost, W. Watson, K. Huhn;
Mayo Clinic College of Medicine, Rochester, MN.

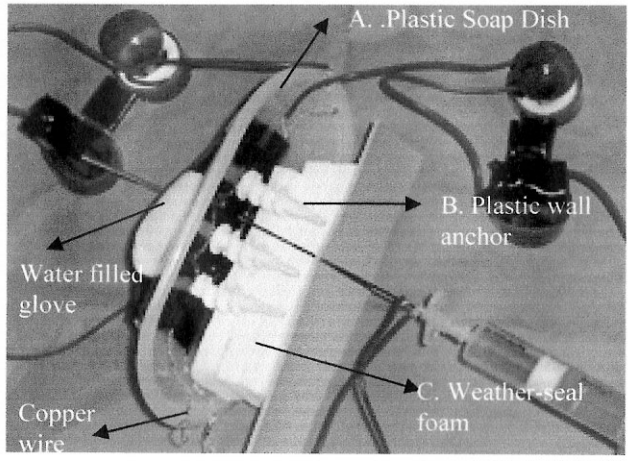
Introduction: To determine the effect of cerclage placement on cervical length using a model of the cervix.
Methods: Models of a cervix were made using smooth or skeletal muscle tissue to a uniform width and central canal diameter. Different types of suture (0-Prolene and 5mm Mersilene) and cerclage types (Shirodkar and McDonald) were loosely placed in each "cervix" model. Each sample had an ultrasound (7.5 mHz) length assessment pre- and post-tightening of the cerclage. Length was assessed to the nearest 0.1cm and recorded as an average of 3 measurements for each assessment. The cerclage stitch was tightened to a uniform pressure using a pressure catheter in the "cervical canal". The increase in cervical length (average and standard deviation) was analyzed using a paired student t-test. A p value <0.05 was considered clinically significant.
Results: There was no difference in change of model length based on tissue type. The average preprocedure length was 4.61 cm (SD 0.533) while the postprocedure length was 5.31 cm (SD 0.724). A 15% increase of 0.70 cm (SD 0.355) was noted after tightening the cerclage (p=0.001). The number of bites into the tissue (Shirodkar vs McDonald) and suture type (0-prolene vs 5 mm Mersilene) did not alter the amount of cervical length gained (p>0.05).
Discussion: Placement of a cerclage in the cervix is a contributor to the ultimate cervical length measured sonographically. This increase in cervical length was similar with both McDonald and Shirodkar type cerclage placements and did not change significantly with suture used.

SOAP A-96
DO IT YOURSELF - EPIDURAL MODEL

S. S. Varaday, B. L. Leighton, T. Davies, L. Bottros;
Washington University in St. Louis, St.louis, MO.

Introduction: We describe a simple model for practicing spinal/ epidural needle placement.Most anesthesiologists get their first epidural experience on live patients even though trainees have high rates of epidural complications. Commercially available plastic models are expensive and, with use, lose a realistic resistive feel. Bananas, apples, and potatoes are cheap and realistic but have a short shelf life.(1,2) Our model is easily assembled from hardware store materials and common medical supplies.
Methods: The model consists of a perforated plastic soap dish (A), 3 plastic wall anchors with screws (B), 1 1/4" wide x 7/16" thick adhesive weather-seal foam (C), tape, gauze, rubber glove, sewing thread, thin rubber mat, two 9-volt batteries, two 12-volt car bulbs, copper wire, and 2 crocodile clips. The wall anchors represent the vertebral spines; the space between them, which represents the epidural insertion site, is covered with tape. Lateral to the holes, two pieces of copper wire are fixed with tape. The wires represent the nerve roots. One end of each wire is connected to a battery and bulb to form two different electrical circuits. Each circuit is connected with a piece of insulated wire to the epidural needle. 3-4 layers of adhesive rubber foam are placed over the anchors so that the anchors partially pierce the foam. The sides of the foam are packed with gauze for fullness. Two layers of rubber-glove-finger are filled with water, tied with thread, and taped behind the soap tray holes. The covering thin rubber mat represents the skin.
Results: The user inserts the epidural needle using an air loss-of-resistance technique. If the needle is not in the midline it touches one of the copper wires, the circuit closes, and one bulb glows. Once loss of resistance is felt, the syringe is disconnected, the spinal needle is inserted through the epidural needle, and a pop is felt as the water-filled glove is pierced. Water slowly drips from the hub after stylette removal.
Discussion: This model is cheap (unlike commercial models), is not biodegradable (unlike vegetable and fruit models), and is judged realistic by our trainees.
References:

1.Anesthesiology,1989;70:368-9.
2.Anaesthesia 1999;54:619-620.
3.Stud Health Technol Inform.1998;50:272-7.



Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-97
CASE REPORT: EPIDURAL HEMATOMA AFTER CATHETHER REMOVAL IN A PARTURIENT WITHOUT IDENTIFIABLE RISK FACTORS

G. K. Applegate, A. J. Haas;
Case Western Reserve University and University Hospitals of Cleveland, Cleveland, OH.

Introduction: The overall estimated incidence of epidural hematoma formation is 1:150,000 with the incidence dropping to 1:1,000,000 in patients without identifiable risk factors.[1,2]

Case description: A 20 year-old G2 P0101 at forty weeks gestation without significant past medical history presented in active labor. At her request, a labor epidural catheter was aseptically placed. Frank blood was not noted with needle placement or catheter aspiration. The patient denied experiencing paresthesias. The patient's platelet count was 311 x 10^9/L. Non-reassuring fetal heart tracings were noted and the patient underwent cesarean section. The epidural was left in place for postoperative analgesia. The infusion contained only fentanyl and epinephrine. Except for the discomfort from postoperative bowel ileus, the patient reported excellent analgesia and was ambulating appropriately on postoperative days (POD) #1 and #2. Upon catheter removal on POD #2, moderate bleeding from the epidural site was noted. The bleeding resolved after applying direct pressure. Within 30 minutes, however, she reported severe back pain to her nurse. The patient received meperidine 100 mg intramuscularly. Because of persistent pain and new onset motor weakness, the anesthesia team was contacted. The epidural site was clean, dry, intact, and non-tender. She reported bilateral burning dysthesia to light touch on her lateral thighs, calves, and feet. Perirectal sensation was diminished. Motor exam demonstrated 3/5 strength for knee flexion and 2/5 strength for ankle flexion and extension. The orthopedic service was consulted and a MRI of the lumbar spine demonstrated a significant epidural hematoma with compression at L_{2-3} and L_{3-4}. Coagulation studies were normal and the platelet count was essentially unchanged. The patient underwent emergent lumbar decompression and hematoma evacuation within 3 hours of symptom onset. The neurological exam was significantly improved postoperatively, with complete neurological recovery at the time of discharge on hospital day #8.

Discussion: The patient did not have any of the reported risk factors for epidural hematoma formation.[3] We hypothesize that bowel ileus may have transmitted increased intraabdominal pressure to the venous system, resulting in epidural vein engorgement. Since the patient was receiving appropriate analgesic effect, catheter migration may also have contributed. Delay in treatment of greater than 8 hours is associated with permanent neurological damage. Therefore, proper management requires a high index of suspicion, prompt diagnosis and emergent surgical treatment. This case report emphasizes the need to be immediately contacted by nursing and obstetrical colleagues if the signs and symptoms of epidural hematoma formation develop. We also highlight the need for vigilance when frank blood returns at any stage of epidural catheter management, including epidural removal.

References:

1. Pro. Anasth Intensivmed Notfallmed Schmerzther 1993;28:179-181
2. Journal of Clinical Anesthesia 2004;16:376-381
3. Regional Anesthesia and Pain Medicine 2003;28:172-197

SOAP A-98
EFFICACY OF FACTOR VII ADMINISTRATION IN PARTURIENT WITH FACTOR VII DEFICIENCY

N. O'Rourke, C. Lee, B. Kodali, M. Harnett;
Brigham and Women's Hospital, Boston, MA.

Introduction

Hereditary Factor VII deficiency is a rare autosomal recessive condition. We report on a parturient with Factor VII deficiency who had two deliveries at our institution. She received FFP prior to administration of regional analgesia in her first delivery and factor VII concentrate prior to regional anesthesia in her second delivery.

Case Report

A 35-year-old G2P0 parturient with a history of Factor VII deficiency presented at term for labor and delivery. Her factor VII level was less than 3%. She had frequent episodes of epistaxis during her pregnancy. On admission her coagulation testing was as follows: PT 32.3, PTT 30.3, INR 3.2. TEG study was also done at this time. Two units of FFP were transfused prior to epidural placement. Coagulations studies three hours later revealed a PT 22.9, PTT 30.3, INR 2.0. TEG analysis revealed no difference in her coagulation status as compared to that prior to administration of FFP. In particular no change in the R value was noted. Four units of FFP were administered perioperatively during a cesarean section for failure of progression of labor. At 2 hours postoperatively her PT was 20.0, PTT 30.6 and INR 1.7.

One year later she presented for an elective repeat cesarean section. Her preoperative coagulation studies revealed PT 36.2, PTT 30.4, INR 3.5. A 30mcg/kg dose of recombinant factor VII was administered intravenously over 5 minutes and a repeat set of coagulation studies sent 15 minutes later revealed PT 13.4, PTT 30.3, INR 1.0. TEG analysis showed a marked reduction in the R value from 5.3 to 3.2 post administration of factor VII.

Cesarean section was performed under spinal anesthesia. The patient's coagulation returned to PT 29.5, PTT 29.3, INR 2.7 nine hours after administration of recombinant factor VII. The patient remained hemodynamically stable postoperatively and did not require any further blood products.

Discussion

The single infusion of factor VII concentrate prior to cesarean section resulted in normalization of the coagulation profile and reduction in the R value in our TEG analysis.

Given the inherent risks of transmission of human immunodeficiency virus and hepatitis with blood products, recombinant factor VII treatment is an alternative that is safe and effective during labor, delivery, and the puerperium (1). It provides a more suitable coagulation profile for regional anesthesia in a shorter time than FFP. TEG is an alternative useful method to detect the efficacy of factor VII administration.

Reference

1. Blanchette VS, Sparling C, Turner C. Inherited bleeding disorders. Baillieres Clin Haematol 1991; 4: 291-332.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-99
MANAGEMENT OF A PARTURIENT IN LABOR WITH AN INTRATHORACIC TUMOR

T. Conermann[1], B. Kaul[1], H. Finegold[1], T. Blodgett[2], R. G. Krohner[1], S. Ramanathan[1];
[1]Magee Womens Hospital & University of Pittsburgh, Pittsburgh, PA, [2]Department of Radiology, University of Pittsburgh Medical Center, Pittsburgh, PA.

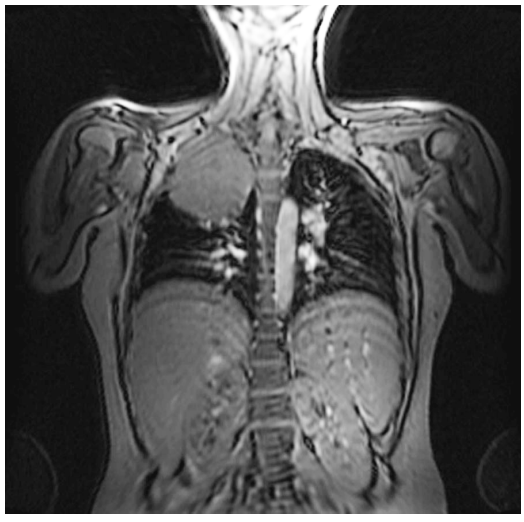
Report: A 21 year old parturient, with a large right apical intrathoracic Ewing's Sarcoma (ES) (Fig), diagnosed by biopsy at 26 weeks gestation, presented at 30 weeks, for a scheduled induction in order to expedite maternal care and to avoid fetal exposure to chemotherapy. MRI showed the tumor extending to the lung apex, encasing the first rib and the right subclavian vessels, with mass effects upon the superior vena cava (SVC) and the right internal jugular vein, but no mediastinal involvement. Upon patient request and after evaluation, analgesia was obtained with lumbar epidural (LE) placed at the L2-L3 level. A decision to deliver by Cesarean section was made for malpresentation and anesthesia to T5 level achieved with incremental doses of 2% lidocaine with epinephrine via LE catheter. The procedure was well tolerated by the patient.

Discussion: ES is rare and optimal management in pregnancy is not clearly established. Evidence suggests that good maternal and fetal outcomes are possible with prompt chemotherapy even during the third trimester[1]. In parturients, the diagnosis may be delayed because of low index of suspicion, masking of the symptoms by those associated with pregnancy, hesitancy in imaging to minimize fetal radiation exposure. Guidelines for pregnant patient radiation exposure suggest that imaging is generally safe.

With induction of general anesthesia the potential problems include compression of the tracheobronchial tree and the pulmonary artery (PA) by the tumor, and possibly difficult airway from airway edema due to the SVC syndrome[2]. With careful titration, a slow onset epidural block helps avoid rapid sympathectomy with its drop in preload, which can exacerbate a cardiovascular collapse from PA or SVC compression. The ease of titration of the epidural block also helps avoid a dense high block, which can impair accessory respiratory muscle function and thus exacerbate compression of the SVC and PA by the tumor. Also, the trendelenberg position, which may be needed to treat rapid hypotension following a spinal, is poorly tolerated by these patients.[3]

Conclusions: We present a case of intrathoracic tumor presenting in pregnancy and discuss anesthetic considerations. An early placement of an epidural to manage labor and and/or a CS may be the anesthetic management of choice.

References:
1.Ann.Oncology1999:10:345-50.
2.CJA2001:48:575-83
3.CJA2001:48:580-83



SOAP A-100
AWAKE CRANIOTOMY FOLLOWED BY CESAREAN DELIVERY FOR A CASE OF RECURRENT BREAST CANCER WITH BRAIN METASTASIS DURING 27TH WEEK GESTATION

M. W. Simon-Baker, H. Huffnagle, S. Huffnagle;
Thomas Jefferson University Hospital, Philadelphia, PA.

Introduction: Breast cancer is the most common cancer in pregnant and postpartum women, occurring in about 1 in 3,000 parturients. Most of these metastatic cancers are hormone receptor negative and are often treated surgically in early stages. For later stage malignancy, chemotherapy is often recommended as the primary treatment for pregnant women after the first trimester. We report a parturient newly diagnosed with recurrent disease and metastasis to the brain for an awake image-guided craniotomy at 27 weeks gestation, followed by scheduled cesarean delivery at 34 weeks.

Case report: A 33 year old parturient presented to our institution at 26 5/7 weeks gestation with a 1 day onset of transient aphasia and left facial droop. Her history was significant for stage II breast cancer two years prior that had been treated successfully with bilateral radical mastectomies, chemotherapy, and radiation. A CT scan showed a 1cm lesion in the liver. Brain MRI showed a 2.7 x 2.5 cystic and solid lesion in the inferior right frontal lobe with surrounding vasogenic edema, consistent with metastatic disease. She was taken to the OR at 27 weeks gestation for an awake image-guided craniotomy. Fetal monitoring was performed throughout. The patient was given oxygen at 2L flow by nasal canula, zantac 50mg, intravenous fentanyl boluses totalling 175 mcg and positioned in the Mayfield headholder after local infiltration with 12 ml of 0.25% bupivacaine at the pinning site. Prior to incision, the skin was infiltrated with 8 ml of 1% lidocaine with epinephrine and the patient was lightly sedated using a propofol infusion (50 to 70 mcg/kg/min) during complete resection. Neurologic/neurophysiological testing of the parturient's speech and motor function were continuously evaluated during the procedure. The patient was discharged home on postop day 3 and returned 7 weeks later, at 34 weeks gestation, for elective cesarean delivery. After neurosurgical reevaluation and anesthesiology consultation, a spinal anesthetic using 15mg of hyperbaric bupivicaine with 0.15mg preservative free morphine was placed at L3-L4. A healthy baby with Apgar scores 8,8 was delivered.

Discussion: To date, we are unaware of any case reports of an awake craniotomy during pregnancy. Management is highly multidisciplinary, involving the cooperation of obstetrics, neonatology, neurology, neurosurgery, nursing, anesthesiology, and the patient. Because of the parturient's risk for aspiration and our desire to maintain her airway reflexes, we chose to lightly sedate our patient with propofol, low-dose narcotic and local anesthetic infiltration. Special attention must also ensure that no increases in intracranial pressure (ICP) occur during the craniotomy and that ICP or imaging studies are followed postoperatively to assist in making appropriate delivery management decisions.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-101
SUCCESSFUL LABOR EPIDURAL ANALGESIA IN A PATIENT WITH SPINOCEREBELLAR ATAXIA

A. Rofaeel, M. Balki, J. Carvalho;
Mount Sinai Hospital and University of Toronto, Toronto, ON, Canada.

Introduction: Spinocerebellar ataxia (SCA) is characterized by progressive ataxia due to degeneration of the cerebellum, brain stem, spinal cord and peripheral nerves. There are no data describing the course of SCA in pregnancy and the potential effects of regional anesthesia on SCA remain unknown. The safety of epidural analgesia was previously described in a parturient with olivopontocerebellar degeneration(1), a neurological disorder with pathologic and clinical features similar to those of SCA.

Case Report: We describe a parturient, 34 years old, G2, P0, with a long history of SCA since childhood. No specific subtype of SCA has been identified. A brain MR done in 1997 showed cerebellar degeneration. Her obstetric history was positive for previous miscarriage and diet-controlled gestational diabetes during the current pregnancy. Throughout pregnancy, the patient was confined to a wheelchair. Neurological evaluation revealed nystagmus, dysarthria, finger to nose ataxia, totally absent reflexes in all limbs and a wide based gait. She had a sensory loss to vibration and temperature to the level of the knees, and normal motor strength. Labor was induced at 40 weeks of pregnancy. Epidural analgesia was started at 2 cm cervical dilatation. A loading dose of 10 ml of 0.125% bupivacaine was administered, and patient controlled epidural analgesia (PCEA) was initiated using bupivacaine 0.0625% plus fentanyl 2 µg/ml. A T_8 sensory block to cold was established and maintained, as per subsequent assessments. No changes in maternal vital signs or fetal heart rate were detected throughout labor. PCEA continued for 6 hours till spontaneous vaginal delivery of a healthy baby with Apgar score of 9 at 1 and 5 minutes. A total amount of 50 mg of bupivacaine was administered. One hour after delivery and discontinuation of PCEA, the patient had bilateral T_{10} sensory block to cold and motor block of 4L and 2R according to modified Bromage scale. The patient was followed daily over the first 3 postpartum days, during which neurological assessment remained unchanged from the basal condition. No subsequent neurological deficit was detected up to 3 months after delivery.

Discussion: SCA, unlike demyelinating and inflammatory conditions, is a slowly progressive degenerative disease that does not exhibit a relapse pattern. Peripheral nerve involvement in SCA manifests as dying-back axonal neuropathy or neuronopathy (2). There is no evidence to suggest that the peripheral nerves of SCA patients may be more sensitive to local anesthetics, or that the pathology is exacerbated by epidural anesthesia. This patient required usual doses of local anesthetic and exhibit the usual clinical response. We suggest that labor epidural analgesia can be safely and successfully used for parturients with SCA, with no residual impact on the patient's neurological status.

References: (1) Anesth Analg 1997; 85:1071-3
(2) Arch Neurol 2004; 61:257-61

SOAP A-102
POSTURAL HEADACHE AFTER CSE: WHAT ELSE COULD IT BE?

B. A. Coda;
McKenzie Willamette Hospital, Springfield, OR.

Case: A 25 yo, 140 kg woman, with an uncomplicated term pregnancy in early labor (cervical dilation 3cm), requested labor analgesia. CSE was performed with the patient sitting, and using 2 separate punctures. Good relief was obtained with intrathecal bupivacaine and fentanyl. Three hours later, labor pain returned, and only a spotty, unilateral block could be obtained with epidural "top up". A second epidural catheter was placed with much difficulty, a bilateral block to T5 was obtained, and PCEA was started. Three hours later she delivered a healthy infant.

The next afternoon she developed a frontal headache, which was effectively treated with Tylenol#3. Five hours later headache and nausea returned, and were treated with promethazine. She was discharged post partum day two with a mild headache.

On post partum day 3, she came to the ED complaining of severe postural headache and requested epidural blood patch (EBP). After multiple punctures, the anesthesiologist was unable to identify the epidural space and abandoned the procedure. Theophylline and an abdominal binder were prescribed. She returned to the ED on post partum day 6 with a severe, throbbing occipital headache, nausea, vomiting, diarrhea, and chills, and was admitted for observation and pain control. She had taken one dose of theophylline. Exam revealed BP 137/76, HR 120, RR 24, SaO2 98%, T 37.8. Her neuro exam was non-focal, with normal cranial nerves II - XII, motor strength and sensation. She had marked photophobia, and neck pain with neck and hip flexion. Other than a bruise and tenderness at the site of needle punctures, no back tenderness was noted. Intravenous fluids and opioid analgesics were prescribed and a head CT scan was ordered.

CT revealed extra-axial fluid distributed over the left frontal and parietal regions, with maximum thickness of 7mm. The fluid was mostly hypodense, with a small amount of high density, suggesting a subacute subdural hematoma. The following day, a left frontal burr hole and drain placement were performed. Clear xanthochromic fluid was obtained, suggesting a hygroma, rather than a hematoma. Symptoms improved and the patient was discharged 3 days later.

Discussion: Intracranial subdural hygroma is a rare complication of neuraxial anesthesia, occurring after accidental dural puncture with epidural needles and after spinal anesthesia. In all 3 reported cases the initial presentation was postural headache.[1-3] In two, patients developed grand mal seizures,[1,2] one preceded by drowsiness, and a third developed tinnitus and ataxia.[3] One patient was treated with EBP,[1] another with epidural dextran,[3] and the third with benzodiazepines only.[2] It is unclear if successful EBP would have effectively managed the problem and allowed our patient to avoid surgery.

References:
1. Anesth Analg 94:1625, 2002
2. Anesth Analg 96:907, 2003
3. Anesth Analg 99:1218, 2004

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-103
ANESTHETIC MANAGEMENT OF TWO MALIGNANT HYPERTHERMIA SUSCEPTIBLE PARTURIENTS REQUIRING CESAREAN SECTION ON THE SAME DAY

N. K. Anand, S. Huffnagle, W. Grodecki, H. Huffnagle, E. Elia;
Thomas Jefferson University Hospital, Philadelphia, PA.

Introduction: The use of regional anesthesia for malignant hyperthermia (MH) susceptible parturients requiring cesarean section has been established as a safe and effective technique. There is a possibility that regional anesthesia will be contraindicated in patients taking anticoagulants like low molecular weight heparin (LMWH) and subsequently require general anesthesia.

Case Report: Two MH susceptible parturients were evaluated during their second trimester. The first patient, a 36-year-old, G_2P_{0010}, white female, 20 weeks pregnant with twins, inherited the MH trait from her mother. She was taking LMWH twice daily to prevent the recurrence of deep venous thrombosis. The second patient is a 20 year old, G_1P_0 Asian female, whose 23 week pregnancy was complicated by debilitating scoliosis. She had a history of an MH reaction while receiving anesthesia during a dental procedure.

Pre-operative anesthetic evaluation included a discussion about the possibility of general anesthesia during an emergency cesarean section, as LMWH precluded the placement of a neuraxial catheter for 24 hours in the first patient, while affliction with scoliosis increased the difficulty of regional blockade in the second patient. The contingency plan in the event of an emergency cesarean section was a rapid sequence induction of general anesthesia using thiopental and high dose rocuronium. Nitrous oxide, opioids, neuromuscular blockers, and a propofol infusion would maintain general anesthesia.

Ironically, both patients required cesarean sections for failure to progress on the same day. LMWH had been held for 24 hours allowing epidural placement prior to cesarean section for our 36 year old patient, and an epidural was also placed after several attempts in our 20 year old scoliotic patient. 30mL of lidocaine 2% with 1:400,000 epinephrine was injected through both catheters and cesarean sections were performed without significant complications.

Discussion: MH susceptible parturients should be seen in consultation by the anesthesia department during their second trimester. A paternal history of the MH trait should also be elicited, since the neonate can inherit the MH trait from the father. If one decides to give dantrolene prophylactically, 4mg/kg should be ingested orally over a 24-hour period. Severe uterine atony secondary to dantrolene-induced smooth muscle relaxation is the main side effect of concern.[1] Neonatal exposure to dantrolene causes decreased muscle tone after birth as it readily crosses the placenta. The Malignant Hyperthermia Association of the United States (MHAUS) recommends a machine washout with O_2 at 10 L/min for 20 minutes. The CO_2 absorbent and anesthesia circuit should be changed as well, to avoid delivering residual inhalational agent. Studies describe the safe use of propofol infusions on unborn neonates in parturients during general anesthesia.[2]

References:

1. Anesth and Analg,1987;66:269-270
2. Anesthes Intensive Care,1992;20:165-168.

SOAP A-104
PANCREATITIS AS A RARE COMPLICATION OF PRE-ECLAMPSIA

L. Zimmerman, N. Sah;
Magee Womens Hospital, Pittsburgh, PA.

INTRODUCTION: The intrapartum and postpartum course of a pregnant patient with acute pancreatitis.

CASE REPORT: A 32 year-old G3P1 female presented at 36 weeks gestation with acute epigastric pain. On examination, the patient appeared cachectic and malnourished. She was 4'11'', 98 pounds, and had gained only 4 pounds during her pregnancy. She had severe (9/10 on a VAS scale with 0 being no pain and 10 being the worst possible) mid-epigastric pain radiating to the back. Her obstetric history was significant for hypothyroidism, gestational diabetes, pre-eclampsia, and acute renal insufficiency. She had a history of gallstone pancreatitis 5 years ago, for which she underwent cholecystectomy. Although her initial amylase, lipase, and alkaline-phosphatase were elevated, a right upper quadrant ultrasound revealed a normal common bile duct with no evidence of stones. Her blood pressure was consistently elevated over 140/90 and the patient was diagnosed with severe pre-eclampsia. In view of the severe pre-eclampsia and acute pancreatitis, a decision was made for expedient delivery via cesarean section. Since her coagulation profile including PT, PTT and platelet count were within normal range, a spinal anesthetic was administered using a 24 gauge Sprotte needle with 0.75% Bupivicaine (11mg) with preservative-free Morphine (150 mcg) and Fentanyl (15 mcg) without complication. A 5lb10oz baby was delivered with Apgar scores of 8 and 9. During the postpartum period, the patient's pancreatic enzymes, BUN, and creatinine decreased to normal levels as shown in the table below. By 72 hours, patient was tolerating a regular diet.

DISCUSSION: Acute pancreatitis is a rare but potentially devastating complication of pregnancy, occurring in 1 in 1000-3000 pregnancies. Gallstone disease and hypertriglyceridemia are responsible for the majority of pregnancy induced pancreatitis (1, 2). This patient had no obvious etiological factors but did have severe pre-eclampsia, renal insufficiency, hypothroidism and diabetes. It is possible that microvascular disease secondary to pre-eclampsia and renal insufficiency may have contributed to her pancreatitis (3). We suggest maintaining a high index of suspicion for pancreatitis in pre-eclamptic patients presenting with abdominal pain. This patient had a favorable outcome due to early diagnosis and expedient delivery.

hrs	Lipase IU/L	Amylase IU/L	AP IU/L	BUN mg/dL	Cr mg/dL
0	8768	1575	238	69	2
8	7933	1630	276	57	2
16	3632	1068	217	49	2
24	2445	857	211	41	1.9
36	916	445	228	31	1.6
48	440	219	204	25	1.4
72	221	96	186	18	1.2

REFERENCES:

1. De Chalain, TM et al. Surg Gyne Obst 1988; 167:469.
2. Parmar, M. J Pancreas 2004; 5(2):101-104.
3. Marcovici I, Marzano D., Am J Perinatology 2002; 19:177-179.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-105
ANESTHESIA FOR CESAREAN SECTION IN A PATIENT WITH DYSTONIA AND IMPLANTED DEEP BRAIN STEM ELECTRODE

S. K. Singaravelu, E. A. Djabatey, G. S. Babu, T. Wauchob;
Liverpool Womens Hospital, Liverpool, United Kingdom.

Introduction: Dystonia is an intractable condition characterized by sustained muscle contraction frequently causing twisting and repetitive movements or abnormal posture[1]. This condition has been successfully controlled by deep brain stimulation (DBS)[2]. We present the management of a patient with adult onset dystonia who underwent two successful cesarean section (LSCS). The first operation was performed under spinal anesthesia, second accomplished with combined spinal anesthesia (CSE). Both were uneventful.

Case Report: A 25 year old parturient (G2P1) was referred to the high-risk anesthetic clinic for anesthetic assessment with a two year history of dystonic attacks. These were of sudden onset and took the form of tonic contractions primarily affecting the limb and back muscles. She was wheel chair bound and had a left hemiparesis. There was no family history or organic cause. DBS electrodes were in-situ in the subthalamic region bilaterally. Her symptoms were controlled and she mobilised easily. Regular readjustment of the current setting was required to keep her symptom free. Occasionally there were breakthrough episodes.Physical examination was normal with no evidence of raised intracranial pressure.

At 39 weeks gestation, anesthesia for LSCS was achieved with spinal anesthesia using 2.8 mls of 0.5 % heavy bupivacaine after a preload of 1 litre Hartman's solution. 24-gauge sprotte needle with introducer was used. Diathermy was avoided intraoperatively due to concerns with brain stem electrode malfunction. She delivered a live healthy infant. Cefuroxime was administered as prophylaxis in view of DBS electrode. 0.5 units syntocinon was given to aid contraction of the uterus. Postoperative pain was managed with morphine PCA.

She had a second successful planned cesarean section 18 months later under CSE using Bupivacaine and intrathecal Diamorphine. Postoperative analgesia was achieved satisfactorily with oral Paracetamol and rectal Diclofenac.

Discussion: There are no published case reports on anesthetic management of pregnant patient with dystonia for cesarean section. Stress of labour, pain and anxiety can precipitate life threatening dystonic storm. Sustained spasm of the adductor muscles may cause difficulty with positioning and delivery of the baby.

Fractures of the implanted wire may occur during labour. It is important to be familiar with the DBS system to allow readjustment for control of symptoms.

Some anesthetic agents including propofol, cyclizine and metaclopramide have been implicated in dystonic reaction during anesthesia and are probably best avoided. There is no literature regarding stimulation of DBS electrodes by fasciculation of succinyl choline and by diathermy.

For the above reasons, we feel that planned cesarean section under regional technique should be considered in this group of patients.

Summary: We report a case of successful management of a parturient with dystonia on deep brain stimulating system for cesarean section.

References: 1.J Neural Transm (1992) [Suppl] 38:91-104; 2.Sterotact Funct Neurosurg 2002;78:168-182

SOAP A-106
ANESTHETIC MANAGEMENT OF A PARTURIENT WITH POSTERIOR FOSSA TUMOR FOR CESAREAN SECTION

L. Hebbar, R. Baker, J. Earley;
MUSC, Charleston, SC.

Maternal malignancy during pregnancy is very uncommon, especially for brain tumors. We report the peripartum management of a 22 y.o.BF G2P1 at 36 weeks IUP with a posterior fossa medulloblastoma who underwent c/ section under general anesthesia (GA). The patient presented with a two-day history of headache. After a negative obstetric workup, head CT scan demonstrated a mass in the posterior fossa with evidence of raised intracranial pressure (ICP) that warranted the placement of a ventriculostomy catheter to maintain ICP between 13-15 mm Hg. On arrival in the OR for c/section, in addition to standard monitors, we also monitored invasive arterial pressure (awake A-line), ICP, cerebral perfusion pressure (CPP), arterial blood gas and Patient Safety Index (PSI) which is a processed 4 channel EEG, with continuous visualization of the 4 channels. Changes in consciousness depth are indicated by numerical changes in PSI (0-100), 100 representing a more alert state. PSI values between 25 and 50 represent a desirable depth for GA. The purpose of using the PSI was to ensure adequate anesthetic depth since we were not planning to use nitrous oxide and to facilitate induction of barbiturate coma, in the event of an intraoperative intracranial catastrophe. Following preoxygenation anesthesia was induced with 500mg sodium thiopental and 120mg succinylcholine. Maintenance was with O2/air at 50/50 and isoflurane at 0.5 MAC with fentanyl 50 mcg administered after delivery of baby. The patient's intracranial pressure at baseline was 18 and ranged from 13 to 20. Approximately 10 milliliters of cerebrospinal fluid was drained in order to maintain ICP in the normal range. PSI at baseline was 78 with a range of 32 to 63 during the case. The patient was hyperventilated to maintain end-tidal CO2 between 25 and 30 mm Hg. APGAR scores at delivery were 4/7. An episode of profound hypotension (systolic of 61mm Hg) occurred during exteriorization of the uterus for hysterotomy closure, which was not accompanied by any changes in ICP, but there was a decrease in Et CO2, raising the possibility of venous air embolism. The hypotension was refractory to treatment with phenylephrine but responded to 50 micrograms of epinephrine. The patient's emergence from GA was unremarkable, with no change in neurological status and she underwent a successful resection of the tumor 2 days later. Traditionally, neuraxial anesthesia is avoided due to concerns of brain herniation in the presence of increased ICP. The optimal management of parturients with intracranial tumors and raised ICP is elective c/section under GA.[1] In patients with markedly raised ICP, placement of a ventriculostomy prior to the c/section and continuous monitoring of ICP, invasive blood pressure, CPP, and 4 channel EEG, provides a safe anesthetic management.

1. Can J Anesth 1999; 46:61-5.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-107
ANESTHETIC MANAGEMENT OF A T4-T5 PARAPLEGIC PARTURIENT WITH MASS MOTOR REFLEX INTERFERRING WITH RESPIRATORY FUNCTION AND AUTONOMIC HYPERREFLEXIA

J. S. Bordelon, C. A. DeSimone;
Albany Medical College, Albany, NY.

Introduction: Parturients with spinal cord lesions at or above T6 are at risk for autonomic hyperreflexia (AH) as well as mass motor reflex[1] (MM).

Case Report: A 36 year old parturient, G3 P1 at 36wks gestation with T4-T5 paraplegia was transferred to our hospital, in labor, for a repeat cesarean section. She had poorly controlled MM with hip flexor spasms associated with chest wall rigidity causing dyspnea. She had an intermittent headache and hypertension, associated with uterine contractions, which was thought to be AH. She had bilateral lower extremity contractures with evidence of old decubiti. She underwent spinal instrumentation and stabilization at age 16 as well as multiple surgical procedures for decubiti. She was recently treated for Pseudomonas urosepsis.

Her laboratory values indicated very poor nutritional status with an albumin of 1.7 G/dl.

The patient was brought to the OR and non-invasive monitors were placed. A combined spinal-epidural anesthetic was planned at the L4-L5 interspace, below the instrumentation scar. A 17 G touhey was placed using loss of resistance technique with air. A 24 G Gertie Marx needle was advanced and 12mg of hyperbaric bupivicaine was injected into the CSF. An epidural catheter was placed 3cm into the epidural space, the catheter was secured, and the patient was placed supine with left uterine displacement. The patient's spasms subsided, her contracture tone decreased and her blood pressure returned to baseline. The intraoperative course was uneventful until 2 hours into the surgery when the patient's blood pressure rose acutely from 100/60 to 150/100 and the patient complained of a headache. She was administered nicardipine 0.3mg IV, and 10ml of 2% lidocaine, incrementally, through the epidural catheter. Her blood pressure returned to baseline. Post operatively, she was evaluated by neurology and they recommended Tizanidine 2 MG PO for treatment of her spasms. She experienced three episodes of hip flexor spasm, chest wall rigidity, hypertension and headache requiring intervention over the next 24 hours. All episodes responded to administration of 0.2% ropivicaine, 5ml through the epidural catheter. She was then transferred to the floor and discharged to home 3 days later without further incident.

Discussion: A combined spinal-epidural approach was planned to provide an immediate block with the spinal anesthetic to prevent further AH during the surgical stimulus and the epidural catheter to allow intermittent treatment of both MM and AH post operatively. A continuous epidural technique was not used because residual epidural scarring may have prevented adequate treatment for AH and large volumes of local anesthetics in the setting of severe hypoalbuminemia may have resulted in toxicity.

References: 1. Chestnut. Obst Anes 2004:875-876

SOAP A-108
ANESTHETIC MANAGEMENT OF A 19 YEAR OLD PARTURIENT WITH MAPLE SYRUP URINE DISEASE

L. E. Helgeson, R. C. Courtney;
Yale University School of Medicine, New Haven, CT.

Introduction: Maple Syrup Urine Disease (MSUD) is an inherited, autosomal recessive metabolic disorder affecting the metabolism of the branched chain amino acids (BCAA's) leucine, isoleucine, and valine. In MSUD, mutated gene(s) result in a defect in the enzyme branched chain keto-acid dehydrogenase complex, which catalyzes the degradation of these BCAA's. This leads to their accumulation resulting in seizures, neurologic and developmental impairment, and profound metabolic decompensation. MSUD occurs in about 1:180,000 newborns in the United States, but may occur as frequently as 1:176 newborns in certain populations such as the Mennonites of Pennsylvania and in societies where consanguineous marriage is prevalent. There are three documented cases of pregnant individuals with MSUD with one dying postpartum. We describe the successful labor and postpartum management of a parturient with MSUD.

Case Report: A 19-year-old G1P0 female with a past medical history of MSUD is admitted in early labor at 39 + 4 weeks. A combined spinal epidural technique was performed when the patient's cervix dilated to 2cm. Fourteen hours later (3cm dilated) a cesarean section was performed under epidural anesthesia for failure to progress. During labor and the cesarean section, parenteral nutrition with 20% intralipid and D10W was used to prevent a metabolic crisis due to protein catabolism. In the postpartum period, intralipid/glucose was continued until postoperative day 2, when the patient tolerated her regular diet. Postoperative analgesia was provided by patient controlled epidural analgesia (PCEA) until postoperative day 2, when PCEA therapy was discontinued and oral oxycodone administered as needed. The patient was discharged home with her regular MSUD powder supplemented diet. Her metabolic status was stable throughout her hospital course.

Discussion: MSUD is an inborn error of metabolism that presents special management problems for both obstetricians and anesthesiologists. Infants born with MSUD who are undiagnosed and untreated die in the first months of life or are severely neurologically impaired. The cornerstone of managing MSUD is the long-term management of diet through medically prepared foods devoid of BCAA's in conjunction with careful monitoring of plasma amino acids. Times of stress such as labor and birth, surgery, and the postpartum period can be tenuous as toxic BCAA levels can accumulate as a result of protein catabolism related to stress and surgery. It is critical to minimize any source of physiologic stress and /or the response to this stress. This would include nutritional, surgical, pain, or emotional sources. Therefore peripartum management should include (1) early placement of epidural analgesia, (2) avoiding a prolonged or difficult labor course, (3) avoiding prolonged surgical time, and (4) early initiation of supplemental nutrition in the form of intravenous intralipids and glucose. In rare circumstances, hemodialysis or peritoneal dialysis may be required to remove BCAA's and keto acids.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-109
COMBINED SPINAL EPIDURAL FOR CAESAREAN SECTION IN A PATIENT WITH LONG QT SYNDROME AND AN AUTOMATIC IMPLANTABLE CARDIAC DEFIBRILLATOR

W. J. Wight;
Royal Victoria Infirmary, Newcastle upon Tyne, United Kingdom.

Introduction: Long QT syndrome (LQTS) is a congenital arrhythmogenic cardiovascular disorder resulting from mutations in cardiac ion channels, presenting with recurrent syncope and sudden death[1]. Recently mortality in this condition has been reduced by the introduction of automatic cardiac defibrillators (AICD), which presents new challenges when these patients are presented for surgery. The reported case describes the successful anaesthetic management of a parturient with LQTS and an AICD undergoing caesarean section.

Case Report: A 32 year old primiparous Caucasian lady with LQTS (QTc = 530ms) diagnosed following a series of blackouts was presented for elective caesarean section at 38 weeks gestation. An AICD had previously been inserted prior to this pregnancy, which successfully reverted two episodes of VF in the ensuing months. At the time of presentation for caesarean section she described frequent episodes of nearly blacking out (chest heaviness, nausea and light headedness) at times of physical exertion or emotional stress. Following an infusion of 2g of Mg^{2+} over 20 minutes, a combined spinal epidural (CSE) was performed in the right lateral position, with 7.5 mg hyperbaric bupivacaine and 300μg diamorphine constituting the intrathecal dose. The patient was then immediately placed in the left lateral position until surgical anaesthesia was achieved, at which point the patient was turned into a supine position with left tilt. Supplementation of the block via the epidural catheter was not required. Immediately prior to surgery the AICD was turned off by a cardiac technician, in order to allow the use of surgical diathermy, and remained off until the operation was completed. Blood pressure and heart rate remained stable throughout the procedure. The patient made an uneventful recovery.

Discussion: The clinical features of LQTS result from the development of torsades de pointes, giving rise to an abrupt decrease in cerebral blood flow leading to syncopal symptoms; although usually self-terminating, the arrhthymia can deteriorate into ventricular fibrillation and death. AICDs do not prevent the formation of torsades de pointes, but they do reduce the incidence of sudden death. Anaesthetic management should focus on the prevention of excessive sympathetic activity and avoidance of factors that can prolong the QT interval, including the use of vasopressor drugs. Sequential CSE allows topping-up of the epidural as necessary in order to achieve a surgical block, although this manoeuvre proved unnecessary in this case. This patient was also kept in the full lateral position until ready for surgery, so eliminating any reduction in pre-load caused by aorto-caval compression. These two measures resulted in a very cardio-stable anaesthetic precluding the need for vasopressor agents that could provoke an episode of torsades de pointes.

Reference: 1. Mayo Clin Proc 1998; 73:250-69

SOAP A-110
ANESTHETIC MANAGEMENT FOR CESAREAN SECTION IN A PARTURIENT WITH MYOTONIA CONGENITA

A. J. Butwick, E. Riley;
Stanford University Medical Center, Stanford, CA.

Introduction: Myotonia congenita (MC), first described by Thomsen in 1876, is a rare and inherited disorder of skeletal muscle excitability. It is caused by mutations in skeletal muscle chloride channel genes (CLCN1). Muscle stiffness is the major presenting complaint, which ameliorates with exercise ("the warm-up phenomenon"). MC is more benign and less common than myotonic dystrophy, and has no extramuscular manifestations. MC is associated with malignant hyperpyrexia. Life-threatening myotonic responses may be triggered by anesthetic agents (e.g. succinylcholine) and physical factors (shivering and hypothermia), causing difficulties in tracheal intubation and ventilation.[1] This case report provides further evidence of the successful use of spinal anesthesia for caesarean section in a woman with MC. [2]

Case Report: A 31y/o primip (wt 54 kg, ht 160cm) was diagnosed with Becker's disease (autosomal recessive form of MC) in adolescence. Obstetric anesthesia review occurred at regular intervals antenatally and caesarean delivery had been planned electively to avoid possible worsening of her symptoms in labor and obstetric concern about patient positioning for vaginal delivery. She was admitted in early labor (38 weeks gestation) and cesarean section was expedited. Her main symptoms were muscle stiffness and weakness, which diminished with exercise but had worsened in pregnancy. She was taking oral corticosteroids for a pregnancy related rash. Preoperative laboratory studies (haematology and renal function) were normal. A warmed crystalloid (1000 ml) preload was given and spinal anesthesia was administered at L3/4 (12 mg bupivacaine with 10 μg fentanyl and 200 μg morphine, achieving a sensory block to T4). Her temperature was maintained (>37 ºC) with warmed IV fluids (using a Hotline fluid warmer®) and lower body-forced air warming (Bair Hugger®). The BP and HR did not vary >15% from baseline values. No shivering or myotonic phenomena occurred. No respiratory support was required and the patient was given supplemental oxygen via a mask. A healthy male baby was delivered. The duration of surgery was 38 mins and the postoperative period was uneventful.

Discussion: Regional anesthesia is preferred in these patients as anesthetic drugs associated with precipitating myotonia (succinylcholine and anticholinesterases) are avoided. Cold and shivering can independently induce myotonia, and we endeavoured to maintain normothermia by using warming systems to avoid these complications.[3] The use of electrocautery was kept to a minimum, thereby reducing the risk of myotonic contractions. We used supplemental oxygen, as some authors suggest that MC can involve the respiratory muscles to the same extent as other skeletal muscles.[4] If general anesthesia had been required, a modified rapid sequence induction with rocuronium and propofol was planned.

References: 1. BJA 1994; 72: 210-6. 2. Rev Esp Anestesiol Reanim 1996; 43: 147-9. 3. BJA 2000; 84: 615-28. 4. Am Rev Respir Dis 1984; 130: 681-4.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-111
TARGET CONTROLLED INFUSION OF PROPOFOL PLUS REMIFENTANIL FOR HELLP PATIENTS: ANOTHER TOOL FOR THEIR MANAGEMENT

C. E. Restrepo[1], M. A. Uribe[1], L. Corredor[2];
[1]Clinica Las Americas & UPB Anaesthesia Program, Medellin, Colombia, [2]Clinica Cardiovascular Colombiana, Medellin, Colombia.

Background
HELLP syndrome is a severe complication associated with Pre-eclampsia, being a leading cause of maternal mortality. Anaesthetic management is challenging due to possible haemodynamic instability and the bleeding risk. Despite the wide use of regional anaesthesia for Caesarean section (CS), a group of pregnant patients remain candidates for general-anaesthesia (GA) when a CS is indicated; HELLP parturients frequently fit in to this group. But GA is not complication-free. The classical "crash" induction does not fulfil the haemodynamic goals of HELLP patients (avoiding hypertension and tachycardia), therefore one needs a smooth procedure for blunting the response to intubation and protecting the airway at the same time. In addition, the effects on the neonate are important and it is also desirable to have a rapid emergence for neurological monitoring to diagnose any intracraneal bleeding.
Target controlled infusion (TCI) of propofol plus remifentanil has been used for anaesthetic management of pregnant patients with plurivalvular lesions and for termination of late pregnancy. The TCI of propofol is very suitable when a high degree of haemodynamic control is desirable, and when a fast-track-anaesthesia is planned. Remifentanil offers a good profile for the neonate and has been used for CS in critically ill parturient
Case Report
We would like to report two parturient with HELLP syndrome scheduled for urgent CS under TCI propofol plus remifentanil; both patients had basic ASA monitoring and an arterial catheter was inserted awake. One large bore (14G) and a peripheral rapid infusion catheter, was placed. No attempts were made to insert a CVC because of a low platelet count (45 000 and 39 000 respectively). A platelet transfusion was administrated to achieve a theoretical level of 50 000. The TCI was adjusted to a target concentration of 2.5µg/ml and the time for induction was set to one minute; the remifentanil was run at 0.1µg/kg/min and additional boluses of 0.5µg/kg were given to maintain an adequate anaesthetic level. Boluses of labetalol were given at the same time and the airway was secured with suxamethonium without problem. The heart rate and the blood pressure were maintained in a 20% range of the basal values. Both infants were born 6 & 7 minutes after the induction and the Apgar scores 7/10 & 8/10 respectively at one minute. Remifentanil was stopped 7 minutes before extubation and the TCI target was dropped to 1µg/ml to achieve sedation; when the patient obeyed verbal command the tracheal tube was withdrawn. Postoperative analgesia was achieved using a PCA morphine pump.
Commentary
We think the combination of TCI for titratable anaesthesia and the good profile of remifentanil in the parturient make this technique very attractive for unstable patients who are not candidates for regional anaesthesia, such those with HELLP.

SOAP A-112
CEREBRAL HEMORRHAGE AND DEATH IN AN ECLAMPTIC PARTURIENT

N. M. Scaccia, B. M. Scavone, C. A. Wong;
Northwestern University Feinberg School of Medicine, Chicago, IL.

Introduction: Eclampsia and cerebral hemorrhage are two of the most severe complications of pregnancy. We report a preeclamptic parturient with presumed eclamptic seizures unresponsive to therapy, who was ultimately diagnosed with cerebral hemorrhage.
Case Report: A healthy 21 y/o G1P0 presented at 38 2/7 weeks in labor complaining of headache, RUQ pain, and visual changes. She was diagnosed with severe preeclampsia based on elevated BP's (180-200/100-110 mm Hg), proteinuria and the above complaints. The diagnosis of HELLP syndrome was confirmed with laboratory data: WBC 9.0, Hg 7.9, Hct 23.2, Platelets 36,000, ALT 241, AST 377 and LDH 871. The patient was treated with magnesium sulfate and hydralazine. Her headache continued to worsen despite treatment with acetaminophen. Shortly after admission, the patient experienced a generalized seizure, and become unresponsive. Over the next hour, she continued to have seizure-like activity with each contraction despite treatment with 10 mg IV diazepam and magnesium sulfate. The anesthesiologist was called for initiation of epidural analgesia, but decided against it due to her mental status and coagulopathy. The trachea was intubated for airway protection and a forceps vaginal delivery was performed. The patient was transferred to the ICU, where the neurology service determined that the patient was not seizing, and had most likely been intermittently posturing in response to painful uterine contractions throughout labor and delivery. CT scan demonstrated an acute IPH with an associated IVH and moderate hydrocephalus. CT and MR angiography of head showed no evidence of intracranial vascular malformation or aneurysm. The patient remained obtunded for the remainder of her hospital course. Nine days later she developed markedly increased ICP, tentorial herniation, extensive parenchymal infarction, and the decision to withdraw life support was made.
Discussion: Cerebrovascular hemorrhage is an uncommon complication of pregnancy associated with substantial maternal morbidity and mortality, contributing to 12% of maternal deaths. The incidence of cerebrovascular accident is 1:6000 pregnancies, 44-47% of which are associated with preeclampsia/eclampsia. Among patients with fatal preeclampsia/eclampsia, up to 85% may have had cerebral hemorrhage. Some theorize that histologic vascular wall changes are responsible for preeclampsia/eclampsia neurologic symptoms, and these may predispose to hemorrhage. In this case, presumption of eclampsia delayed the diagnosis of intracranial hemorrhage. Severe acute hypertension, resulting in an inability to autoregulate blood flow, may be associated with generalized cerebral edema in the absence of hemorrhage, and represent an alternative explanation of loss of consciousness. The underlying pathology can be distinguished by neuroimaging studies. This case report suggests that preeclamptic/eclamptic patients who present with decreased level of consciousness, or seizures unresponsive to magnesium sulfate therapy, should undergo neuroimaging studies as soon as possible.
References: American Journal of Obstetrics and Gynecology 1997: 176(6) 1139-1145.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-113
ARRHYTHMOGENIC RIGHT VENTRICULAR DYSPLASIA IN LABOUR: IMPLICATIONS FOR ANAESTHESIA

C. Fielding, C. Murphy, C. McCaul;
Department of Anaesthesia & Intensive Care, Waterford Regional Hospital, Ireland.

Introduction: Arrhythmogenic right ventricular dysplasia (ARVD) has been associated with death in atheletes and anaesthesia related mortality. The natural history of ARVD in pregnancy is not known. We present a case report of severe ARVD presenting to the Anaesthesia team for the first time in Labour.

History: A 35 year old lady with a strong family history of early cardiac death complained of palpitations at 17/40. Cardiology investigations were as follows; 12 lead ECG showed ventricular ectopy consistent with morphology in the right ventricular outflow tract. Holter monitoring recorded in excess 20,000 beats averaging 740 ectopics per minute. Echocardiogram showed abnormal right ventricular trabeculation. A diagnosis of arrhythmogenic right ventricular dysplasia (ARVD). Antiarrhythmics were not advised.

Arrhythmogenic right ventricular dysplasia. This is a rare condition which may be caused by mutations in plakoglobin and desmoplakin resulting in decreased myocyte function under conditions of mechanical stress and subsequent cell death, inflammation and remodelling. It may also be associated with mutations in cardiac ryanodine receptors and abnormal calcium release from the sarcoplasmic reticulum. The clinical phenotype is extremely variable and ranges from subclinical disease to biventricular failure. It may manifest as a malignant arrhythmia and sudden death. These arrhythmias may be exacerbated by cathecholamines. Therapy is controversial as response to antiarrhythmics is variable and during pregancy may have adverse fetal effects. Implantable defibrilators are currently recommended in those who have had severe symptoms including previous cardiac arrest.

Progress in Labour: In this patient, after induction of labour, increasingly palitations occurred and increasingly frequent ectopics were noted. The Anaesthesia team were contacted about provisional resuscitation and analgesia. Arrhythmias may be sympathetically mediated in ARVD, therefore we prioritized analgesia before considering antiarrhythmic medication. Satisfactory analgesia established by lumbar epidural infusion of L-Bupivacaine/fentanyl during which the patient had minimal symptoms. However during breakthrough pain ventricular ectopy increased significantly but responded to epidural top ups. Symptoms increased after delivery and beta blockade was commenced. She was discharged from hospital alive and well.

Conclusion: Malignant arrythmias may be sympathetically mediated in ARVD. Epidural analgesia has not been previously reported in this condition and in our case resulted in improved patient symptoms and reduced frequency of ectopic beats. Priority should be given to effective early analgesia in labour in patients with ARVD.

SOAP A-114
DIABETES INSIPIDUS AFTER POSTPARTUM EMERGENT HYSTERECTOMY

P. M. McCullough, M. L. DeRuyter;
Mayo Clinic Jacksonville, Jacksonville, FL.

Introduction: We present a case of an obstetric patient who developed diabetes insipidus following emergent hysterectomy for post-partum hemorrhage. Although rare, prompt recognition and treatment of this uncommon complication of pregnancy is important and is illustrated in this case report.

Report of case: A 32-year old Asian woman, gravida 4, para 1 was admitted for induction of labor at 35 5/7 weeks estimated gestational age for preeclampsia. Her last pregnancy was seven years prior to admission and was complicated by preeclampsia. The patient received regular prenatal care during the course of this pregnancy. A combined spinal epidural technique was used for labor analgesia. After uneventful vaginal delivery, uterine atony led to postpartum hemorrhage unresponsive to oxytocin, carboprost, and misoprostol. A decision was made to perform an emergent hysterectomy for postpartum hemorrhage. Upon arrival to the operating room, the patient's blood pressure was 70/55. Baseline hemoglobin - 13 gm/dL, serum Na - 141 mEq/L. A total abdominal hysterectomy was performed under general anesthesia with an EBL of 2500-mL, urine output - 1300-mL. Intraoperative transfusion included 4U PRBCs, 2U FFP, 1 L 5% albumin, and 4400-mL of crystalloid. Upon transfer to the PACU, 2000-mL urine output was noted with another 1950-mL output within 20 minutes. Initial serum Na - 149 mEq/L, urine osmolality -169 mOsm/kg, and serum osmolality - 303 mOsm/kg. 5 hours later serum Na - 161 mEq/L. A presumptive diagnosis of diabetes insipidus was made and the patient was admitted to the intensive care unit where she received aggressive fluid resuscitation and was treated with DDAVP. Maximum serum sodium level was 164 mEq/L, serum glucose - 135 mg/dL while in ICU. Serum arginine vasopressin level was elevated at 2.2 pg/mL. Her condition stabilized after 2 days of treatment. MRI of the brain showed no acute hemorrhage and a possible pituitary microadenoma.

Discussion: Diabetes insipidus is a rare complication in pregnancy, occurring in 2-6 per 100,000 births and is thought to be due to the excessive secretion of vasopressinase by the placenta, but is usually transient (1). Central diabetes insipidus may also be caused by conditions that disrupt the hypothalamic-posterior pituitary axis, such as hemorrhage in this patient. Nephrogenic diabetes insipidus is often hereditary and congenital, but may be caused by lithium administration, relief of chronic urinary obstruction, or certain electrolyte abnormalities (2). Although the exact type of diabetes insipidus present in this patient is difficult to discern, early recognition of the condition in the peripartum period is important and can lead to life-saving interventions, such as treatment with DDAVP.

References: 1. *The Journal of the American Board of Family Practice*, 1999, **12(6):** 489-
491.
2. *Archives of Internal Medicine,* 1997, **157(12):** 1293-1301.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-115
ANESTHETIC MANAGEMENT OF A PARTURIENT WITH STICKLER SYNDROME AFTER TWO PRIOR FETAL DEATHS

M. W. Simon-Baker, H. Huffnagle, S. Huffnagle;
Thomas Jefferson University Hospital, Philadelphia, PA.

Introduction: Stickler Syndrome, hereditary arthro-opthalmopathy, is a rare, autosomal dominant, connective tissue disorder of type II collagen characterized by multiple abnormalities. These include orofacial (cleft palate, micrognathia, and flat facies), ophthalmologic (retinal detachment and blindness), musculoskeletal alterations of the spine and pelvis (atlanto-axial instability, cervical narrowing and fusion, scoliosis, narrow pelvic outlet, and hyperextensible joints), mitral valve prolapse and deafness.(1) We report a case of a parturient with Stickler Syndrome whose two prior pregnancies resulted in fetal death.

Case Report: A 30-year-old parturient presented at 37 weeks gestation for elective cesarean section. Her first pregnancy was complicated by severe pre-eclampsia; she delivered a stillborn fetus vaginally at 25 weeks gestation. Her second pregnancy required an emergency cesarean section at 39 5/7 weeks gestation under general anesthesia for cord prolapse and fetal bradycardia that ultimately ended with neonatal death 4 days post partum. Her medical history was significant for hypertension, gestational diabetes, DVT 12 years prior, reflux, latex allergy, mitral valve prolapse, and spondylolisthesis with severe thoracolumbar scoliosis. She had previously undergone cleft palate repair and two lumbar fusions. Her airway exam was unremarkable, excluding a surgical scar from the palate repair, and she had been intubated without difficulty on five prior occasions. After consultation with a pulmonologist, perinatologist, cardiologist, and anesthesiologist, a spinal anesthetic was planned. Following much discussion, the patient refused regional anesthesia (RA), despite full knowledge of the increased risk for both morbidity and mortality associated with general anesthesia. Preoperative pulmonary function tests (PFT) were normal. Echocardiogram revealed MVP with a 60% EF and normal ventricular function. After an uneventful intravenous induction of general anesthesia, a 6.5 ETT was placed without difficulty. The surgery proceeded without incident; she emerged from anesthesia and was extubated without complications.

Discussion: Narrow pelvic outlet and cephalopelvic disproportion common with Stickler Syndrome necessitates delivery by cesarean section. Due to the unfortunate outcomes from our parturient's past pregnancies, a cesarean section was planned at 37 weeks gestation to avoid an unplanned emergent delivery. Because of our patient's scoliosis, severe reflux, and potential airway difficulties (in addition to the known benefits of RA), we had hoped to perform a spinal anesthetic. However, RA in this patient with 2 previous lumbosacral fusions might be more difficult to place and a challenge to manage should a postoperative PDPH occur. This case demonstrates the potential anesthetic difficulties of a parturient with Stickler Syndrome. These patients require a multidisciplinary approach. Preoperative workup should include PFT's, an echocardiogram, cervical spine radiographs with attention to atlanto-occipital stability and an upper-airway exam in anticipation of potential airway difficulty should RA be an unacceptable option.

References: 1. Spine 1999;24(12) 1260-1264.

SOAP A-116
PHAEOCHROMOCYTOMA IN TWIN PREGANANCY

D. McIntosh, W. J. Wight;
Royal Victoria Infirmary, Newcastle upon Tyne, United Kingdom.

Introduction: Phaeochromocytoma in pregnancy presents a challenge to obstetricians, anaesthetists and endocrinologists. In this case report we discuss the second trimester diagnosis, the use of α and β-adrenoreceptor blocking agents and the perioperative management of phaeochromocytoma in a twin pregnancy.

Case Report: A 21-year-old healthy primigravida presented to the antenatal booking clinic at 17 weeks gestation with a blood pressure (BP) of 156/88 mmHg. Elevated 24 hour urinary catecholamine levels and an MRI scan which demonstrated the presence of a 7 x 7cm mass within the right adrenal confirmed the diagnosis of phaeochromocytoma. A multidisciplinary team discussion resulted in a plan for elective caesarean section at or around 34 weeks following a period of pharmacological blockade and then early laparoscopic right adrenalectomy. She was admitted at 26 weeks for the establishment of α-blockade. Despite increasing the doses of phenoxybenzamine together with the introduction of metoprolol the patient remained significantly hypertensive with no apparent significant volume deficit. Intra-uterine death of twin 2 occurred at 29 weeks and within one week twin 1 was beginning to show signs of deterioration. An urgent caesarean section was therefore arranged at 30 weeks gestation. Intra-operative monitoring included invasive blood pressure and non-invasive cardiac output monitoring using lithium dilution techniques (LIDCO™). Following an infusion of 2g Mg^{2+} and a bolus of 1mg alfentanil general anaesthesia was induced. BP remained stable throughout the surgery. Sodium nitroprusside infusion was commenced to control hypertension for a short period of time around extubation and her recovery in the intensive care unit was largely uneventful, with her cardiovascular status greatly improving after delivery. Laparoscopic adrenalectomy was successfully performed 4 weeks post partum.

Discussion: Undiagnosed phaeochromocytoma during pregnancy is associated with a high maternal and fetal mortality[1]. Our patient responded poorly to treatment resulting in the loss of one twin. This may be a result of the gravid uterus acting as a mechanical stimulus for tumour catecholamine release, as has previously been described[2]. Certainly, BP control became much more straightforward following delivery. However, despite these difficulties tight blood pressure control in the perioperative period guided by CO and invasive BP monitoring resulted in the successful delivery of the second twin.

References: 1. Br J Obstet Gynaecol 1989;96:595-606. 2. IJOA 1997;6(2):112-7

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-117
ANESTHETIC MANAGEMENT DURING LABOR AND DELIVERY OF PARTURIENTS WITH FACTOR XI DEFICIENCY: A REPORT OF FOUR CASES

B. X. Lee, B. Kaul, S. Ramanathan, N. B. Sah, K. T. Shannon, M. C. Vallejo;
Magee Womens Hospital & University of Pittsburgh, Pittsburgh, PA.

REPORT: Four parturients with Factor XI (FXI) deficiency presented to us seven times over the last sixteen years for anesthetic management for labor and/or delivery. Four of these seven encounters were cesarean sections (C/S) and three were vaginal deliveries. Patient 1, an Ashkenazi Jew who had no family history of bleeding diasthesis, but did have excessive bleeding after dental extractions and a FXI level of 21%. She had two scheduled uneventful C/S both with a single shot regional technique after a preoperative correction of FXI deficiency with fresh frozen plasma (FFP). Patient 2, also an Ashkenazi Jew, had easy bruising but no family history of bleeding. Her FXI level decreased to 25% at 37 weeks, along with an elevated PTT. Therefore, after 1 unit of FFP transfusion and normal PTT, an epidural catheter was placed for an uneventful scheduled C/S. Patient 3 was non-Jewish and presented in labor with an elevated PTT and history of perinatal bleeding in close female relatives. Therefore, she only received i.v. analgesia for a normal vaginal delivery. However, on postpartum day 5, she returned with postpartum hemorrhage and required significant transfusions of FFP, blood, and DDAVP. She was diagnosed to have co-existent Von Willebrand's disease at this time. She was scheduled for a C/S for breech presentation during her second pregnancy and this was performed under general anesthesia. Patient 4, also non-Jewish, had a mild elevation of PTT and was transfused FFP before each of two vaginal deliveries. Both times, she received epidural analgesia with uneventful deliveries except the need for a vacuum extraction in the first.

DISCUSSION: Although 30% FXI is accepted as sufficient to achieve hemostasis, bleeding tendency varies considerably with bleeding reported at 40%. Fresh frozen plasma, FXI concentrates, fibrin glue, antifibrinolytic drugs, and desmopressin are available for treatment. Our experience seems to show that bleeding tendency has a genetic predisposition, and the best predictor of significant bleeding is not the absolute FXI level, but a personal or history of significant bleeding in close female relatives.

CONCLUSION: It is difficult to make recommendations based on four patients but regional anesthesia appears to be safe if there is a no history of bleeding either in the patient or close female relatives and patient administered preoperative FFP. General anesthesia appears safer if there is a history of PPH/post-surgical bleeding.

SOAP A-118
RIGHT VENTRICULAR TACHYCARDIA IN THE PARTURIENT: THREE CASES!

M. K. Slodzinski;
Johns Hopkins University, Baltimore, MD.

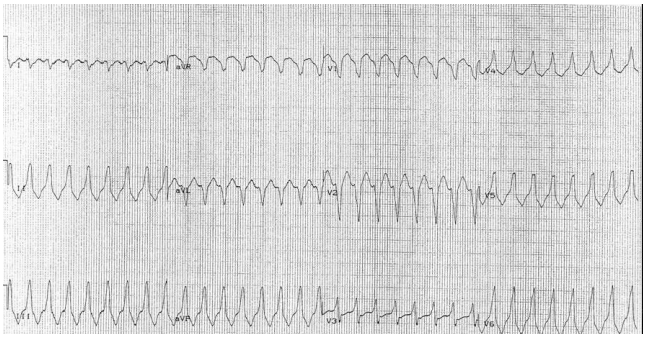
Introduction: Intuitively, the tremendous hemodynamic, catecholamine, hormonal, and emotional changes of parturition should be fertile grounds for cardiac arrhythmias. The incidence of maternal cardiac arrhythmias in the healthy parturient with a normal labor and delivery is no more frequent than the general population[1]. Yet, oxytocin, tocolytics, and anesthetics have been implicated in cases of *supraventricular* tachycardia in parturients[2]. This report presents three patients with right *ventricular* tachycardia during parturition.

Methods: Three patients with right ventricular outflow tract tachycardias during parturition are described. The time course, treatment, and outcome of these patients are described. I in two of the three patients, the subsequent management of the second pregnancy is described.

Results: Each patient presented without a history of ventricular tachycardia. Development of ventricular tachycardia occurred initially during parturition. Each patient was treated acutely with oxygen, β adrenergic antagonists, adenosine, L-type Ca^{2+} channel blockade, and/or manual vagal stimulation. Each patient and infant survived. One patient required post-partum radiofrequency ablation therapy.

Discussion: Right ventricular tachycardia occurs in structurally normal hearts. Though right ventricular tachycardia is uncommon during parturition, atrial and ventricular ectopy, supraventricular tachycardia, and ST changes may accompany parturition. If hemodynamically significant, management of these electrophysiological changes necessitates that pharmacological and mechanical tools and knowledge readily available on the labor and delivery unit.

References: [1]Gyn and Obstet Invest 52: 128-131, 2001 [2]BJA 92:140-143, 2004



Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-119
PNEUMOCEPHALUS COMPLICATING LABOUR EPIDURAL ANALGESIA: SHOULD WE REALLY STILL BE USING AIR?

O. O. Nafiu;
University of Michigan, Ann arbor, MI.

INTRODUCTION

Pneumocephalus is an unusual complication of epidural analgesia. Most cases are associated with the loss of resistance to air (LORA) technique.[1] There are many reports criticizing the use LORA because of its potential risks.[1] This is a report of pneumocephalus with headache in a patient following an apparently normal epidural analgesia in labour.

CASE REPORT

A 40 year old, obese, primigravida requested epidural for pain relief in labour. Except for a history of severe reactive depression, she was fit and well. Pregnancy was uneventful and there were no contraindications to regional anaesthesia.

Shortly after an uneventful epidural using LORA she complained of severe frontal headache associated with nuchal pain. Since there was no evidence of dura puncture, this was not thought to be PDPH and the patient was reassured. Thereafter labour progressed uneventfully ending with low-cavity forceps delivery of a live female baby.

About 18 hours after the epidural, she developed PDPH associated with nausea, phonophobia and photophobia. There were no signs of meningitis. She was treated with NSAIDs and liberal fluids.

The following day, she still had severe PDPH hence the decision to proceed with a blood patch. With full asepsis; the epidural space was located at the L3:4 interspace using loss of resistance to saline (LORS). The procedure was uneventful but provided only a transient relief. On the 3rd post partum day, a cranial CT scan showed air bubbles in the basal cisterns and lateral ventricles (Fig 1).

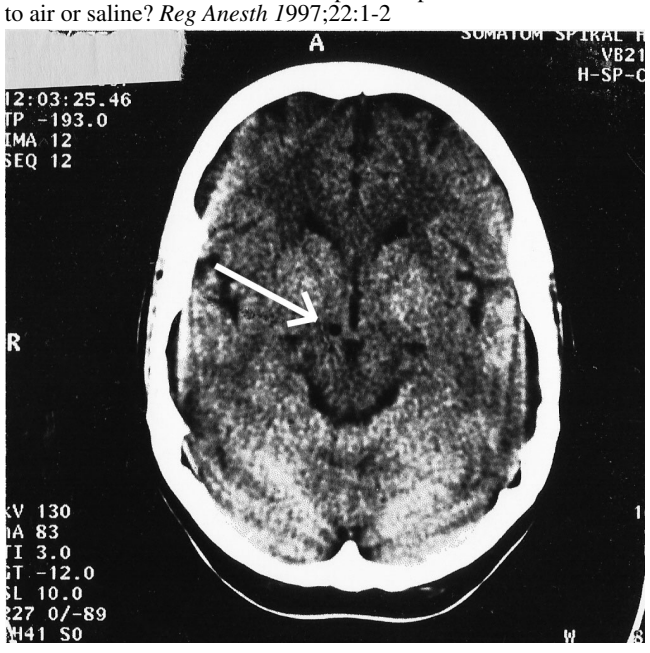
The patient became severely distressed when she was informed about the CT finding insisting that this was not explained to her as a potential complication before the procedure. Her headaches continued with periods of labile affect until she asked to be discharged on the 5th post partum day. A repeat cranial CT scan 2 weeks later showed resolution of the air.

CONCLUSION:

This report adds to the numerous reports of adverse events associated with the use of air as a medium for identifying the epidural space and one wonders if obstetric anesthesiologists could justifiably still continue to use LORA technique.

REFERENCES:

1. Scott DB. Identification of the epidural space: Loss of resistance to air or saline? *Reg Anesth 1*997;22:1-2



SOAP A-120
CONTINUOUS HEMODYNAMIC MONITORING WITH LIDCO™ IN A PARTURIENT WITH CONGENITAL HEART DISEASE AND IDIOPATHIC RESTRICTIVE CARDIOMYOPATHY UNDERGOING CESARIAN DELIVERY

G. A. Dumitrascu, T. S. Wen, D. P. McGrane;
UTHSCSA, San Antonio, TX.

Introduction:

Cardiac disease further complicates the already altered hemodynamic state of pregnancy. How to best monitor these parturients during delivery is still debated.[1]

Methods:

We report on a 23 year old G1P0 with a medical history significant for idiopathic restrictive cardiomyopathy in addition to an important left-to-right shunt. Comprehensive work-up unmasked a low cardiac output, significantly increased right ventricular end-diastolic pressures and a prolonged QT interval. With a fetal weight estimated at 5% for gestational age, we elected to deliver the baby by C-section. The anesthetic plan included a lumbar epidural catheter dosed incrementally with lidocaine, while continuously monitoring the hemodynamics with a LiDCO device.

Results:

Delivery proceeded without hemodynamic alterations. During closure, a sudden decrease in systemic vascular resistance triggerred a drop in blood pressure. Used promptly, phenylephrine corrected the perturbation, yet a transient ST segment depression ensued. Close post-operative monitoring revealed an uncomplicated course with both mother and baby doing well.

Discussion:

General anesthesia using a PA catheter has evolved as the preferred approach for the obstetrical patient with severe cardiac disease despite the potential for serious complications. In our case, the use of a PA catheter was contraindicated by the presence of the prolonged QT interval, the congenital defect itself, and the risk of bacterial endocarditis. The LiDCO monitoring system provided an appealing alternative: it attaches easily to an arterial line and displays continuous, real-time measurements of heart rate, blood pressure, cardiac output, systemic vascular resistance, stroke volume and oxygen delivery as trends; in addition, it is user friendly and portable. Initial cardiac output is determined by the indicator dilution technique, utilizing an intravenous injection of Li^+ along with an arterial waveform analysis algorithm. (Lithium exposure has been shown to be safe for the fetus during second and third trimester.)[3] Data provided by the LiDCO system correlate well with those determined by PA catheter in critically ill patients.[2,4]

In conclusion, employment of the LiDCO system allowed us to avoid the risks of pulmonary artery catheterization, while continuously providing the vital real-time data needed to timely recognize and treat critical changes in cardiovascular parameters during epidural blockade in a complex obstetrical patient.

References:

1 Wallenburg HCS. Invasive hemodynamic monitoring in pregnancy. *European Journal of Obstetrics, Gynecology and Reproductive Biology* 1991.

2 Jonas M, et al. Clinical assessment of cardiac output vs LiDCO indicator dilution measurement: are clinical estimates of cardiac output and oxygen delivery reliable enough to manage critically ill patients? *Critical Care Medicine* 2003.

3 Cohen L, et al. A re-evaluation of risk of in utero exposure to lithium. *JAMA* 1994.

4 Garcia-Rodriguez C, et al. Lithium dilution cardiac output measurement: A clinical assessment of central venous and peripheral venous indicator injection. *Critical Care Medicine* 2002.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-121
MATERNAL SPINA BIFIDA: NOT A CONTRAINDICATION TO VAGINAL DELIVERY

B. C. Brost;
Mayo Clinic College of Medicine, Rochester, MN.

Introduction: Women with repaired neural tube defects are entering their reproductive years in increasing numbers. Short maternal stature and abnormally shaped pelvis has lead many practitioners to suggest primary cesarean delivery for these women. We evaluated factors that may affect vaginal delivery in women with spina bifida.
Methods: Retrospective review of the maternal and fetal biometrics and pregnancy outcomes of two women with a history of open neural tube defects repaired shortly after birth.
Results: Both women had an abnormally shaped pelvis on examination. The cervix was at the pelvic floor with shortening vaginal canals. The sacrum in both women felt short and non-curved and ischial spines were non-detectable on palpation in one woman and markedly blunted in the other. Case 1: 21 year-old primigravida had spontaneous membrane rupture at ~37 weeks gestation. Her weight increased from 68.5 to 89 pounds during the pregnancy. She progressed from 3 cm to complete dilitation in 3 hours and felt no uterine contractions until she noticed "fundal pressure" immediately prior to delivery. After 4-5 minimal pushes, she had spontaneous vaginal delivery of a 2305 gm infant with Apgar scores of 8^1 and 9^5. She had an uncomplicated postpartum course. Case 2: 25 year-old primigravida was admitted to labor and delivery at 34 weeks gestation for foley bulb induction after finding IUGR and oliohydramnios on ultrasound. Her weight had increased from 83-103 pounds during the pregnancy and she had increasing urinary incontinence and bladder infections through the pregnancy. She underwent amniotomy/amnioinfusion at 3 cm and was completely dilated within 3.5 hours. She pushed once and delivered a 1635 gm infant with Apgars of 8^1 and 9^5. She had an uncomplicated postpartum course.
Discussion: An increasing number of women with corrected open neural tube defects will be presenting for obstetric care. Despite short stature and a significantly abnormal pelvis on manual exmaination, these women may be candidates for vaginal delivery.

SOAP A-122
A PARTURIENT WITH NEUROFIBROMATOSIS TYPE 2: ANESTHETIC AND OBSTETRIC CONSIDERATIONS FOR DELIVERY

T. Sakai, M. C. Vallejo, K. T. Shannon;
University of Pittsburgh, Magee-Womens Hospital, Pittsburgh, PA.

Introduction: Neurofibromatosis type 2 (NF2) is a rare form of neurofibromatosis distinctly different from Neurofibromatosis type 1 (NF1, i.e. von Recklinghausen's disease). NF1 is characterized by the presence of peripheral neurofibromas, while in NF2; the hallmark feature is the presence of central nervous system schwannomas (neurofibromas).
Case Report: A 28-year-old, G1P0 with NF2 presented at 39 weeks gestation for delivery. She was diagnosed with NF2 at the age of 21, when she presented with seizures and was subsequently found to have bilateral acoustic neuromas, a right parietal temporal meningioma, soft tissue tumors in the left cerebello-pontine cistern angle, and schwannomas at C6-C7, T3-T4, T8-T9, T12-L1, and S1-S2 levels. She complained of chronic dizziness, hoarseness, slight vertigo, and ringing in her ears, suggestive of central nervous system involvement. She had a class I airway. Café-au-lait spots were noted over her right breast, left forearm and left medial malleolus. On neurological examination, she had minimal left thenar weakness. Fetal heart rate was stable and reassuring. A standard general anesthetic with rapid sequence induction was performed; endotracheal intubation was facilitated with intravenous injections of propofol (2 mg/kg), fentanyl (3 µg/kg) and succinylcholine (1.5 mg/kg). General anesthesia was maintained with isoflurane (1%) and nitrous oxide in oxygen (50%). A 3321 gm neonate was delivered with Apgar scores of 8 and 8 at 1 and 5 minutes. Postoperative recovery was without any new neurological symptommatology or complication.
Discussion: NF2 has no effect on fertility; therefore, obstetric anesthesiologists will encounter parturients with this condition. Neuroaxial anesthesia may carry significant risk such as; bleeding, epidural hematoma formation, patchy block distribution, and the possibility of raised intracranial pressure secondary to non compliant intracranial tumors. Indication for neuroaxial anesthesia in patients with NF2 depends on confirming the absence of central nervous/neuroaxial involvement. The management of a parturient with NF2 for labor and delivery warrants careful multidisciplinary assessment and planning. Cesarean section under general anesthesia may be the safest option for delivery in a parturient with CNS tumor involvement. We believe this is the first reported case in the literature of the anesthetic management of a patient with NF2.
References: 1. Br J Anaesth 2001; 86: 555-64.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-20050500-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-123
ANESTHETIC MANAGEMENT OF A PREGNANT PATIENT WITH AN INCARCERATED, CONGENITAL, DIAPHRAGMATIC HERNIA

J. K. Boyle, J. Grimm, A. Sambasivan;
Vanderbilt University Medical Center, Nashville, TN.

Introduction: Congenital diaphragmatic hernia complicating pregnancy is a rarity, accounting for only 6 out of 17 cases of diaphragmatic hernia in the English literature.(1) Symptomatic maternal diaphragmatic hernia is a surgical emergency associated with high morbidity and mortality(2) ranging from 22% to 80% if strangulation occurs.(3) This case report describes (possibly) the (third) successful repair of an acutely symptomatic foramen of Bochdalek hernia during pregnancy, with maternal and fetal survival.(1)

Case Report: A 39 yo G1P0 at 16 weeks was admitted with a 2 week history of nausea, vomiting and abdominal pain. The hernia was diagnosed at age 17 but she refused repair. Despite recurring episodes of pancreatitis and abdominal pain for 2 years prior to this admission,she continued to refuse repair. Prior surgical history included breast augmentation, eyelid surgery and a LEEP, all without anesthetic complications. She had been counseled against pregnancy as the increase in abdominal pressure could have catastrophic events on the incarcerated abdominal contents within the chest. She was again urged to undergo repair during this admission, but refused. She acutely decompensated at 17.5 weeks and emergent surgery was scheduled. After informed consent, a thoracic epidural catheter was placed preoperatively for postop pain control. She was transported to the operating room and after monitors were placed and the patient preoxygenated, a rapid sequence induction was performed with thiopental 250 mg,succinylcholine 100mg and fentanyl 150 mcg. The patient was intubated with a 7.5 SL ETT and anesthesia maintained with isoflurane, fentanyl and air/oxygen.Vecuronium was used for neuromuscular blockade. A R radial arterial catheter and R IJV 8F Cordis sheath were inserted. After bronchoscopy and esophagoscopy by the surgeon was completed, a 37F left sided double lumen ETT replaced the standard ETT and position was confirmed by fiberoptic bronchoscopy. A left thoracotomy revealed a large gastric volvulus that required a gastrotomy to decompress 2.6 L of fluid. 50% of the patient's abdominal contents were seen to be located in her chest. After a splenectomy was performed via the thoracotomy incision, the left lung expanded to fill ½ of the chest. The patient was then turned supine and the DL ETT was replaced with a 7.5 SL ETT. Subsequent laparotomy permitted primary repair of the diaphragmatic hernia, appendectomy, cholecystectomy, detorsion of malrotated intestines and cecopexy. Patient was transferred to the SICU intubated in critical but stable condition. She was extubated on POD 1 and had an uneventful recovery. Pt returned at 35 weeks for delivery by Csection to avoid any increase in intra-abdominal pressure due to labor. She was given a combined spinal-epidural anesthetic with bupivacaine 15 mg, followed by a bupivacaine/fentanyl infusion via the epidural catheter for postop pain management.

1.ObstetGynec1988:71;869.2.ObstetGynec2003;102;1194.3.A&A 86(3)

SOAP A-124
MOYAMOYA DISEASE IN A PARTURIENT UNDERGOING URGENT CESAREAN SECTION

A. Hapgood[1], J. Spiegel[2];
[1]Brigham and Women's Hospital, Boston, MA, [2]Beth Israel Deaconess Medical Center, Boston, MA.

Case Report: Moyamoya disease is a rare, occlusive, vascular disorder of unknown etiology affecting the internal carotid arteries and vessels within the Circle of Willis. Anesthetic goals in patients with moyamoya disease include minimizing hemodynamic changes, thereby reducing the potential for perioperative ischemic or hemorrhagic stroke, and maintaining adequate cerebral blood flow. The patient, a 17-year-old G1P0 with moyamoya disease at 34 weeks' gestation undergoing cesarean section. The patient was diagnosed with moyamoya disease at age 15 following ischemia of the right communicating artery and the right middle cerebral artery, with no residual deficits. Her only medication was daily aspirin (325mg). Urgent cesarean section was required at 34 weeks because of worsening systolic hypertension (150's/90's) refractory to labetolol and a non-reassuring fetal heart tracing. A preoperative ABG revealed a resting pCO_2 of 36 mmHg. A 20G epidural catheter was placed in the L_{3-4} interspace. She was placed supine, in left lateral uterine displacement. Invasive arterial monitoring was utilized. Incremental epidural doses of 3-5 cc of 2% plain lidocaine were given every 3-5 minutes until a pinprick sensory level of T_4 was achieved (total dose: 20 cc). Hemodynamics were stable throughout the procedure, and a healthy female infant was delivered. 100mcg Fentanyl and 3mg morphine were given in the epidural at this time. 30 mg IV ketorolac was given for breakthrough discomfort in the PACU. The patient had an uneventful postoperative course, and was discharged home on day #4 on daily aspirin (325mg). **Discussion:** The primary goals of anesthesia in a patient with moyamoya disease are maintaining cerebral circulation and minimizing hemodynamic changes, in order to reduce the risk of hemorrhagic or ischemic stroke. Induction of anesthesia may cause hemodynamic changes and alterations in cerebral blood flow. General anesthesia can increase intracranial pressure and oxygen consumption during laryngoscopy, adding stress to the fragile cerebral vessels; the possibility of failed intubation and aspiration must also be considered. These risks, as well as the inability to perform a meaningful neurologic exam during and immediately after surgery, make GA less desirable. Spinal anesthesia may be associated with precipitous hypotension because of its rapid onset and block of sympathetic vasomotor activity, and potentially alter flow within moyamoya vessels. Epidural anesthesia allows for flexible titration in level of anesthesia and slower, more easily reversed blood pressure. **Summary:** Moyamoya is a rare disease in the Western Hemisphere. Epidural anesthesia for cesarean section in patients with moyamoya disease is safe and effective, although SBP and PaCO2 should be kept stable and within normal baseline range to prevent excessive cerebral vasoconstriction or vasodilation. The risk of hemorrhagic stroke may be increased in the peripartum period, and patients must be followed closely.

1. Anesthesiology 1983; 58:204-205
2. Anes Analg 1994;79:183-185

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-125
ANESTHETIC MANAGEMENT OF A CESAREAN SECTION IN A PARTURIENT WITH FAMILIAL MEDITERRANEAN FEVER (FMF)

S. W. Samoya, K. Cho;
University Hospitals of Cleveland, Case Western Reserve, Cleveland, OH.

Introduction: We report a case of successful management of a cesarean section in a Hispanic parturient with Familial Mediterranean Fever (FMF).

Case: A 29 y.o. woman, G3P1, presented at 39 weeks gestation for elective repeat C-section. Her past history was significant for a prior c-section secondary to fetal distress, chronic opioid usage secondary to painful attacks due to FMF, and arthritic pain. Her last attack of peritonitis was in the first trimester, she suffered from severe GERD requiring several medications, was lactose intolerant, and had asthma requiring daily inhalers. She also had long history of poor intravenous access secondary to vasculitis and had a left subclavian mediport placed prior to this admission to allow for pain medication during FMF attacks.

After consultation with the anesthesiologist, the patient agreed to have an epidural placed. After a negative 3 cc test dose, we dosed the epidural with 15 cc of 2% lidocaine with bicarbonate and 1:200K epinephrine incrementally until an adequate level was obtained. 100 mcg of fentanyl via the epidural catheter was provided. The operative course was uneventful with 1350 ml EBL and delivery of a healthy baby. Postoperatively, we used our standard epidural post c-section infusion which was inadequate. Subsequently, the patient received several boluses and then high-dose PCA meperidine. Eventually she was discharged on postoperative day 3 on oral medications.

Discussion: Our challenge in this case was finding information about this disease in pregnancy and subsequent c-section management. Research of the literature provided no cases for anesthetic care of these patient's and their potential problems with c-section. Though this patient's outcome was a positive one, there were many potential pitfalls due to FMF, including, but not limited to; reactive airway disease/asthma; serositis; amyloidosis causing vasculitis, pericarditis, and renal failure with preceding nephrotic syndrome; pleuritis; peritonitis (with subdiaphragmatic inflammation) decreasing an already lowered FRC; pleural effusions; difficult to control pain; fever and leukocytosis in attacks; and pelvic/abdominal adhesions.

SOAP A-126
SUCCESSFUL MANAGEMENT OF A 30 YEAR OLD PARTURIENT WITH AMNIOTIC FLUID EMBOLUS AND ELEVATED SERUM TRYPTASE

S. K. Kane, L. Nelson, C. Nicholson;
University of Cincinnati, Cincinnati, OH.

INTRODUCTION: Amniotic fluid embolus (AFE) is a rare and usually lethal obstetrical emergency. It is characterized by sudden onset of hypoxia, profound hemodynamic instability and coagulopathy, all of which can create a complicated and confusing clinical picture for the anesthesiologist.

CASE REPORT: A pregnant 30 year old G_5P_{2114} with a 32 1/7 week twin gestation was determined to be in preterm labor and taken to the OR for vaginal delivery of twins. Following delivery of the second placenta, the patient developed a non-productive cough, became dyspneic, and then apneic. Following the arrest, the patient was bradycardic with a systolic blood pressure of 60mmHg. Oxygen ventilation by mask was started, IV fluids administered and rapid sequence induction and intubation were performed. Atropine sulfate (1mg) was given IV with improvement of hemodynamics. Central venous and arterial catheters were placed, laboratory studies sent and the patient was transferred to the SICU. On arrival, the patient's hematocrit was 20%, PT was 15.6 seconds, fibrinogen was 105 mg/dL, D-dimer was >20μg/mL and platelets were 165,000. The patient received 30 units of cryoprecipitate, 4 units of pRBCs and 4 units of fresh frozen plasma. Serum tryptase was 4.1 ng/mL (normal <1 ng/mL) and high dose corticosteroid therapy was initiated. The patient stabilized hemodynamically, coagulation studies normalized and the patient remained stable on minimal ventilator support. The patient was extubated on ICU day 3 with a hematocrit of 37%, fibrinogen of 329 mg/dL, PT was 11.9 seconds and serum tryptase was 1.1 ng/mL. Following extubation the patient was found to be neurologically intact and transferred to the post partum floor.

DISCUSSION: The rarity of AFE is offset only by its lethality as it remains a leading cause of maternal mortality. The patient's clinical presentation, coagulopathy, and elevated serum tryptase level offer considerable support for the ongoing anaphylactoid syndrome of pregnancy and the presence of AFE. Serum tryptase, a stable serine protease released in large quantities in response to mast cell degranulation may serve as a marker elucidating the anaphylactoid complications associated with amniotic fluid entering the systemic circulation. While elevated serum tryptase adds additional laboratory evidence to the presence of AFE, AFE cannot be predicted or prevented and remains a diagnosis of exclusion. A high index of suspicion, coupled with ongoing laboratory studies and prompt and decisive supportive care remains the paramount objective of the anesthesiologist when addressing suspected AFE.[1-3]

REFERENCES:

1. Canadian Journal of Anesthesiology. 2001: 48:88-98.
2. Journal of Reproductive Medicine. 2001; Oct; 46(10): 926-8.
3. OB-GYN Clinics of North America. 1999; Sept; 26(3): 435-44.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-127
BLURRED VISION AS A RESULT OF A POSITIVE EPIDURAL TEST DOSE

S. T. Beaman, M. C. Vallejo;
Magee-Womens Hospital of the University of Pittsburgh Medical Center, Pittsburgh, PA.

Introduction: The epidural test dose is frequently used to identify inadvertent intrathecal or intravenous catheter placement.[1] We report a case where blurred vision was the only symptom associated with a positive epidural test dose.

Case Report: A 29 year-old primiparous woman at term, in active labor, requested an epidural for labor analgesia. The patient was placed in the sitting position, and the skin was infiltrated with 3 cc of 1% lidocaine over the L3-4 vertebral interspace. Using the loss of resistance to saline technique, a 17-gauge Tuohy needle was used to identify the epidural space, and a flexible tip single orifice Arrow® catheter was inserted 5cm into the epidural space. The patient experienced no paresthesias. After negative aspiration, a test dose consisting of 3 cc of 1.5% lidocaine with 1:200,000 epinephrine was injected. Within one minute, the patient reported bilateral blurred vision. She denied any other symptoms. Her pulse remained stable between 75 and 85 bpm and her blood pressure remained between 128-145 mmHg systolic and 50-95 mmHg diastolic. Pulse oximetry remained 100% on room air and the fetal heart tracing was reassuring. The patient was positioned supine with left uterine displacement. The blurred vision completely resolved within 5 minutes. The catheter was retested with an additional 3cc test dose, and the patient again reported bilateral blurred vision for approximately 1 minute, resolving within 5 minutes. The patient experienced no other symptoms, and her vitals signs remained stable as reported above. The catheter was removed and noted to be heme stained. A second epidural catheter was inserted at the L2-3 vertebral interspace uneventfully, and the test dose was negative. The patient was bolused with 10 cc of 0.125% bupivacaine and placed on patient controlled epidural analgesia. She remained comfortable during her 11 hours of labor after which she delivered a healthy baby.

Discussion: The symptoms experienced by this patient most likely represent intravascular placement as supported by heme staining in the epidural catheter. A positive intravascular test dose usually results in tachycardia secondary to epinephrine, with symptoms of mild local anesthesia toxicity including tinnitus, perioral paresthesias, and a metallic taste. We report a case where the only symptom of intravascular placement was bilateral blurred vision. Atypical symptoms such as blurred vision can occur, and the value of using a test dose to rule out intravascular or epidural placement cannot be underestimated.

Reference: 1. Jour of Clin Anes 2003; 15: 474-477.

SOAP A-128
SUPRAVENTRICULAR TACHYCARDIA (SVT) COMPLICATING EMERGENCY C-SECTION

R. Govindarajan, P. Manoharan, A. Raza, N. Kodali, O. Babalola, R. Spatz, W. Saweris;
Brookdale University Hospital and Medical Center, Brooklyn, NY.

Introduction: Enhanced sympathoadrenal response, halogenated volatile anesthetics, blood gas and electrolyte abnormalities, comorbid conditions like CAD, COPD, CHF, HTN, IDDM and the type of surgery (Cardiac, Pulmonary) have been found to increase the incidence of perioperative and postoperative SVT (1). Treatment of underlying condition, correction of hypotension, pharmacological therapy and DC cardioversion are the mainstay of management. Troublesome in preoperative and the postoperative setting, they are a daunting challenge perioperatively during emergency surgery. We present our management of a 21 year old Para 0 woman with no significant past medical history who underwent emergency C section under spinal anesthesia and developed SVT during the procedure.

Case report: While patient was being aggressively hydrated with normal saline, subarachnoid block with 1.2 ml 0.5 % marcaine and 25mcg fentanyl was placed in L3L4 space through 25G needle. Immediately after commencement of surgery, patient developed hypotension (76/40 mm Hg) and was given IV ephedrine boluses (10mg X 2) as temporizing measure. Eventhough BP improved marginally to 90/56 mm Hg. patient developed SVT with a rate of > 212 and BP declined to 60/32 mm Hg. Neosynephrine boluses 50mcg X 2 followed by infusion (0.25-1 mcg/kg/min) was started. As BP improved to 96/46 mm Hg, an arterial line and a second IV line were placed. Esmolol infusion was started with 500 micrograms/kg loading dose followed by 50 micrograms/kg/ min and titrated to keep the HR<100.Further surgical course was uneventful. A male baby weighing 2.6kg with an Apgar score of 9/ 9 was delivered. Esmolol infusion was tapered and discontinued in SICU 8 hours after surgery with the patient in sinus rhythm. Postoperative cardiac evaluation revealed MVP by echocardiogram while electrophysiological mapping was negative.

Discussion: Most patients with MVP (>85%) are asymptomatic and are often diagnosed incidentally by echocardiography (2). These patients are prone to atrial and ventricular dysrhythmias. SVT may occur and often associated with pre excitation syndromes. Leftventricular emptying can accentuate MVP leading to cardiac arrhythmias or acute MR (3). Perioperative events that can increase left ventricular emptying include a) increased sympathetic nervous system activity b) decreased SVR and c) upright position (2). Maintenance of intravascular fluid volume is an important prerequisite to avoid LV emptying secondary to decreased SVR during regional anesthesia.

Suboptimal intravascular fluid volume, decreased SVR secondary to spinal anesthesia and the attempted correction of hypotension with indirect acting sympathomimetic agent likely contributed to the development of SVT in our case.

Heightened sense of awareness, prompt recognition and appropriate intervention will greatly improve the odds of fetal and maternal well being when confronted with such life threatening perioperative emergency.

References : (1) Australasian Anesthesia 201-209; 1996 (2) Anesthesia Analgesia 59: 379-83; 1980 (3) Anesthesia and Coexisting Disease 2:30-31; 1998

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-129
LABOR ANALGESIA IN A PARTURIENT WITH MARFAN SYNDROME, COMPLICATED BY LUMBOSACRAL DURAL ECTASIA: A CASE REPORT

K. Kim, M. King;
Loyola University Medical Center, Department of Anesthesiology, Maywood, IL.

INTRODUCTION: Dural ectasia (DE) is defined as enlargement of the neural canal due to connective tissue weakness, most commonly in the lumbosacral region. DE is one of the major diagnostic criteria of Marfan syndrome because of its rarity in the general population. Despite its high prevalence in Marfan syndrome, up to 95%,[1,2] DE is frequently under-recognized by the clinicians. We present a case report of labor analgesia in a parturient with Marfan syndrome complicated by DE.

CASE: A 35 year-old Caucasian nulliparous presented to L&D for induction of labor at 39 weeks of gestation. She had Marfan syndrome and had been seen for high-risk obstetric anesthesia consultation. Other past medical history included mitral valve prolapse and severe headache consistent with benign intracranial hypotension. Family history was remarkable for mother and sister died of aortic dissection from Marfan syndrome. She was on atenolol and had no drug allergy. Significant physical findings included a tall (185 cm, 100 kg) gravid woman with arachydactyly, mild scoliosis and Mallampati class 2 airway. Echocardiograms showed stable aortic root dimensions at 32 mm without dilation. MRI of spine revealed a large arachnoid cyst at lumbosacral area.

During labor and delivery, she was continued on atenolol and received SBE prophylaxis. Epidural analgesia was requested at 4 cm of cervix dilation for mild discomfort in order to avoid any cardiovascular burden from severe pain. In sitting position, epidural space at L_{2-3} level was easily identified using loss of resistance to air technique at 4 cm in depth from the skin. However, it was unable to thread the spring-wound epidural catheter (B. Braun) beyond 1 cm into the space despite various maneuvers. Eventually, a stiffer polyamide epidural catheter was threaded and made an intrathecal placement. After initial bolus of bupivacaine 2.5 mg and fentanyl 25 mcg, continuous spinal infusion of bupivacaine 0.0625% and fentanyl 2 mcg/ml at 4 ml/ hour provided excellent labor analgesia throughout. She had uneventful vacuum-assisted vaginal delivery of a male infant with Apgar scores of 9 and 9. She developed severe postdural puncture headache the next day. Successful epidural blood patch was done with injection of 25 ml of her blood. She was uneventfully discharged home on the second postpartum day.

DISCUSSION: In pregnant patients with Marfan syndrome, anesthetic consideration usually focuses on hemodynamic stability because of its well-known cardiovascular risks.[3] However, anesthetic implications of DE in these patients could be significant. First, technically, epidural anesthesia may be difficult due to the expansion of dural sac. Second, a large volume of CSF in the arachnoid cyst may dilute the local anesthetic and result in unreliable spinal or epidural blockade.

REFERENCES: 1. Radiology 2001; 220: 514-8, 2. Radiology 2002; 223:767-71, 3. J Clin. Anesth 1993; 5: 248-51.

SOAP A-130
HEMIPLEGIA FOLLOWING CESAREAN DELIVERY

S. J. Ranasinghe, M. Lai, T. Toyama, D. Birnbach;
University of Miami, Miami, FL.

Introduction: During pregnancy, most strokes result from embolic or thrombotic events due to the hypercoagulable state. Hemorrhagic strokes are commonly caused by eclampsia or ruptured vascular malformations. We report a case of hemorrhagic stroke after an uneventful cesarean delivery in a patient with protein C deficiency.

Case Report: A 35 yr old, 152 cm, 61.4 kg, G4P2010 was admitted for elective repeat cesarean at 37 weeks. Her history was significant for two previous cesarean deliveries, protein C deficiency, panic disorder, and gestational diabetes (A_1). She received heparin prophylaxis during pregnancy which was stopped 24 h prior to surgery. Preop Hct 40%. BP 100/70. HR 92, blood sugar 76. PT/ PTT and INR were WNL.

CSE was performed with a 27g Whitacre needle using 7.5 mg hyperbaric bupivacaine, 20 µg fentanyl, and 250 µg morphine. Ephedrine 10mg and 5mg were given IV to stabilize BP. Infant's Apgar was 9/9.

She was anxious and restless throughout the procedure. Divided doses of IV midazolam 2 mg , morphine 5 mg , and fentanyl 25 µg were given.

She received 2200 ml of crystalloid, EBL 500 ml, urine output 700 ml. During skin closure she required 3 cc of 2% lidocaine with epinephrine for discomfort. Five minutes later her SBP was 60-65 (x3). Ephedrine 10 mg and phenylephrine 150 µg were given IV. Within 5 minutes she complained of severe headache. A BP of 180/ 110, HR of 72 and was treated with sub-lingual nitroglycerine 400µg.

In PACU she continued to have elevated BP and severe headache. Divided doses of labetalol 20 mg and nicardapine 5mg were given. Forty-five minutes later, she developed altered mental status, slurred speech, left hemiplegia and facial weakness. CT scan confirmed a hemorrhagic stroke with an extensive external capsule bleed.

Patient was transferred to the stroke unit and is undergoing rehabilitation with slow recovery. Subsequent CT and MRI were negative for cerebral vascular abnormalities or tumor.

Discussion: The cause of this patient's stroke is uncertain but the possibility that it is related to the use of vasopressors (ephedrine and phenylephrine) and/or the brief period of hypertension cannot be dismissed. There is one case report of acute cerebral arteritis and hemorrhagic stroke following IV ephedrine 10 mg during routine surgery and anesthesia[1]. No controlled studies have confirmed that vasopressors in the dosages used here increase the risk of perioperative stroke.

Today stroke is considered a medical emergency. The interval from stroke to intervention (< 3 h) is one of the main factors that determine the effectiveness of the treatment. Although contraindicated in hemorrhagic stroke, thrombolytics and anticoagulants have been used successfully in perioperative stroke. Neurological consultation and intracranial imaging should be obtained expediently.

References: 1. Cerebrovasc Dis. 1999;9:355-7.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-131

ANESTHESIA AND CARDIOPULMONARY BYPASS FOR A PREGNANT PATIENT WITH MULTIPLE SCLEROSIS

W. T. Fritz, C. McKinney, T. Shankar, T. Cole, P. Gatmaitan;
Temple University/ Memorial Medical Center, Johnstown, PA.

The increased metabolic demands placed upon the maternal heart during pregnancy can unmask symptoms of cardiac insufficiency. In this report, the authors describe a 25-year-old expecting mother who underwent surgical correction of an anomalous left coronary artery. The woman had a history of mitral valve prolapse and long-standing multiple sclerosis. She complained of chest pain and dyspnea while at rest in a wheelchair. An adenosine perfusion study disclosed a small area of reversible apical ischemia. Since, at 25 years of age, the likelihood of CAD was very low; catheterization was deferred pending dobutamine echo. Dobutamine infusion was associated with chest pain and shortness of breath. Anterior wall motion deterioration was noted on EKG and on echo, and LVEF was measured at 55%. Coronary angiogram further disclosed a left main coronary artery arising from the right sinus of Valsalva and coursing between the aorta and infundibulum. Since this is a cause of sudden cardiac death, the woman was counseled regarding the benefit and risks of surgery. When she was found to be pregnant the risks to her baby were discussed. Cannulation for cardiopulmonary bypass (CPB) was performed using aortic return and a single two-stage cannula in the right atrium. A 9-French cardioplegia catheter was inserted into the aortic root. Myocardial temperature was maintained below 20 degrees Celsius, while normothermia and high flow were maintained on bypass. Distal anastomosis as performed using the left internal mammary artery to the obtuse circumflex coronary artery. The patient was discharged home, and in the care of an obstetrician on post-operative day number four with no complaints. Sudden death from this congenital lesion usually occurs at a young age, and after strenuous exercise. Since disability had caused this patient to spend most of each day in a wheelchair, symptoms of angina did not occur until her cardiac output began to increase secondary to pregnancy. Maternal perioperative mortality is affected little by pregnancy, but the fetus is at great risk. CPB pump perfusion pressure should be sufficient to keep mean arterial pressure above 70mmHg. Maternal PAO2 from 200 to 400 mmHg promotes placental gas exchange. Acid-base and electrolyte disturbances must be closely watched. The well being of the fetus can be monitored by cardiotocography by the ninth week of gestation. Most anesthetic agents are safely used during pregnancy.

SOAP A-132

FETAL KARYOTYPING FROM VAGINAL POOL FLUID IN A PREGNANCY COMPLICATED BY SPONTANEOUS MEMBRANE RUPTURE

M. Hopkins, B. C. Brost;
Mayo Clinic College of Medicine, Rochester, MN.

Introduction: Current techniques for evaluation of fetal karyotype are invasive and include either amniocentesis or chorionic villus sampling. We present a case of obtaining fetal amniocytes from a vaginal pool sample in a woman with spontaneous membrane rupture.

Methods: A 22 year-old, gravida 1, was transferred for evaluation of polyhydramnios after noting a fundal height of 44cm at 32 weeks gestation. She had spontaneous rupture of memebranes enroute and had an AFI of 18.4 on our evaluation despite continued regular leakage of amniotic fluid. She declined amniocentesis for fetal karyotype. Vaginal pool fluid was collected and sent for evaluation of fetal chromosomes (the baby had male appearing genitalia).

Results: Interfish FISH was performed for Xcen (DXZ1x1), Ycen (DYZ3x1), and 18cen (D18Z1x2). Interphase FISH results for chromosomes 13 and 21 were unable to be determined secondary to the high level of maternal cell contamination. Interphase FISH results as shown in the table below were confirmed on full karyotype analysis of 20 metaphases from 12 colonies and 6 primary cultures that were analyzed yielding a fetal karyotype of 46,XY.

Conclusion: Evaluation of fetal karyotype is possible from a vaginal pool sample in women carrying a male fetus and with spontaneous membrane rupture. While the full karyotypic analysis was not affected by maternal cell contamination, methods to enrich the amniocyte sample may lead to more effective use of interphase FISH in women with premature spontaneous membrane rupture.

Interphase FISH results of 200 nuclei

	Number of Signals
2 DXZ1	191
1 DXZ1 and 1 DYZ3	9
2 D18Z1	196

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-133
ANESTHETIC CONSIDERATIONS FOR CESAREAN SECTION IN A PATIENT WITH SPONDYLOEPIPHYSEAL DYSPLASIA CONGENITA: A CASE REPORT

K. Kim[1], K. Langen[1], W. MacMillan[2];
[1]Loyola University Medical Center, Department of Anesthesiology, Maywood, IL, [2]Loyola University Medical Center, Department of Obstetrics & Gynecology, Maywood, IL.

INTRODUCTION: Spondyloepiphyseal dysplasia congenita (SEDC) is a rare inheritable disorder caused by a mutation in the COL2A1 gene. There are only two obstetric cases reported in literature regarding anesthetic management during cesarean section. [1-2] We present a case report of a parturient with SEDC, who underwent cesarean section under general anesthesia.

CASE REPORT: A 23 year-old female, G_1 P_0, at 22 weeks of gestation was referred for a high-risk obstetric anesthesia consultation. She was 122cm tall and weighed 36 kg. She had significant PMH of SEDC, Pierre-Robin syndrome and cleft palate. She underwent facial repair and posterior spinal fusion. Physical examination showed an extremely short-statured woman with mild micrognathia, class 2 airway and kyphoscoliosis. No neurological abnormalities were noted. PFT revealed normal lung volumes with mild restrictive pattern. Radiographic examination showed marked kyphoscoliosis with Harrington rods from T_2 to L_3. She tolerated her pregnancy well until 36 weeks of gestation, when elective cesarean section was scheduled under general anesthesia. For postoperative analgesia, epidural catheter was placed easily at L_{3-4}, below the Harrington rods. Rapid sequence induction was done in routine manner and intubation was uneventful. Almost immediately after the incision, 0_2 saturation started dropping rapidly to 90%. Endobronchial intubation was promptly diagnosed and corrected. ETT was noted to be pushed in by 1.5 cm while being taped secure. A 2,250gm infant was delivered in 2 minutes with Apgar scores of 7 and 8 at 1 and 5 minutes. Anesthesia was maintained with $0_2/N_2O$ and desflurane (1.5-2.5%). Midazolam 2 mg was given and rocuronium for muscle relaxation. Fentanyl 50 mcg and morphine-PF 1 mg were administered epidurally, followed by total 6 ml lidocaine 1.5% with epinephrine. Uterine hemostasis was satisfactory with oxytocin. The rest of the procedure was uneventful. Her epidural level was T_{11} (R) and T_8 (L) in PAR. Her recovery was uneventful and excellent epidural analgesia was maintained for 48 hours postoperatively. She was discharged home on postoperative day three. Her newborn was diagnosed as having SEDC by a DNA test**.**

DISCUSSION: Our early involvement in her prenatal care allowed us to formulate the anesthetic plan in controlled manner for the best outcome of this challenging case. General anesthesia was selected mainly due to her respiratory compromise, potential risk of unsatisfactory epidural anesthesia with spinal fusion and her history of uneventful intubation. Epidural analgesia was a better option in view of her restrictive lung function and abdominal surgery. In summary, we present a case report of a parturient with SEDC, Pierre-Robin syndrome and Harrington rods placement who successfully underwent a cesarean section under general anesthesia and postoperative epidural analgesia**.**

REFERENCES:

1. Br J Anaesth 2001; 86: 133-4.
2. Anaesthesia 1991; 46: 648-50.

SOAP A-134
HYPERTROPHIC CARDIOMYOPATHY COMPLICATED BY PREGNANCY

M. A. Rockford, G. Shih;
Kansas University Medical Center, Kansas City, KS.

Introduction: Hypertrophic cardiomyopathy is a common genetic cardiac disease. Most HCM patients do well with pregnancy.[1, 2] However, we present the anesthetic management of a parturient with symptomatic hypertrophic cardiomyopathy.

Case Report: A 22 year-old G2P1 female with a $31^{4/7}$ week intrauterine pregnancy presented with shortness of breath, orthopnea, cough, and chest pain. Past medical history of HCM was previously asymptomatic including prior pregnancy and c-section delivery. Echocardiogram showed severe asymmetric septal hypertrophy, normal to increased left ventricular ejection fraction, mild to moderate mitral regurgitation, elevated pulmonary artery pressures, high left ventricular outflow tract gradient, and systolic anterior motion of the mitral valve. Medical treatment included high-dose beta blockade, diisopyramide, diuresis, electrolyte and iron supplementation, and supplemental oxygen.

The patient was hospitalized for 22 days prior to c-section delivery under general endotracheal anesthesia of a 35-week viable infant female weighing 2165 grams with Apgar scores of 9/9 at 1 and 5 minutes. Decision was made to proceed with delivery after the patient's cardiac status was medically optimized and infant survivability was maximized. Prior to c-section, a Swan-Ganz catheter and an arterial line were placed. Induction was provided with etomidate, succinylcholine, and remifentanil. Isoflurane, fentanyl, and oxygen were used for anesthetic maintenance. ASA standard monitors, SvO2, CO, PAP, and CVP were monitored intraoperatively. Titration of esmolol, nitroglycerin, and phenylephrine was required on emergence. The patient did well intraoperatively and was extubated in the operating room. By POD 1, the patient was returned to parenteral cardiac medications. Diet and activity progressed to normal. Oxygen saturation was maintained on room air. The patient was discharged home five days following c-section on her pre-pregnancy dose of metoprolol.

Discussion: Hypertrophic cardiomyopathy is a common genetic cardiac defect occurring in 1 in 500 of the population.[3] Approximately 25% of those affected become symptomatic during their lifetime. Adverse outcomes include sudden cardiac death and severe congestive heart failure. Treatment is primarily medical management with surgical procedures available for those with severe symptoms. Anesthetic goals are aimed at attenuating LVOT obstruction. These measures include increased preload, afterload, and intravascular volume, and decreased inotropy and heart rate. Both general and regional anesthesia have been performed safely in parturients with HCM[4], despite regional techniques being relatively contraindicated in the past.[5]

An understanding of our patient's cardiac disease allowed us to optimize our treatment plan in consult with cardiac and obstetric physicians such that this patient experienced a safe, uneventful perioperative course resulting in delivery of a viable infant and return to her pre-pregnant cardiac status.

References:

1. Heart 2003; 89: 752-756.
2. Journal of the American College of Cardiology 2002; 40: 1864-1869.
3. Circulation 2002; 106: 2419-2421.
4. Anesthesiology 1999; 90: 1205-1207.
5. British Journal of Anaesthesia 2004; 93: 428-439.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-135
NEURAXIAL LABOR ANALGESIA IN A MORBIDLY-OBESE PARTURIENT WITH EBSTEIN'S ANOMALY, WPW-SYNDROME AND COPD

V. S. Misa, J. Thomas, B. Clyne, P. H. Pan;
Wake Forest University, Winston Salem, NC.

Introduction:
The rare congenital heart defect of Ebstein's anomaly is characterized by downward displacement and elongation of the septal cusp of tricuspid valve (TV). As a result, it is often associated with a thin-walled and poorly contractile RV, an enlarged atrium, TR, ASD with intracardiac shunt, pulmonary hypertension and tachyarrhythmia. There are limited reports on this disease especially in parturients. We presented a successful labor analgesic management of a morbidly-obese parturient with Ebstein's anomaly, WPW syndrome and COPD.

Case:
A 25 y/o morbidly obese, nulliparous parturient with IUP 34 2/7wks gestation was admitted for acute dyspnea. Her medical history and examination were significant for Ebstein's anomaly, WPW syndrome, COPD, hypertension, heavy smoking history, and a class-III Mallampati airway with a short neck and short thyromental distance. Transthoracic echocardiogram revealed displacement of TV into RV, dilated RA, pulmonary hypertension, LV hypertrophy, MR, TR and a patent foramen ovale. Labor induction was initiated and patient requested neuraxial analgesia. An 18-guage multiport closed-tip epidural catheter was inserted via a 17-guage Tuohy needle, using loss-of-resistance to saline technique. Instead of traditional test doses, 0.11 % bupivacaine with 2 mcg/ml fentanyl was administered in increments of 2-3ml to confirm placement and establishing a sensory block. Patient was then placed on EPCA infusion with the same solution. 24 hours later, patient had completed cervical dilation and a planned prophylactic pudendal block was administered for a forceps-delivery. A healthy fetus was delivered with APGAR =>8 at 1 and 5mins. Patient tolerated the procedure with stable hemodynamics without the need for vasopressors. Patient was monitored at telemetry-bed overnight without remarkable events.

Discussion:
With the morbidly obese patient's difficult airway, we chose epidural analgesia to ensure that the epidural catheter was functional early on. 0.11% bupivacaine was administered incrementally, in place of standard test doses, to minimize profound hypotension in a patient with pulmonary hypertension, atrial distention and tachyarrhythmia. Phenylephrnine was planned instead of ephedrine to minimize risks of worsening WPW syndrome. Judicious amount of preload together with phenylephrine can be used to minimize rapid onset heart failure with dilated atriums and ventricles. Without morbid obesity and a difficult airway, combined spinal-epidural analgesia with intrathecal opioids alone followed with an epidural catheter gradually titrated with low concentration of local anesthetic and opioid offers a good option to minimize maternal hemodynamic changes. A pudendal block was planned to minimize maternal expulsive efforts and valsalva maneuvers. Air bubbles were carefully eliminated to prevent paradoxic emboli in patient with patent foremen ovale. For optimal maternal and fetal outcomes, these patients must be managed through multidisciplinary evaluation and planning, including early consultation by an anesthesiologist to discuss and formulate an anesthetic plan well in advance with patients.

SOAP A-136
INADVERTENT EPIDURAL ADMINISTRATION OF MAGNESIUM SULFATE TO A PARTURIENT - 2 CASE REPORTS

D. M. Woods, A. Haas;
University Hospitals of Cleveland, Cleveland, OH.

Case Report #1: A 27 year old term parturient received an uneventful labor epidural. The test dose provided adequate initial analgesia. A patient controlled epidural analgesia (PCEA) infusion, which was believed to contain bupivicaine/epinephrine/fentanyl (BEF), was initiated. Approximately one hour later, the anesthesia team was contacted to evaluate the patient for inadequate analgesia. It was discovered that magnesium sulfate (MgSO4) (25 grams/250 ml) was infusing into the epidural catheter. Because of repeated PCEA boluses, the patient received 87 ml (8.7 grams) of MgSO4 solution. The magnesium sulfate infusion was stopped and replaced with a BEF infusion. Adequate analgesia returned and the patient had a spontaneous vaginal delivery (apgars: 1 min = 7, 5 min = 9).
Case Report #2: A 32 year old term parturient received an uneventful labor epidural. She experienced adequate initial analgesia with the test dose and received a PCEA infusion. Several hours later the patient complained of inadequate analgesia and received a 10 ml 1% lidocaine bolus. Analgesia returned. Over the next four hours the patient received multiple boluses of local anesthetics. On one occasion the epidural catheter was withdrawn 1 cm prior to dosing. Due to continued inadequate analgesia, it was decided to replace the epidural catheter. Upon replacement, it was discovered that the epidural solution contained MgSO4. The patient received 96 milliliters (9.6 grams) of MgSO4 solution. It was replaced with BEF solution and analgesia returned. A cesarean section was required due to primary labor arrest, with anesthesia provided via the in situ epidural catheter. The cesarean section was uneventful (apgars: 1 min = 8, 5 min = 9). There were no apparent neurological sequelae in either case.
Based on these two cases, MgSO4 administered via the epidural route does not appear to cause focal neurological damage. It also does not appear to provide analgesia. More importantly, theses cases highlighted a systems problem of health care delivery at our institution. Prior to these incidents, both MgSO4 and BEF solutions were prepared in almost identical 250 ml bags and stored in the same refrigerator. Based on recommendations from the anesthesia department's quality improvement program, several changes were made. The solutions are now stored in separate refrigerators and the epidural solutions are labeled with a bright blue "epidural" label. In the eight months since this policy change, there have been no epidural drug bag errors. The role of individual anesthesia providers must also be stressed. The labels of all medications should be checked carefully before they are administered. In addition, when the effect of administered medication is other than expected, drug error should always be considered in the differential diagnosis. Systems improvement, vigilance, and clinical awareness together can improve patient safety.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-137
NITROGLYCERIN FOR UTERINE INVERSION IN ABSENCE OF PLACENTAL FRAGMENTS

R. W. Hong, M. V. Greenfield, L. S. Polley;
The University of Michigan Health System, Ann Arbor, MI.

Introduction: Uterine inversion is an infrequent but serious postpartum complication. The potential for life-threatening hemorrhage necessitates immediate and aggressive management. There are five reports in the literature indicating that nitroglycerin, injected intravenously (1-4) or sprayed sublingually (5) can relax and facilitate replacement of an inverted uterus; however, the ability to relax the uterus in the absence of placental tissue is under debate (4,6). We report of inverted uterus following a cesarean delivery during which nitroglycerin relaxed the inverted uterus after removal of all placental fragments.

Case: A 30-year-old, gravida 3 para 2, presented at 39 weeks for an elective repeat low transverse cesarean section under epidural. Obstetricians delivered a healthy infant and then noted a markedly adherent placenta. Uterine inversion occurred with placental delivery, and the patient received nitroglycerin for uterine relaxation. Nitroglycerin 600 µg was given as a sublingual spray, followed by a supplemental 20 µg intravenous dose. The nitroglycerin enabled relaxation and subsequent manual replacement of the inverted uterus. There were no visible placental fragments adherent to the endometrium. The patient recovered with no evident complications from intraoperative events.

Discussion: A MEDLINE literature review using the key words "uterine inversion" and "nitroglycerin" resulted in 5 relevant case reports. Each report was reviewed for evidence that no placental fragments were present in the uterus at the time nitroglycerin was given (Table 1). Our case is the first known report of nitroglycerin used for uterine inversion at a cesarean delivery, permitting complete inspection of the endometrium. We conclude that nitroglycerin may be useful for uterine inversion despite the absence of placental fragments.

References: (1) Am J Obstet Gynecol 1992; 166:1237-8. (2) J Clin Anesth 1992; 4:487-8. (3) Anesth Analg 1996; 82:1091-3. (4) Anesth Analg 2000; 91:1043-4. (5) J Am Board Fam Pract 2000; 13:374-5. (6) Anesth Analg 1998; 86:304-9.

Table 1 - Reports of Nitroglycerin Use in Uterine Inversion

Altabef et al. (1992)	First reported case of IV nitroglycerin, placenta present at time of use
Bayhi et al. (1992)	Second reported case of IV nitroglycerin, placenta present at time of use
Dayan et al. (1996)	Third reported case of IV nitroglycerin, placenta delivered vaginally prior to use
Hartnett and Segal (2000)	Fourth reported case of IV nitroglycerin, placental fragments present at time of use, authors suggest that nitroglycerin will not relax uterus devoid of placental tissue
Hicks (2000)	First reported case of sublingual nitroglycerin, placenta delivered vaginally prior to use

SOAP A-138
METASTATIC NON-SMALL CELL LUNG CANCER IN PREGNANCY: A CASE REPORT

M. H. Dixon, G. M. Vasdev, W. J. Watson;
Mayo Clinic, Rochester, MN.

Background

Lung cancer is rare in pregnancy, with 17 case reports documented in the literature. We describe a case of metastatic non-small cell lung carcinoma diagnosed at 28 weeks gestation.

Case

A 42-year-old gravida 5, para 4 female presented at 27 weeks with mid-back pain. She was treated with over-the-counter analgesics. Two days later, she returned with complaints of increasing pain. She was exquisitely tender over the mid-thoracic vertebral bodies and left-sided ribs. Chest x-ray revealed a large left-sided chest mass; in light of an extensive history of tobacco use, malignancy was suspected. The patient was hospitalized for pain control and further investigation. Corticosteroids were administered for acceleration of fetal lung maturity.

MRI revealed a left apical lung mass with chest wall invasion and extension to the upper ribs. There was compression of the T8 vertebral body with epidural metastasis impinging upon the spinal cord. No neurologic deficits were present. Ultrasound-guided biopsy of the mass confirmed metastatic non-small cell lung carcinoma.

Oncology, neurology, and neurosurgical consults were obtained. Treatment with dexamethasone was initiated for spinal cord compression. Palliative radiation therapy was offered, and the patient received ten treatments to the T8 region resulting in markedly decreased pain.

Extensive discussion amongst the patient and her family, obstetrics, and neonatology attempted to optimize the outcome for both the patient and the fetus. Vaginal delivery was contraindicated due to spinal cord compression; thus, Cesarean delivery was planned for 32 weeks. Anesthesia consult confirmed that regional anesthesia was contraindicated.

On hospital day 18, the patient was developed left lower extremity swelling. Ultrasound revealed thrombus of the left external iliac, common femoral, and popliteal veins. Heparin treatment was initiated. Fetal monitoring showed intermittent heart rate decelerations, and thus Cesarean section was performed without complication under general anesthesia. Estimated blood loss was 1000 cc. The patient was transferred, intubated, to the ICU for recovery, and was extubated shortly thereafter.

The patient developed heparin-induced thrombocytopenia and was thus treated with lepirudin and warfarin. CT scan of the chest, abdomen, and pelvis obtained for metastatic workup revealed splenic and bilateral adrenal infarcts. Two days later, the patient was noted in the morning to respond only to painful stimuli. Head CT demonstrated extensive cerebral infarcts. The patient did not regain consciousness, and expired on hospital day 28. The neonate was discharged to home from the intermediate care nursery 30 days post-delivery. Placental pathology revealed areas of infarction but no metastasis.

Conclusion

Although lung cancer is the leading cause of cancer death among women, lung cancer diagnosed in pregnancy is rare. Management is complex and requires a multi-disciplinary approach. The goal of intervention is to optimize outcomes for both the gravida and the fetus.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-139
SACRAL CYST AND CHOICE OF ANESTHESIA TECHNIQUE FOR CESAREAN SECTION

H. J. Lacassie, P. Jaklitsch, M. Njaa, A. J. Olufolabi, A. S. Habib;
Duke University, Durham, NC.

We present a case of a parturient scheduled for a cesarean section in whom a sacral cyst was found incidentally preoperatively.A 32 yo primigravida, ASA II, presented at 37 weeks for an elective c-section due to fetal congenital malformations and IUGR. On a fetal diagnostic MRI, a maternal sacral cyst was incidentally found. It measured approximately 20x20x13mm, and was located at S_2-S_3 junction (figure). The patient had no history of postural headaches, neurological deficits or radicular pain. Her physical examination was unremarkable, except for the metacarpal and inter-phalangeal joint deformities due to rheumatoid arthritis. She had a normal airway evaluation. We inserted a L_2-L_3 epidural catheter and administered fractionated doses of lidocaine 2% with bicarbonate (300 mg) and fentanyl 100mcg to achieve a bilateral T_4 surgical block. Surgery was uneventful. A male infant, 1920 gr with Apgar 8 and 9 was delivered. The postoperative course was unremarkable and the patient was discharged home on POD 3.Discussion: Sacral cysts are a relatively common finding in neuroradiologic examinations, with an incidence ranging from 4.6 to 9% of the adult population.[1] However, most of them are asymptomatic and their finding is incidental.

In our patient, we chose regional over general anesthesia to avoid the risks of the latter in a pregnant patient[2] with the added potential airway problems associated with rheumatoid arthritis.[3] The choice of epidural anesthesia was based on the concern that the intrathecal injection might cause an increase in cyst pressure. A major role has been ascribed to the hydrostatic and pulsatile forces of cerebrospinal fluid (CSF) for the symptomatology of sacral nerve root cysts.[4] Injecting the anesthetics into the subarachnoid space could increase the intrathecal pressure and thus increase the pressure on the cyst, potentially becoming symptomatic in terms of radicular pain or nerve dysfunction. Furthermore, increased intra-cyst pressure could produce over distension, tearing or even complete rupture of the cyst, leading to spontaneous intracranial hypotension syndrome.[5] In summary we present a case of an incidental finding of an asymptomatic sacral cyst in a parturient in whom an uneventful epidural anesthesia for cesarean section was performed.

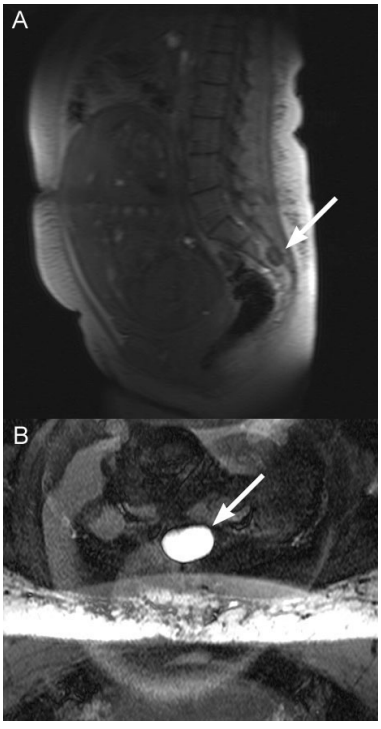
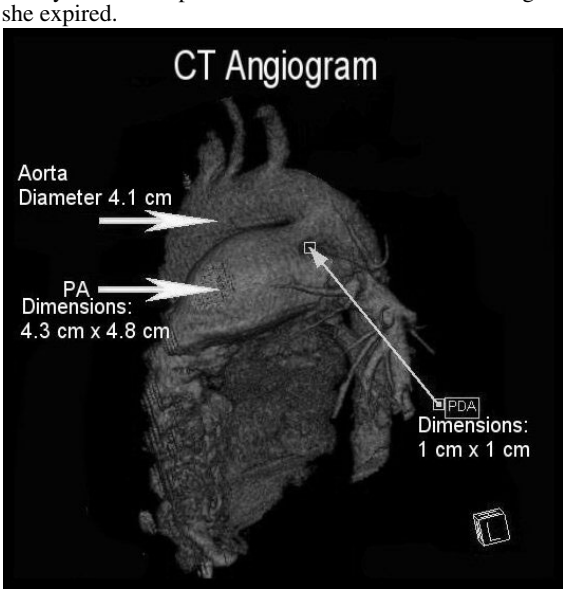


Figure. A. Scout image of a MRI. Arrow shows the cyst at the S_2-S_3 interspace; B. MRI transversal T2 weighted image. Arrow shows the cyst.

SOAP A-140
A CASE REPORT: ANESTHETIC MANAGEMENT OF A PARTURIENT WITH EISENMENGER'S SYNDROME

K. Tyagaraj, R. Hotwani, K. Shevde;
Maimonides Medical Center, Brooklyn, NY.

Introduction: Heart disease is the primary cause of nonobstetric maternal mortality, which is as high as 30% to 50%. Many of these deaths occur as late as 4 to 6 weeks after delivery. We are reporting the peripartum course of a parturient with Eisenmenger Syndrome. Case report: 19 years old parturient at 37 weeks gestation presented to L&D with acute onset of shortness of breath, labor contractions, cyanosis and swelling of lower extremities. Her vital signs were BP 130/90 mm hg, Heart rate 101/ min, SpO2 70-75% on room air, increased to 90-95% on oxygen mask. Fetal heart 130-145 beats/minute. TEE revealed severe pulmonary hypertension, Eisenmengers syndrome, Patent ductus arteriosus (PDA), pulmonary artery pressure >80 mm hg. The goals of management are delivery in a monitored setting, avoid central line insertion and pulmonary artery catheterization as the associated risks outweigh the benefits, effective labor analgesia, to avoid hypotension and excessive preload reduction, to minimize maternal expulsive efforts by early instrumental vaginal delivery. Patient transferred to CCU. Right radial arterial line inserted. Combined spinal epidural block performed aseptically and epidural infusion of 0.1% Ropivacaine with fentanyl 2mcgs/ml initiated. Phenylephrine infusion titrated to maintain BP. Baby girl was delivered vaginally assisted with vaccum extraction. Furosemide 20 mg was given intravenously after the delivery of the placenta. Patient remained hemodynamically stable with no respiratory distress. No evidence of deep venous thrombosis on doppler studies. On the 3rd postpartum day, patient was intubated and on mechanical ventilation for worsening respiratory distress. Pulmonary artery catheter inserted. Right atrial pressure 13 mm Hg, RV pressure 120/10 mm Hg and pulmonary artery capillary wedge pressure 40 mm Hg. Nitric Oxide therapy initiated. Patient's condition progressively deteriorated with worsening hypoxia. Eventually she developed disseminated intravascular coagulation and she expired.



Discussion: Parturients with Eisenmenger syndrome are unable to respond to the increased demands for oxygen during pregnancy and labor. A multidisciplinary approach involving the cardiologist, anesthesiologist and obstetrician is very essential. Pulmonary artery catheterization is a relative contraindication in Eisenmenger syndrome and rarely yields relevant information in the face of severe irreversible pulmonary hypertension. Combined spinal epidural block is ideal to provide effective labor analgesia with minimal sympathetic block and prevent the catecholamine induced worsening of pulmonary hypertension.

1. Anesth Analg 1990; 70:212-4.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-141
HOW DURABLE ARE THESE EPIDURAL NEEDLES?
D. J. Santos, S. Reddy, M. Rahman, A. Saubermann;
Montefiore Medical Center, Bronx, NY.

Introduction: In the course of inserting the epidural needle, one may encounter difficulty which may result in reinserting or redirecting the epidural needle a number of times. These repeated attempts may cause the needle to bend and become distorted which can weaken the needle and cause it to break. How strong and durable are these needles?
Case Report: An experienced senior anesthesia resident was placing an epidural in a healthy 200 lb parturient scheduled for elective repeat cesarean section using the Arrow epidural kit for the first time. The epidural needle was redirected three times after hitting bone. The attending anesthesiologist took over and after straightening the slightly bent needle, had no difficulty inserting the epidural needle at L3-4 interspace until reaching a depth of 4 cm at which time it was noted that a lot of pressure was required to advance the needle. The patient felt no pain and the needle was advanced to 5 cm. The pulsator needle was removed and the stylette replaced to dislodge any tissue at the needle tip. The stylette could not be advanced beyond the 4 cm mark so the needle and stylette were withdrawn as a unit. Upon re-examination of the needle, it was noted to be almost completely severed at the 3 cm mark from the tip. Using a Braun epidural needle, the loss or resistance was quickly identified at 4.5 cm and epidural anesthesia was established without problems.
Method: The epidural needle was examined carefully with scanning microscope and photographs were taken. Despite careful handling, the epidural needle broke into two at the 3 cm point.
Several Braun and Arrow needles were tested by bending and straightening them at approximately 45 degrees. All needles broke after bending twice at 45 and after bending them once at 120 degrees.
Discussion: The epidural needles appear and feel durable, but they can break if undue force is exerted in redirecting or "walking off bone" and the degree of bending and frequency of bending can cause these needles to break. We showed that bending both the Arrow and Braun epidural needles to 45 degrees, straightening and then bending them a second time, was enough to break them into two pieces. We noted that the the softer Arrow needles broke off without much of the snap seen with the more brittle Braun needles. We advise that to prevent possible breakage of the epidural needle, it should be withdrawn to the subcutaneous tissue prior to redirecting to avoid bending and distorting the needle.

SOAP A-142
TWO EPIDURAL TECHNIQUE FOR A PARTURIENT WITH PANCREATITIS
M. B. Fulton, A. Haas;
University Hospitals of Cleveland, Case Western Reserve University, Cleveland Heights, OH.

Introduction: A 28 year-old primigravid at 36 weeks gestation presented with two diagnoses: acute on chronic idiopathic pancreatitis and pre-eclampsia. The patient's obstetrician decided to induce labor. The anesthesia service was consulted for peripartum management of the patient's intense abdominal pain and labor analgesia. Placement of both thoracic and lumbar epidurals was recommended. After appropriate consent, the patient agreed to proceed.
Methods: A single sterile field was prepared. Two epidural catheters were placed without complication at the T7-8 and L3-4 levels. The thoracic epidural was bolused with 5 ml 0.25% bupivacaine and 50 micrograms fentanyl. A solution of 0.1% bupivacaine with fentanyl 1 microgram/ml and epinephrine 1:400,000 was infused. The lumbar epidural remained undosed until the patient was in active labor. The thoracic epidural infusion was then temporarily discontinued while the lumbar epidural was bloused for labor pain.
Results: The thoracic epidural achieved a T4-9 sensory level bilaterally with excellent analgesia. Dosing of the lumbar catheter produced minimal analgesia. This epidural catheter was removed, and on attempted replacement, an inadvertent subdural puncture occurred. Finally, an epidural catheter was placed at the L2-3 level which produced patchy analgesia. After an uncomplicated vaginal delivery, the lumbar catheter was removed. Post-partum, the patient continued to experience upper abdominal pain, so the thoracic epidural infusion was restarted. As the pancreatic pain decreased, the infusion was stopped and the epidural was removed on post-operative day two. During a follow-up conversation, the patient reported no post-dural puncture headache and she commented on the excellent care she received.
Discussion: Acute pancreatitis in a parturient presents an interesting clinical challenge. The usual therapy for pancreatitis, including high dose opioids, was not seriously considered because of its depressant effects on the fetus. Placing only one epidural, at the T12-L1 level was considered. The main advantage of this technique is that it minimizes patient exposure to the potential complications of an additional epidural placement. At routine analgesic local anesthetic concentrations however, such an epidural might not provide adequate analgesia for either pancreatic or labor pain. Higher local anesthetic doses would increase the risk of hypotension and motor block. The two-epidural technique provides the ability to infuse dilute local anesthetics at more ideal locations, providing excellent analgesia without motor block or hemodynamic effects. It also allows for selective infusion and for post-partum infusion of local anesthetic in an ambulating patient via the thoracic route. One improvement to this technique as presented is to properly test the lumbar epidural catheter after the thoracic epidural is demonstrated to be working adequately and safely. We believe that this technique was ideal for providing maximal patient safety and comfort.
References: 1.) Acta Anaesthesiologica Sinica.32:251-254, 1994
2.) Japanese Journal of Anesthesiology.51:916-920, 2002

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-143
PERIPARTUM CARDIOMYOPATHY: A COMMON CAUSE OF LATE MATERNAL MORTALITY IN NORTH CAROLINA

A. J. Olufolabi, A. H. Melnick;
Duke University, Durham, NC.

Introduction

A 34 yr old 450 lb G3 P2 African American parturient (BMI 73 kg/m2) presented at 24wk with dyspnea, edema and weight gain. Past medical history included peripartum cardiomyopathy (PCM), chronic hypertension, Asthma and IDDM. Drug history included hydralazine, procardia and insulin. Vital signs were BP 194/122, P 101, Temp 36.6, SaO2 98%. Thick meconium was noted 24h later. Chest xray showed mild pulmonary edema. Echocardiogram revealed EF < 15%, severe LA, LVH and akinetic walls. Telemetry demonstrated non sustained paroxysmal ventricular tachycardia. Management included fluid restriction, hydralazine, nitropaste, steroid, lovenox and antibiotics. Ultrasound revealed breech presentation. Decision to deliver by induction was made. CVP/arterial lines were placed under local anesthesia.

On Hospital Day (HD) 7 at 25 wks, labor was induced and Epidural placed. Delivery was difficult as fetal head became entrapped while access was difficult. One cm dührssens incision was performed. Baby was delivered with pulseless umbilicus and no palpable heart beat. Apgars were $0^1/0^5$, wt 730 g. Mother was stable and transferred to MICU.

On HD 13/ Postpartum day (PPD) 5, she was diaphoretic, lethargic with faint pulses. BP was 70/20. Norepinephrine, zosyn/clindamycin, captopril, heparin were given. Amiodarone started with persistent non sustained VT. Echocardiogram confirmed low EF and severe LV dysfunction. Evidence of renal/liver dysfunction and metabolic acidosis (BE -10) ensued. Despite multiple runs of non-sustained VT, EP declined ICD insertion. Cardiac catheterization ruled out ischemia. On HD 20/PPD 13, she experienced left calf pain and dopplers confirmed left popliteal DVT. Complaints of SOB/weakness/fatigue worsened. V/Q scan revealed possible PE. Full anticoagulation commenced. On HD 24/PPD 17, desaturation occurred despite CPAP. She became hypotension, unresponsive to dobutamine, sodium bicarbonate. Respiratory Decompensation worsened. She was intubated but went into a PEA/VF rhythm and an unsuccessful resuscitation.

Autopsy revealed multiple bilateral pulmonary emboli; partial saddle embolus in right pulmonary artery ostia; hemorrhagic bilateral pulmonary infarcts; severe cardiomegaly (658 gm), pericardial effusion, significant hepatomegaly (3820 gm).

Discussion

PCM is the leading cause of pregnancy related death in North Carolina accounting for 26 (21.8%) of the 119 deaths (1). This increase in trend is not limited to North Carolina. Hawaii also demonstrated PCM as a cause of death in 25% from 1992 to 1996 (2). National annual incidence is estimated at 1400 to 15000, thought an underestimation. Many of the deaths related to PCM occur beyond 42 days. Recent studies have shown persistent intrinsic dysfunction despite overt functional recovery (3). Anesthesiologists are usually unaware of the high death rate due to the delay in mortality event.

NCMJ March/April 2002; 63: 76-79
Personal communication, Hawaii DOH June 8, 2002
American Journal of Cardiology 2004; 93: 1441- 2

SOAP A-144
PERIPARTUM MANAGEMENT OF FULMINANT COLITIS

S. A. Mullany, M. L. Marnach, W. J. Watson, G. M. Vasdev;
Mayo Clinic, Rochester, MN.

Introduction: The peak age of presentation with inflammatory bowel disease (IBD) during the third and fourth decades correlates with a woman's prime reproductive years. An IBD flare during pregnancy involves optimizing medical therapy. Fulminant colitis refractory to conservative management is a rare problem in pregnancy associated with significant maternal and fetal complications. Here, we describe a case of fulminant colitis surgically managed in the third trimester. A multi-disciplinary approach involving experts in Gastroenterology (GI), Colorectal surgery, Maternal Fetal Medicine (MFM), Anesthesia, and Neonatology was employed for optimal outcome.

Case Report: The patient is a 29 year old G8P5 with a two-year history of indeterminate colitis managed with mesalamine. Her colitis was quiescent until 24wks EGA when she developed a flare characterized by severe abdominal pain, and loose, bloody stools, often in excess of 50 stools/day. Outpatient therapy with high dose prednisone was ineffective. She was hospitalized at 25 3/7wks for dehydration and electrolyte abnormalities. Over 19 days, exhaustive attempts were made to treat her medically with IV methylprednisolone, mesalamine, hydrocortisone enemas, bowel rest and parenteral nutrition. Colonoscopy with biopsies revealed severe indeterminate colitis. After no improvement, the patient received infliximab, an anti-TNF α antibody effective against refractory Crohns disease, but of which little is known on its use during pregnancy. She continued to worsen, requiring transfusions for ongoing rectal bleeding and narcotics for severe pain. After discussion between GI, colorectal surgery, MFM, and anesthesia regarding the risk of further maternal deterioration if surgery was delayed versus the risk of preterm labor if surgery was undertaken, surgical intervention was recommended. At 28 2/7wks, the patient underwent a subtotal colectomy and ileostomy. Pathology confirmed Crohns colitis. Intraoperatively, there was continuous fetal heart rate monitoring. To permit access to the pelvis, the uterus was elevated, anteflexed and shifted to the maternal right. Due to palpable contractions during uterine manipulation, a nitroglycerin drip was started intraoperatively with subsequent uterine relaxation. Postoperatively, the patient was monitored for preterm labor. The nitroglycerin drip was continued for 24hrs for tocolysis. Forty-eight hours postoperatively, the patient precipitously delivered a viable infant at 28 4/7wks. The patient was dismissed after an uncomplicated post-operative course.

Discussion: Typically, pregnancy outcomes for patients with IBD are excellent. In the rare situation in which a colitis flare is refractory to medical therapy, maternal and fetal outcomes can be compromised. Risks and benefits to both mother and fetus must be carefully weighed before proceeding to a major abdominal surgery. Even when every attempt is taken to optimize outcome with support from multiple disciplines, surgical treatment of colitis in pregnancy is fraut with complications including preterm delivery, as shown in this case.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-145
VENTILATORY SUPPORT USING BIPAP DURING NEURAXIAL BLOCKADE IN PATIENTS WITH SEVERE RESPIRATORY COMPROMISE

R. Garrison, S. Sharma;
University of Texas southwestern medical center, Dallas, TX.

Introduction: Patients with Myasthenia gravis (MG) severe respiratory insufficiency have an increased sensitivity to muscle relaxants and are at increased risk for prolonged postoperative ventilation following surgery under general anesthesia (1). Neuraxial anesthesia on the other hand can be advantageous, although the risk for respiratory depression from motor blockade of accessory muscles does exist. We present a case report of a pregnant MG patient with severe respiratory compromise who received epidural anesthesia for dilatation and curettage (D&C) and bilateral tubal ligation (BTL) and Bilevel positive airway pressure ventilation (BiPAP) for noninvasive ventilatory support during the procedure.

Case report: A 26 year old woman with a 12 week intrauterine pregnancy and a two year history of severe MG was scheduled for D&C and BTL. She had significant respiratory involvement to include bilateral phrenic nerve paralysis, central sleep apnea, and a restrictive pattern of ventilation (FEV1 of 1.42, 48% of predicted; FVC 1.56, 46% of predicted). The patient suffered from significant orthopnea and could sleep at night only by sitting up in a chair while using BiPAP (Respironic Inc., Whisper, CA). Her typical BiPAP settings were as follows: IPAP 10-20 cmH_20, EPAP 5-10 cmH_2O, RR spontaneous 16-22/min. The epidural space was located at L3-4 with a 17 G Tuohy needle and loss of resistance to saline. A multiport epidural catheter was threaded 4 cm into the epidural space. After a negative test dose with 3 mL of 2% lidocaine with epinephrine 15 mcg, the epidural was dosed over 20 minutes with 20 mL of 2% lidocaine in 2 mL increments and 100 mcg of fentanyl in 25 mcg increments to a bilateral T 4 ice level. The patient maintained her oxygen saturation between 96-99% on room air with BiPAP. The PACU course was uneventful with the patient on room air with BiPAP (SPO_2 97-99%). Vitals signs at the time of discharge from the PACU were as follows: BP 137/71 mmHg, HR 79/min, RR 18/min, SPO_2 95%.

Discussion: BiPAP is a noninvasive positive pressure ventilatory support device which uses either a nasal or face mask to obviate the need for endotracheal intubation. This device has beeen successfully used for respiratory support during regional anesthesia and in a ICU setting (2,3) There is no ideal anesthetic technique in MG patients with severe respiratory compromise. A safe and successful outcome with regional anesthesia is possible with careful titration of local anesthetic agents and close monitoring of respiratory status. Our case report shows that intraoperative BiPAP can be particularly helpful in avoiding respiratory depression during the administration of a regional anesthetic in patients with compromised respiratory status.

References: 1. Can J Anesth 1992;39:476-86.
2. Neurology 2002; 59:1647-9.
3. J Clin Anesth 2002; 14:24-33.

SOAP A-146
ANESTHETIC MANAGEMENT OF ELECTIVE CARDIOVERSION FOR A PARTURIENT WITH ATRIAL FIBBRILLATION

C. Baysinger, J. Boyle, M. Mamidi, E. Lockhart;
Vanderbilt University, Nashville, TN.

Introduction: New onset atrial fibrillation is rare in pregnancy[1] although recurrence of atrial fibrillation and supraventricular tachyarrhythmias is more likely during pregnancy than at other times [2]. We describe the anesthetic management of a parturient with atrial fibrillation for elective DC cardioversion.

Case Report: A 28 year old G2P0 at 25 weeks was referred to our institution for increasing shortness of breath and complaints of rapid pulse rate. She had been diagnosed with atrial fibrillation one year previously and had been medically managed with metoprolol and digoxin for rate control and warfarin to prevent mural thrombus formation. She had not been previously cardioverted. Her past medical history was remarkable for mild asthma, and her family history was significant for atrial fibrillation in her father and paternal grandfather and grandmother. After onset of her pregnancy, she stopped both her digoxin and warfarin and continued her metoprolol. Her initial electrocardiogram showed atrial fibrillation with a ventricular rate of 100 - 110 bpm at rest. Her initial echocardiogram showed no valvular abnormality, a moderately enlarged left atrium with other chambers of normal size, normal PA pressures, but moderate global hypokinesis with estimated left ventricular EF of 35%. An initial diagnosis of atrial fibrillation due to cardiomyopathy was made and a Holter monitor was placed which revealed non significant ventricular ectopy. She was anticoagulated with enoxaparin and was scheduled one week later for a transesophageal echocardiogram and DC cardioversion. After appropriate aspiration prophylaxis, she was taken to the OR with continuous fetal heart rate monitoring and tocodynanometry, and positioned supine with left uterine displacement. General anesthesia was induced with intravenous etomidate 14 mg and succinylcholine 200 mg followed by endotracheal intubation and maintenance with isoflurane in air/oxygen for uterine relaxation and amnesia. Small doses of ephedrine and phenylephrine were used to maintain systolic blood pressure greater than 100 mmHg. TEE revealed no thrombus and mildly depressed LV function, and she was successfully cardioverted with 100J of biphasic energy. Fetal heart rate was normal throughout and no uterine contractions were noted. She was discharged the next day in sinus rhythm on enoxaparin and metorolol. She was seen one month later in sinus rhythm and had a normal obstetric examination.

Discussion: DC cardioversion in pregnancy is considered safe [2] although cases of concurrent uterine tetany have been reported [3]. A general anesthetic is indicated for airway protection against gastric aspiration, administration of a volatile agent for uterine relaxation if needed to prevent uterine tetanic contraction, and rapid deepening of the anesthetic if cesarean section for fetal indications is required.

References: 1. Int J Cardiol 2003; 88:129-133; 2. Circulation 2003; 108:1871-1909; 3. BJOG 2002; 109:1406-1407.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-147
SEVERE CERVICAL RADICULAR PAIN WITH LUMBAR EPIDURAL BOLUS INJECTION

C. S. Dupre, D. C. Mayer, F. J. Spielman;
UNC, Chapel Hill, NC.

Introduction: To our knowledge, no published reports exist of severe cervical pain in patients with continuous lumbar labor epidurals.

Methods: A 20-yr-old $G_3 P_{1011}$ 132cm 91 kg female at 40 weeks gestation was admitted to labor and delivery. A continuous labor epidural was placed at $L_{2/3}$ without any complications. The epidural catheter was threaded to 8cm at the skin. The patient received 15cc of a mix of 0.04 % bupivicaine, Fentanyl 1.7mcg/ml, and epinephrine 1:600K (BEF) and was then started on the BEF at 15cc/hr. She had a T8/T8 sensory level and received good analgesia for 10 hours, then required a 5cc bolus of 0.25% bupivicaine through the epidural catheter, which provided pain relief. The patient was taken to the OR for a cesarean section for failure to progress. The epidural catheter was aspirated and there was no CSF or blood, then dosed with 3 cc of 2% lidocaine with 1:200k epinephrine without any complications. While giving the second bolus the patient began to complain of right hand and right-sided neck pain. Another 2cc were given and again she complained of right hand and right-sided neck pain. This pain abated as soon as the boluses were stopped. No motor or sensory deficits were found. General endotracheal anesthesia was induced.

Results: Post-op the epidural catheter was removed without complication and the tip was intact. The patient had no motor or sensory deficits in their upper or lower extremities, and denied any neck, back, or arm pain. Close follow up over the next few days revealed no neurologic complications.

Discussion: Since the patient received an epidural space fluid volume close to 170cc, it is highly likely that this volume exceeded the absorption capacity of the epidural venous plexus and the local tissues, thereby resulting in pressure on the cervical nerve roots. If this is the case, several questions arise. It is conceivable that there is a critical volume that the epidural space can accommodate and below which these symptoms will not be seen. At this time such a critical volume is not known. This critical volume may be related to the height of the patient, as the patient was 132cm tall. It is unclear why the fluid moved cephlad, but it may be related to the thoracic spine kyphosis. Once the critical volume is reached some patients may develop lumbar symptoms as well. Other possible explanations for these symptoms include an epidural hematoma, cervical radiculopathy, and a migrating epidural catheter. No histories or lab abnormalities support these explanations. One conclusion is clear, all patients with these symptoms need to be followed closely to assure that the neurologic symptoms resolve without complications and that they receive a complete workup if these symptoms persist.

SOAP A-148
MASSIVE INTRAOPERATIVE HEMORRHAGE DURING A D&C PROCEDURE

K. Y. Cho, S. Olejnikova;
University Hospitals, Cleveland, OH.

Placenta accreta, or the presence of an abnormally adherent placenta, is a known risk factor for postpartum hemorrhage. As obstetric anesthesiologists, we weigh in the risk of placenta accreta when we see a parturient with a history of multiple c-sections or one who presents with placenta previa. This case presentation represents a rare case of placenta accreta causing massive intraoperative hemorrhage during a D&C procedure at 8 weeks gestation. A.W. is a 28 year old gravida 4 para 2, with a history of 2 prior term c-sections and 1 spontaneous abortion. She has a history of well-controlled asthma for which she has never been intubated or hospitalized, and her previous surgeries included 2 cesarean sections. She presented to our labor and delivery ward at 8 weeks gestation with vaginal bleeding, and was found to have a spontaneous missed abortion. A dilitation & curettage under sedation anesthesia using propofol-ketamine infusion was started. Obstetricians encountered massive bleeding, and A.W. lost over 3 liters of blood within 3 minutes of the procedure. Our anesthesia team responded by intubating the patient, starting 2 large bore IVs and transfusing colloid and O negative blood. As this blood was running, we checked the patient's hemoglobin which was 4.2. The obstetricians managed to control the bleeding by tamponade with a balloon, and their decision was to keep the balloon in the uterus and wake the patient. At this point, however, the patient became hypotensive and tachycardic, signaling that the bleeding was far from controlled. A decision was then made to perform an emergency hysterectomy. To keep up the estimated 5800cc blood loss and DIC, we transfused 8 units of packed blood cells, 9 units of fresh frozen plasma and 2 units of pooled platelets. The patient was transported hemodynamically stable to the intensive care unit after the procedure and she was extubated six hours later. Surgical pathology reports from A.W.'s uterus revealed placenta increta, or placenta invading the myometrium.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

POSTER CASE REPORTS

SOAP A-149
DIAGNOSTIC LUMBAR PUNCTURE IN THE PARTURIENT WITH HISTORY OF PREVIOUS POST-LUMBAR PUNCTURE HEADACHE

K. M. Kuczkowski, R. D. Hope, U. B. Eisenmann;
University of California, San Diego, San Diego, CA.

Introduction: In the USA diagnostic lumbar punctures (DLP) are routinely performed by neurologists or emergency medicine physicians with a 20 or 22-gauge spinal needles. We herein present the first reported case of a DLP performed with a 27-gauge spinal needle.

Report of case: A 35 y/o G1P0 otherwise healthy female with a history of previous post-lumbar puncture headache (14 years ago requiring epidural blood patch to treat severe cephalgia) presented to Labor and Delivery suite at 34 weeks gestation with a fever of unknown origin (tympanic body temperature of 102.3 ^{o}F). With the working diagnosis of meningitis a DLP was performed by an obstetric anesthesia providers with a 27-gauge Pencan spinal needle. Cerebro-spinal fluid (CSF) was obtained on the first attempt; however, it took approximately 15 minutes to fill the culture vials from the lumbar puncture kit. No post-procedure complications (including post-lumbar puncture headache) were reported. The positive viral culture (enterovirus) established the diagnosis of viral meningitis.

Discussion: More than a century has passed since the initial description of the post-dural puncture headache (PDPH); however, this unique clinical entity still remains a disabling complication of needle insertion into the subarachnoid space. There is considerable variability in the incidence of PDPH, which is affected by several factors such as age, gender, pregnancy, and needle type and size (1). In clinical practice, the signs of PDPH may be observed following intentional dural puncture associated with the DLP, the administration of spinal or combined spinal-epidural anesthesia or unintentional dural puncture during epidural anesthesia. History of previous PDPH is a strong risk factor for another PDPH if dural puncture is performed in these patients (1). Although most anesthesiologists are critical of the use of large gauge needles for DLP, many neurologists still maintain that adequate flow of CSF can only be achieved with spinal needles of 22 or larger gauge (2). Birnbach et al. mailed a questionnaire, which included items pertaining to knowledge of pencil-point spinal needles, and DLP practices to all 7798 members of the American Academy of Neurology listed in the membership directory. Only a fraction (2%) of the neurologists surveyed routinely used pencil-point spinal needles. Almost half of the responding neurologists reported having no knowledge of these needles. Among those who did have knowledge of these spinal needles, the most common reasons given for not using them were nonavailability and expense (2). Although the use of pencil-point needles is standard practice among anesthesiologists, they have not been adopted by other medical specialties, what may lead to unnecessary morbidity among patients undergoing DLP. The obstetric patient is at particular risk of PDPH because of sex, young age and pregnancy.

Reference: 1. Acta Anaesthesiol Scand 2003; 47: 98-100. 2. Headache 2001; 41: 385-90.

SOAP A-150
AMPHETAMINE USE IN THE PARTURIENT

Y. Yamamura, G. M. Vasdev;
Mayo Clinic, Rochester, MN.

Introduction

Illicit drug use is increasingly common in women of reproductive age. In addition to the unique challenges posed by the antepartum management of such women, special consideration must be given to the obstetric and anesthetic management of parturients with recent substance use. As amphetamine use rises in the U.S., knowledge of the central nervous system effects of amphetamines is paramount to safe anesthetic management of labor.

Report of Case

A 33-year-old gravida 6, para 4 was admitted at 28 1/7 weeks EGA for preterm premature rupture of membranes. The pregnancy was complicated by monochorionic, diamniotic twin gestation and twin-twin transfusion syndrome. The patient received corticosteroids for fetal lung maturity, and intravenous antibiotics were started. Due to a history of illicit drug use, a urine drug screen was performed and was positive for amphetamines.

On admission, the patient was normotensive and mildly tachycardic. Fetal heart tones were within normal limits. Several hours after hospitalization, maternal tachycardia resolved. The patient was noted to be somnolent but easily awakened. On hospital day 3, the decision was made to proceed with Cesarean delivery for fetal indications. Rapid sequence intubation and general anesthesia were undertaken without difficulty, and during an uneventful Cesarean section, the blood pressure remained stable. However, in the postpartum period, blood pressures were labile with peak systolic pressures of 170 mm Hg and peak diastolic pressures of 130 mm Hg. Each of these episodes was short-lived and no anti-hypertensives were required. By postpartum day #2, blood pressure lability had resolved and the remainder of the postpartum course was unremarkable.

Discussion

Antepartum use of amphetamines by the parturient significantly affects anesthetic management in labor. Although regional neuraxial blocks may be utilized, the resultant sympathetic blockade may precipitate severe hypotension; furthermore, hypotension in amphetamine-abusing parturients may not be responsive to vasopressors. General anesthetic for operative deliveries must therefore be considered in these patients, particularly in the face of acute intoxication with amphetamines. Halothane should be avoided as it may sensitize the myocardium to endogenous catecholamines. In the case presented, general anesthesia was chosen due to suspicion of recent amphetamine use. The patient remained hemodynamically stable throughout the procedure. Postpartum blood pressure lability was likely secondary to withdrawal from recent amphetamine ingestion.

Conclusion

As the incidence of drug abuse in pregnancy increases, it is critical that a multi-disciplinary approach between the Obstetrician and Anesthesiologist be utilized in the management of these complicated parturients. Anesthetic management must be tailored to both the physiologic changes of pregnancy and to those potential changes induced by the use of illicit drugs.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

POSTER CASE REPORTS

SOAP A-151
RAPID ONSET OF PERIPARTUM DILATED CARDIOMYOPATHY DURING AN ELECTIVE REPEAT CESARIAN SECTION

L. M. Councilman-Gonzales, K. J. Morgan-Vanderlick;
Scott & White Memorial Hospital/ Texas A&M Health Science Center, Temple, TX.

Introduction: Peripartum dilated cardiomyopathy is an uncommon form of dilated cardiomyopathy that occurs in 1 in 3,000-4,000 deliveries.[1] By definition, perpartum dilated cardiomyopathy occurs between one month pre-delivery and five months postpartum.[2] Peripartum dilated cardiomyopathy is the fifth leading cause of peripartum maternal deaths.[2] Presentation is often subtle with lower extremity edema, fatigue, and mild shortness of breath. Such symptoms of dilated cardiomyopathy can be mistakenly attributed to late pregnancy. Symptoms can rapidly progress to florid pulmonary edema, followed by respiratory and cardiac failure, often necessitating intubation, pharmacologic therapy, and Intensive Care Unit (ICU) admission.

Case: A 22 year old Spanish speaking only female, gravida 2 para 1, presented at 39 and 0/7 weeks gestation for elective repeat cesarean section. Her medical history was significant for late term onset of care, episodes of anxiety with tachycardia, especially during medical examinations, gastroesophageal reflux during pregnancy, and previous cesarean section in Mexico under regional anesthesia for failure of labor progression. No additional medical records were available. Shortly after initiation of T_3 spinal anesthesia using bupivicaine 10.5mg, fentanyl 15mcg, and morphine 0.25mg, the patient developed shortness of breath and mild hypotension. The infant was delivered uneventfully. Oxygen via face mask, ephedrine, neosynephrine, and fluid boluses were administered to the mother to treat the continuing progressive hypotension following the delivery. The patient continued to demonstrate hypotension with a systolic blood pressure of 80 mmHg, despite aggressive treatment, however her oxygen saturation (SpO_2) remained above 92%. Once in recovery, the patient experienced progressive decline in SpO_2 with ensuing respiratory distress requiring emergent intubation during which copious amounts of clear fluid were suctioned from the oropharynx and the endotracheal tube. The patient was then quickly transferred to the ICU. Subsequent bedside transesophageal echocardiography revealed an ejection fraction of ten to twenty percent, global hypokinesis, mild tricuspid regurgitation, and mild global chamber enlargement. Over the course of the following 72 hours, the patient was extubated and experienced near-complete resolution of symptoms with repeat transthoracic echocardiography revealing normal left ventricular function with an ejection fraction of 55 percent on post-operative day #1.

Discussion: Peripartum dilated cardiomyopathy is often a diagnosis of exclusion. Mortality has been estimated to be as high as fifty percent.[2] However, some patients experience complete or near-complete recovery. More severe cases may require vasodilators, inotropes, ventricular assist devices, and even cardiac transplant.[2] Sequelae often includes increased risk of recurrence and death with future pregnancies. Our case is unique because we saw firsthand the rapid development and deterioration of the cardiomyopathy in a thirty-minute timeframe perioperatively.

References:

1. Chestnut H, Obstetric Anesthesia Principles and Practice, 3rd Ed., Mosby, 2004: 707-733.
2. Tidswell M, Crit Care Clin 2004; 20: 777-788.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

AUTHOR INDEX

Agaram, R. S. SOAP A-83
Allen, C. SOAP A-15
Alluin, L. SOAP A-18
Amaro, A. R.. SOAP A-34, A-50
Anand, N. K. SOAP A-103
Andes, L. SOAP A-45
Andes, L. C. SOAP A-47
Angle, P. SOAP A-43
Angle, P. A. SOAP A-8
Applegate, G. K. SOAP A-97
Arfeen, Z. SOAP A-72
Armstrong, J. E. SOAP A-38
Arnold, I. SOAP A-48, A-52, A-75
Arzola, C. G. SOAP A-63
Ashpole, K. J. SOAP A-5
Ashton, V. SOAP A-60
Babalola, O. SOAP A-128
Babu, G. S. SOAP A-105
Baker, R. SOAP A-106
Balki, M. SOAP A-7, A-101
Baysinger, C. SOAP A-146
Beaman, S. T. SOAP A-127
Beilin, Y. SOAP A-48, A-52, A-75
Bernstein, H. SOAP A-52, A-75
Biem, S. SOAP A-39
Birmingham, S. D. SOAP A-79
Birnbach, D. SOAP A-130
Birnbach, D. J.. SOAP A-73
Blanchfield, P. SOAP A-81
Blodgett, T. SOAP A-99
Blouin, J. SOAP A-19, A-23, A-26
Bolad, N. SOAP A-88
Boni, F. SOAP A-80
Bordelon, J. S. SOAP A-107
Bottros, L. SOAP A-96
Boyle, J. SOAP A-146
Boyle, J. K. SOAP A-123
Breen, T. W. SOAP A-94
Brennan, A. SOAP A-66
Brost, B. SOAP A-62
Brost, B. C. SOAP A-78, A-95,A-121, A-132
Broussard, D. SOAP A-44
Brummel, C. SOAP A-17, A-32, A-47, A-86
Bullough, A. S. SOAP A-56
Bureau, N. SOAP A-90
Butwick, A. J. SOAP A-45, A-101
Bythell, V. SOAP A-60
Camann, W. R. SOAP A-41
Campbell, D. C. SOAP A-35, A-39
Campbell, K. A. SOAP A-21
Cardoso, M. M. M. S. SOAP A-34
Cardoso, M. M. SOAP A-50
Carroll, R. C. SOAP A-38
Carvalho, B. SOAP A-17, A-32, A-45, A-46, A-47, A-55, A-76, A-86
Carvalho, J. SOAP A-7, A-13, A-101
Cerda, S. E. SOAP A-15, A-63, A-64
Chang, T. SOAP A-25
Cho, K. SOAP A-125
Cho, K. Y. SOAP A-148
Chu, L. SOAP A-17
Clifford, C. SOAP A-42
Clinkscales, C. P. SOAP A-37
Clyne, B. SOAP A-24, A-125
Clyne, B. B. SOAP A-2, A-58
Coda, B. A. SOAP A-102
Coghill, R. C. SOAP A-10
Cohen, S. SOAP A-47, A-81, A-93
Cohen, S. E. SOAP A-17, A-32, A-45, A-46
Cole, T. SOAP A-131
Columb, M. SOAP A-1, A-5, A-11
Columb, M. O. SOAP A-23, A-33, A-70
Conermann, T. SOAP A-99
Conklin, D. R. SOAP A-2
Contag, S. SOAP A-62
Corredor, L. SOAP A-111
Councilman-Gonzales, L. M. SOAP A-151
Courtney, R. C. SOAP A-108
Crochetière, C. SOAP A-90
Cumsille, F. SOAP A-15
D'Angelo, R. SOAP A-24, A-58
Datta, A. SOAP A-54
Datta, S. SOAP A-61
Davallou, M. SOAP A-8
Davies, S. SOAP A-7
Davies, T. SOAP A-96
DeRuyter, M. L. SOAP A-114
DeSimone, C. A. SOAP A-107
Dick, J. SOAP A-1
Dierdorf, S. SOAP A-31
Dixon, M. H. SOAP A-138
Djabatey, E. A. SOAP A-105
Dolak, J. A. SOAP A-29
Doré, S. SOAP A-4
Douglas, J. SOAP A-83
Downey, K. SOAP A-28
Dumas, S. D. SOAP A-85
Dumitrascu, G. A. SOAP A-120
Dupre, C. S. SOAP A-147
Durbin, M. SOAP A-86
Earley, J. SOAP A-106
Eglington, G. S. SOAP A-89
Eisenach, J. C. SOAP A-2, A-10, A-24, A-71
Eisenmann, U. B. SOAP A-149
Elegbe, E. O. SOAP A-92
Elia, E. SOAP A-103
Enegess, D. M. SOAP A-14
Escobar, J. A. SOAP A-15
Eubanks, S. SOAP A-21
Evans, P. Robert SOAP A-72
Fang, M. SOAP A-4
Fernandez, N. SOAP A-59
Fernando, R. SOAP A-1, A-5, A-11
Fielding, C. SOAP A-113
Finegold, H. SOAP A-99
Flood, P. SOAP A-54
Freedman, P. V. SOAP A-19, A-26
Fritz, W. T. SOAP A-131
Fuller, A. SOAP A-32, A-47, A-55
Fuller, A. J. SOAP A-17, A-86

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

AUTHOR INDEX

Fulton, M. B. SOAP A-142
Gallant, C. SOAP A-20
Gan, T. J. SOAP A-68
Gantner, M. SOAP A-81
Garcia, L. SOAP A-73
Garrison, R. SOAP A-3, A-40, A-145
Gatmaitan, P. SOAP A-131
Gaughan, E. SOAP A-82
Geary, M. SOAP A-82
George, R. B. SOAP A-91
Gershon, R. Y. SOAP A-77
Giraldo, O. L. SOAP A-59
Glassenberg, J. SOAP A-84
Glassenberg, R. SOAP A-84
Goldszmidt, E. SOAP A-13
Goodman, E. J. SOAP A-85
Goswami, S. SOAP A-77
Govindarajan, R. SOAP A-128
Grange, C. S. SOAP A-49
Green, R. SOAP A-79
Greenfield, M.V.H. SOAP A-12, A-37, A-65, A-66, A-74, A-137
Grimm, J. SOAP A-123
Grodecki, W. SOAP A-103
Guinn, N. R. SOAP A-75
Haas, A. SOAP A-136, A-142
Haas, A. J. SOAP A-97
Habib, A. S. SOAP A-42, A-68, A-70, A-139
Halpern, S. H. SOAP A-8
Hapgood, A. SOAP A-124
Harnett, M. SOAP A-98
Harris, L. SOAP A-10
Hart, S. R. SOAP A-44
Hawney, E. SOAP A-87
Hayes, N. E. SOAP A-82
Hebbar, L. SOAP A-30, A-106
Heesen, M. SOAP A-69
Heil, J. W. SOAP A-79
Helgeson, L. E. SOAP A-108
Hernandez-Aquino, M. SOAP A-73
Hess, P. E. SOAP A-36, A-53
Hidalgo, G. A. SOAP A-15
Holzman, I. SOAP A-52
Hong, R. W. SOAP A-137
Hope, R. D. SOAP A-149
Hopkins, M. SOAP A-132
Hossain, S. SOAP A-48
Hotwani, R. SOAP A-140
Huffnagle, H. SOAP A-100, A-103, A-115
Huffnagle, S. SOAP A-100, A-103, A-115
Huhn, K. SOAP A-95
Hussain, K. SOAP A-43
Iheme, L. SOAP A-28
Imarengaiye, C. SOAP A-28
Islam, M. SOAP A-9
Itchon-Ramos, N. SOAP A-68
Jaklitsch, P. SOAP A-139
Johnson, T. Rb. SOAP A-12
Kaczynski, S. S. SOAP A-79
Kane, S. K. SOAP A-126
Kane Low, L. SOAP A-74
Kaul, B. SOAP A-14, A-99, A-117
Kaynar, M. SOAP A-61
Kern, C. SOAP A-23
Kerssens, C. SOAP A-77
Kim, K. SOAP A-129, A-133
King, M. SOAP A-129
Kingdom, J. SOAP A-7, A-13
Kodali, B. SOAP A-61, A-98
Kodali, N. SOAP A-128
Krohner, R. G. SOAP A-99
Kuczkowski, K. M. SOAP A-149
Lacassie, H. J.. SOAP A-70, A-139
Lacroix, J. SOAP A-90
Lai, M. SOAP A-130
Landau, R. SOAP A-19, A-23, A-26
Langen, K. SOAP A-133
LaRocca, N. K. SOAP A-66
Lavand'homme, P. M. SOAP A-18
Lee, B. X. SOAP A-117
Lee, C. SOAP A-98
Leighton, B. L. SOAP A-96
Lew, E. SOAP A-9
Leyton, P. SOAP A-15
Li, Y. SOAP A-20
Lindeman, K. SOAP A-25, A-27
Lindeman, K. S. SOAP A-4
Lipman, S. S. SOAP A-45
Lockhart, E. SOAP A-146
Lockhart, E. M. SOAP A-42
Lorenz, E. SOAP A-34
Loughrey, J. SOAP A-82
Lowenwirt, I. P. SOAP A-89
Lujan, E. SOAP A-79
Macarthur, A. J. SOAP A-28
Mackin, C. SOAP A-30
MacMillan, W. SOAP A-133
Malan, A. J. SOAP A-39
Malek, S. SOAP A-20
Maleski, J. SOAP A-25, A-27
Mamidi, M. SOAP A-146
Manoharan, P. SOAP A-128
Mantha, V. R. SOAP A-30
Marnach, M. L. SOAP A-144
Martel, J. SOAP A-39
Martin, G. SOAP A-52
Mayer, D. C. SOAP A-147
McCarthy, R. SOAP A-51
McCarthy, R. J. SOAP A-16, A-22
McCaul, C. SOAP A-113
McCheyne, J. SOAP A-72
McClaine, D. J. SOAP A-21
McClaine, R. J. SOAP A-21
McCullough, P. M. SOAP A-114
McEvoy, M. SOAP A-31
McGrane, D. P. SOAP A-120
McIntosh, D. SOAP A-116
McKay, W. SOAP A-35
McKeen, D. SOAP A-91
McKinney, C. SOAP A-131
Mecklenburg, B. W. SOAP A-79

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

AUTHOR INDEX

Melnick, A. H. SOAP A-143
Mezzetti, R. SOAP A-50
Mhyre, J. M. SOAP A-12, A-74
Misa, V. S. SOAP A-6, A-135
Misra, U. SOAP A-72
Montaño, R. E. SOAP A-63
Moore, M. SOAP A-88
Mörch-Siddall, J. SOAP A-87
Morgan, K. G.. SOAP A-20
Morgan-Vanderlick, K. J. SOAP A-151
Muir, H. A. SOAP A-42, A-68, A-70
Mullany, S. A. SOAP A-144
Murphy, C. SOAP A-113
Nafiu, O. O. SOAP A-119, A-92
Negron, M. SOAP A-19, A-26
Nelson, L. SOAP A-126
Newman, R. SOAP A-78
Nicholson, C. SOAP A-126
Njaa, M. SOAP A-139
O'Neill, A. SOAP A-82
O'Rourke, N. SOAP A-98
O'Sullivan, G. SOAP A-88
Olejnikova, S. SOAP A-148
Olufolabi, A. J. SOAP A-70, A-80, A-139, A-143
Owen, M. D. SOAP A-6, A-71, A-80, A-94
Palacio, W. A. SOAP A-59
Pan, P. SOAP A-10
Pan, P. H. SOAP A-6, A-58, A-71, A-135
Panni, M. K. SOAP A-33, A-41
Parra, V. M. SOAP A-15
Patel, R. SOAP A-16, A-51
Pathel, R. SOAP A-27
Patteson, S. K. SOAP A-38
Philip, J. SOAP A-3
Phillips, T. W. SOAP A-44
Polley, L. S. SOAP A-12, A-37, A-65, A-66, A-137
Pratt, S. SOAP A-36
Pratt, S. D. SOAP A-53
Rahman, M. SOAP A-141
Ramanathan, S. SOAP A-14, A-30, A-99, A-117
Ranasinghe, S. SOAP A-73
Ranasinghe, S. J. SOAP A-130
Ratliff, J. SOAP A-16
Ratliff, J. T. SOAP A-51
Ravindran, R. S. SOAP A-67
Raza, A. SOAP A-128
Reddy, S. SOAP A-141
Restrepo, C. E. SOAP A-111, A-59
Reynolds, F. SOAP A-88
Reynolds, J. D. SOAP A-21
Riesner, M. N. SOAP A-65
Riley, E. SOAP A-47, A-10
Riley, E. T. SOAP A-17, A-46, A-55, A-76, A-86
Robles, C. SOAP A-16
Robles, C. M. SOAP A-51
Robson, S. C. SOAP A-60
Rockford, M. A. SOAP A-134
Rodriguez, G. A. SOAP A-59
Roelants, F. SOAP A-18
Rofaeel, A. SOAP A-101
Ronayne, M. SOAP A-7
Rosa, M. C. R. SOAP A-34
Ross, V. H. SOAP A-71, A-80
Sah, N. SOAP A-104
Sah, N. B. SOAP A-117
Sahin, S. SOAP A-94
Sakai, T. SOAP A-122
Sakr, A. SOAP A-81, A-93
Salaam, R. A. SOAP A-92
Sambasivan, A. SOAP A-123
Samet, R. SOAP A-93
Samoya, S. W. SOAP A-125
Santos, D. J. SOAP A-141
Sarna, S. SOAP A-32, A-55
Saubermann, A. SOAP A-141
Saweris, W. SOAP A-128
Saxena, A. SOAP A-17, A-55
Scaccia, N. M. SOAP A-112
Scardo, J. SOAP A-78
Scavone, B. M. SOAP A-22, A-51, A-112
Schocket, M. SOAP A-40
Scott, J. A. SOAP A-19, A-26
Sebel, P. S. SOAP A-77
Sedensky, M. M. SOAP A-94
Seid, M. H. SOAP A-71
Shafer, S. SOAP A-24
Shankar, M. SOAP A-11
Shankar, T. SOAP A-131
Shannon, K. T. SOAP A-117, A-122
Sharma, S. SOAP A-3, A-40, A-145
Shevde, K. SOAP A-140
Shih, G. SOAP A-134
Shimazutsu, K. SOAP A-21
Shorshtein, A. SOAP A-81, A-93
Siddall, V. J. SOAP A-22
Siddiqui, M. SOAP A-13
Simon-Baker, M. W. SOAP A-100, A-115
Singaravelu, S. K. SOAP A-105
Skupski, D. W. SOAP A-89
Slodzinski, M. K. SOAP A-4, A-25, A-27, A-118
Smiley, R. M. SOAP A-19, A-23, A-26
Snider, C. C. SOAP A-38
Socha, N. I. SOAP A-59
Spatz, R. SOAP A-128
Spiegel, J. SOAP A-36, A-124
Spielman, F. J. SOAP A-147
Sproviero, M. T. SOAP A-22
Stack, K. E. SOAP A-77
Steen, N. SOAP A-60
Stricker, P. SOAP A-93
Sumrall, W. David SOAP A-44
Sundar, S. SOAP A-76
Sunwoo, D. H. SOAP A-85
Tamilselvan, P. SOAP A-1, A-5, A-11
Tan, N. SOAP A-49
Tang, S. SOAP A-8
Tarant, N. S. SOAP A-79
Tharmaratnam, U. SOAP A-13
The Duke Women's Anesthesia Research Group SOAP A-68
Thomas, J. SOAP A-135

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Anesthesiology
2005; 102, Supp 1

AUTHOR INDEX

Thorp, J.	SOAP A-80
Tingle, M.	SOAP A-86
Tong, C.	SOAP A-2
Toro, A.	SOAP A-73
Torres, M. A.	SOAP A-50
Toyama, T.	SOAP A-130
Tran, T.	SOAP A-35
Trinh, I.	SOAP A-67
Tsen, L. C.	SOAP A-41
Tureanu, L.	SOAP A-28
Tyagaraj, K.	SOAP A-140
Ucer, S.	SOAP A-94
Uemura, K.	SOAP A-21
Uribe, M. A.	SOAP A-111
Vallejo, M.	SOAP A-30
Vallejo, M. C.	SOAP A-14, A-117, A-122, A-127
Vanarase, M.	SOAP A-37
Vanderbeck, B.	SOAP A-18
Varaday, S. S.	SOAP A-96
Vasdev, G.	SOAP A-62
Vasdev, G. M.	SOAP A-138, A-144, A-150
Vasudevan, A.	SOAP A-53
Villeneuve, E.	SOAP A-90
Vuffray, A.	SOAP A-90
Wade, L.	SOAP A-22
Wang, P.	SOAP A-46
Waters, J. H.	SOAP A-29
Watson, W.	SOAP A-62, A-95
Watson, W. J.	SOAP A-138, A-144
Wauchob, T.	SOAP A-105
Wen, T. S.	SOAP A-120
Whitaker, G. L.	SOAP A-38
Whittaker, S. M.	SOAP A-56
Wieser, J.	SOAP A-52
Wight, W. J.	SOAP A-60, A-109, A-116
Wiley, J.	SOAP A-3, A-40
Wilkins, K. K.	SOAP A-66
Williams, D. A.	SOAP A-74
Windrim, R.	SOAP A-7, A-13
Wissler, R.	SOAP A-57
Wong, C. A.	SOAP A-16, A-51, A-112
Woods, D. M.	SOAP A-136
Yamaguchi, E. T.	SOAP A-50
Yamamura, Y.	SOAP A-150
Yee, J.	SOAP A-8
Zahn, J.	SOAP A-52, A-75
Ziliotto, V.	SOAP A-34
Zimmerman, L.	SOAP A-104

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

Society for Obstetric Anesthesia and Perinatology

Upcom Events »
SOAP 37th Annual Meeting

Palm Desert, California
May 4-7, 2005. More...

Username

Password

Member Login

Become a Member

Visit www.soap.org to view the new website design.

The Society for Obstetric Anesthesia And Perinatology was founded in 1968 to provide a forum for discussion of problems unique to the peripartum period. SOAP is comprised of anesthesiologists, obstetricians, pediatricians, and basic scientists who share an interest in the care of the pregnant patient and the newborn.

The mission of the Society is to promote excellence in research and practice of obstetric anesthesiology and perinatology. Through the newsletter, Internet site, and annual meetings, this Society allows practitioners of several specialties to meet and discuss clinical practice, basic and clinical research, and practical professional concerns.

A membership in SOAP is an opportunity to meet people who share your interests, and to stimulate improvements in health care for pregnant patients.

Our Website is a Resource for Anesthesiologists, Obstetricians, Mothers of the Future and their Families...

Contact SOAP

Celebrating Over 150 Years of Obstetric Anesthesia

Website sponsored by

IMD, Inc.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024

SOAP 37th Annual Meeting
Best Paper Presentations
Saturday, May 7, 2:00-3:30 pm

SOAP A19 BETA-2 ADRENOCEPTOR GENOTYPE AFFECTS TREATMENT RESPONSE TO HYPOTENSION AFTER SPINAL ANESTHESIA FOR CESAREAN SECTION

R. M. Smiley, R. Landau, P. V. Freedman, M. Negron, J. A. Scott, J. Blouin;
Columbia University, New York, NY, University of Geneva and Columbia University, New York, NY and Geneva, Switzerland, University of Geneva, Geneva, Switzerland

SOAP A20 FOCAL ADHESION SIGNALING CONTRIBUTES TO ERK ACTIVATION IN MYOMETRIUM DURING LATE PREGNANCY

Y. Li, S. Malek, C. Gallant, K. G. Morgan;
Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, Boston Biomedical Research Institute, Watertown, MA

SOAP A21 MATERNAL GENERAL ANESTHESIA (GA) PRODUCES GESTATIONAL-AGE DEPENDENT CHANGES IN FETAL CEREBRAL OXYGENATION

R. J. McClaine, K. Shimazutsu, K. Uemura, D. J. McClaine, K. A. Campbell, S. Eubanks, J. **D. Reynolds**;
Duke University Medical Center, Durham, NC, University of Missouri, Columbia, MO

SOAP A22 RELIABILITY AND VALIDITY OF A SCORING SYSTEM USED TO MEASURE RESIDENT PERFORMANCE DURING AN OBSTETRIC ANESTHETIC SCENARIO ON A HUMAN PATIENT SIMULATOR

B. M. Scavone, M. T. Sproviero, V. J. Siddall, L. Wade, R. J. McCarthy;
Northwestern University Feinberg School of Medicine, Chicago, IL

SOAP A23 POLYMORPHISM OF μ-OPIOID RECEPTOR (A118G) AFFECTS INTRATHECAL FENTANYL ED50 FOR LABOR ANALGESIA.

R. Landau, C. Kern, R. M. Smiley, M. O. Columb, J. Blouin;
University Hospital of Geneva (HUG), Geneva, Switzerland, Columbia University, New York, NY, Manchester University Hospital, Manchester, United Kingdom

SOAP A24 EFFICIENCY AND ACCURACY OF UP-DOWN VS. RANDOM ALLOCATION TO DETERMINE ANALGESIC POTENCY AND DOSE RESPONSE

R. D'Angelo, S. Shafer, B. Clyne, J. C. Eisenach;
Wake Forest University, Winston-Salem, NC, Stanford University, Palo Alto, CA

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/102/5/B1/654251/0000542-200505000-00041.pdf by guest on 19 April 2024