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

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

The Society for Obstetric Anesthesia and Perinatology designates this educational activity for a maximum of 25 hours in category 1 credit towards the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

Mission of SOAP

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

Mission of SOAP Program Committee

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

Goals of the SOAP 2002 Program

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

Educational Format

CME activities may include the following formats: Plenary sessions, debates, lectures, poster discussions, problem-based learning, and refresher courses.

Participants in the SOAP 2002 Program

Attendance shall be open to all health practitioners, provided that they have registered for the meeting. CME credit will only be offered to MDs or DOs or equivalent. A Verification of Participation form (found on page 3) must be turned in to SOAP at the conclusion of the meeting.
# Table of Contents

Distinguished Service Award ........................................................................................................... 2
Verification of Participation .................................................................................................................. 3
Abstract Presenter Disclosures ........................................................................................................... 5
Faculty Disclosures ............................................................................................................................. 7
Faculty .................................................................................................................................................. 8
General Information ........................................................................................................................... 10
Meeting at a Glance ............................................................................................................................ 11
Poster Exhibits .................................................................................................................................... 14

**Wednesday / Thursday at a Glance**

- Neonatal Resuscitation .................................................................................................................... 17
- Gertie Marx Symposium ..................................................................................................................... 18
- Oral Presentations #1 ....................................................................................................................... 19
- Debate No. 1: *Anesthesiologists May Leave the Hospital When a Patient Has an Indwelling Epidural Catheter* .................................................................................................................. 20
- Poster Review #1 ................................................................................................................................ 21
- Hands-on Airway Workshop ............................................................................................................ 24
- Refresher Course Lectures ............................................................................................................... 38
  
  *Paternal Medications for Labor & Delivery*
  *Reimbursement Options in Obstetric Anesthesia*

**Friday at a Glance**

- Zuspan Papers .................................................................................................................................. 53
- What’s New in Neonatology: Vignettes in Neonatal Resuscitation ................................................. 54
- What’s New in Obstetrics? .................................................................................................................. 60
- Poster Review #2 ............................................................................................................................... 65

**Saturday at a Glance**

- Multidisciplinary Obstetric Simulated Emergency Scenarios (MOSES) ......................................... 69
- Research Works in Progress ............................................................................................................. 72
- Clinical Forum: *Scripted Cases of Parturients with Cardiovascular Disorders* ............................ 73
- ASA Presidential Address .................................................................................................................. 85
- Debate No. 2: *Failed Epidural for Urgent C/S: Spinal is Preferable to General Anesthesia* .......... 86
- Poster Review #3 ................................................................................................................................ 87
- Gerard W. Ostheimer: *What’s New in Obstetric Anesthesia Lecture* ........................................... 89

**Sunday at a Glance**

- Breakfast with the Experts ................................................................................................................ 145
- Fred Hehre Lecture ............................................................................................................................ 147
- Oral Presentations #2 ....................................................................................................................... 159
- Oral Presentations — Best Paper of the Meeting Award ................................................................. 160

Exhibitors - Product Description ....................................................................................................... 161
2002 Distinguished Service Award

Founders of the Society for Obstetric Anesthesia & Perinatology

Robert O. Bauer, MD *
Richard B. Clark, MD
James O. Elam, MD*
James A. Evans, MD*
Robert F. Hustead, MD
Bradley E. Smith, MD

* deceased
VERIFICATION OF PARTICIPATION
34th Annual Meeting
May 1-5, 2002 • Hilton Head Island, South Carolina

Return to: SOAP, PO Box 11086, Richmond, VA 23230-1086 or fax to (804) 282-0090.
Forms MUST be returned no later than July 5, 2002 to receive a CME certificate for this educational offering.

The Society for Obstetric Anesthesia & Perinatology (SOAP) maintains records of learner participation for six years. To enable SOAP to maintain accurate records of your participation and TO RECEIVE YOUR CME CERTIFICATE, you must complete, sign and return this form to the SOAP’s headquarters office. Your certificate of participation will be mailed to you within 4-6 weeks.

SOAP designates this educational activity for up to 25 hours in category I credit toward the AMA Physician’s Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

PLEASE PRINT CLEARLY AND COMPLETE ALL SECTIONS

Last Name: ___________ ___________ ___________ ___________ ___________ ___________ ___________ ___________ ___________ 
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I wish to claim the following number of credits for the above-captioned SOAP meeting: [ ]

I certify that I am claiming the number of hours I actually spent in the educational activity.

Signature of Attendee __________________________ Date __________

From the Physician’s Recognition Award Information Booklet for CME Providers

“Certificates for AMA PRA category I credit should only be given to physicians. Certificates should be provided after physicians complete the educational activity so they can document participation. Certificates should only be given for the actual credit claimed and earned by the physician.”
Abstract Presentor Disclosures

1. No relationship w/commercial supporters
2. Research Support
3. Speaker's Bureau
4. Consultant
5. Shareholder (Directly Purchased)
6. Other Financial Support
7. Large Gift(s)
8. Did not receive disclosure information prior to printing. Disclosure will occur prior to presentation.
9. Unless otherwise indicated all faculty will comply with Trade/Unlabeled Use of products policy in their presentation

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General Information

Hotel Information
The Hilton Head Island Marriott Beach and Golf Resort, a natural splendor of Hilton Head Island, South Carolina, is located in Palmetto Dunes, a premier oceanfront destination. The resort is 10 minutes from the Hilton Head Island Airport and 45 minutes from the Savannah International Airport. SOAP will be one of the first groups to stay in this multi-million dollar renovated premier resort. Beautiful ocean and island views are available from private terraces outside each guest room. You'll discover uncounted ways to enjoy the sun, basking beside the oceanfront Olympic size pool, strolling along nine miles of golden sand, or enjoy tee for two on one of the six world-class 18-hole championship golf courses. When the business day is done, you can enjoy an invigorating match at a world-class tennis facility or visit the Spa, a fully equipped health club, complete with indoor heated pool, whirlpools, sauna and massage therapist. You can sightsee in near-by Shelter Cove or Harbour Town before dining in one of four elegant restaurants. Discover the perfect blend of experienced service and resort ambiance as only Marriott can deliver!

SOAP Dine-Around (Thursday, 6:00 pm)
Menus, sign-up sheets along with transportation options will be available on site.

Fun Run/Walk - Sea Pines Forest Preserve (Friday, 1:30 pm)
Transportation will be provided from the Marriott to the natural preserve in Sea Pines Plantation for a 5K Fun Run. The 605-acre Sea Pines Forest Preserve has approximately 8 miles of trails that follow antebellum rice dikes from the 1840s and old logging trails from the 1950s. Supported by a grant from B. Braun.

SOAP Tennis Tournament (Friday, 1:45-5:15 pm)
SOAP will host a tennis tournament Friday afternoon at the Palmetto Dunes Tennis center. The format will be a mixed doubles round robin.

SOAP Golf Tournament — Golden Bear Golf Club (Friday, 1:00-6:00 pm)
Created by the Jack Nicklaus' design team, the Golden Bear Golf Club is an excellent example of Hilton Head Island golf. Created on a fairly flat terrain, with little natural mounding, the Nicklaus Architectural group relied primarily on ponds, marsh and the forest to carve a challenging, yet fair test of golf. Golden Bear is highly-regarded by, and a local favorite of the golf community on Hilton Head Island. The course reaches just over 7,000 yards at the tips, but most visitors will have plenty of challenges at either 6,643 or 6,184 yards.

SOAP Banquet/Beach Music Party (Friday, 6:30)
Our annual banquet theme is “Beach Music Party”, which will be held at the Hilton Head Island Marriott Beach & Golf Resort. Highlights of the Party will include a live band, “Sterlin Colvin and the Improv” who, along with a couple instructors will have everyone “shagging” a popular dance indigenous to the Carolinas and Virginia. So get out your casual beach wear and enjoy a night of Hilton Head Island hospitality, casual dinner, dancing and merriment. Advance registration necessary.

Sunset Sailing (Saturday, 5:30 pm)
Enjoy sunset sailing on America's Cup Racer, “Stars and Stripes” and “Pau Hana” Catamaran. Cocktails and hors d'oeuvres will be served. Seating is extremely limited (US Coast Guard Regulations). Sign-up will be at the Baxter booth on Thursday morning on a first-come, first-serve basis. If you are interested, please email <shane_montgomery@baxter.com>, however, sign-up will only be on-site. Please wear non-marking soft shoes and bring a light jacket. Those on Stars and Stripes should be prepared to get a little wet. For liability/safety issues, sorry no children are allowed. Supported by Baxter.

Tours, Shopping, Sea Kayaking, Bike Rentals, etc.
Deep sea fishing, parasailing, sunset sails and dolphin cruises are favorites, in addition to plenty of outlet and boutique shopping. Please contact the hotel concierge directly at 843-842-8000 for assistance in planning your extra-curricular activities.
Scientific Program

Wednesday, May 1, 2002

8:00 am - 2:00 pm
Executive Committee / Board of Directors Meeting

2:00 - 6:00 pm
Committee Meetings

2:00 - 6:00 pm
Registration

2:00 - 6:00 pm
Poster Mounting (Both Sessions)

3:00 - 6:00 pm
Neonatal Resuscitation Course (Limited Registration - By Ticket Only)
Coordinator: Medge Owen, MD; Lauri P. Cox, RN, BSN, IBLLI; Debbie Ward Gordon, RN, MSN

6:00 - 8:00 pm
Wine/Cheese Reception - (Hilton Head Island Marriott)

Thursday, May 2, 2002

7:00 am
Registration

7:00 - 7:45 am
Breakfast with Exhibitors & Posters

7:45 - 8:00 am
Opening Remarks & Welcome
Joy L. Hawkins, MD; Gary M.S. Vasdev, MD

8:00 - 9:30 am
Gertie Marx Symposium - Joy L. Hawkins, MD (Moderator)

9:30 - 9:45 am
Distinguished Service Award Presentation
Valerie A. Arkoosh, MD

9:45 - 10:15 am
Break with Exhibitors & Posters

10:15 am - 11:15 am
Oral Presentations #1
Moderator: Christopher James, MD

11:15 - 12:15 pm
Anesthesiologists May Leave the Hospital When a Patient Has an Indwelling Epidural Catheter
Moderator: Kathryn J. Zuspan, MD
PRO: Gerald A. Burger, MD
CON: Theodore G. Cheek, MD

12:15 - 1:15 pm
Lunch with Exhibitors and Posters

1:15 - 2:15 pm
Poster Review #1
Introduction: Valerie A. Arkoosh, MD
Moderator: Yaakov Bellin, MD

2:15 - 2:30 pm
Break with Exhibitors and Posters

2:30 - 4:00 pm
"Hands on" Airway Workshop
(Limited Registration - By Ticket Only)
Group 1
Group 2
Coordinators: Barry Harrison, MD; Gerard S. Kamath, MD

2:30 - 3:30 pm
Parenteral Medications for Labor & Delivery
David C. Campbell, MD, MSc, FRCPCH

4:00 - 5:00 pm
Covering Labor & Delivery in a Community Hospital
Patricia A. Dailey, MD

6:00 pm
SOAP Dine Around (sign-up on site)
Scientific Program

Friday, May 3, 2002

6:30 am  Registration
7:00 - 8:00 am  Breakfast with Exhibitors & Posters
8:00 - 9:00 am  The Zuspan Award by Perinatal Resources Inc

Moderator/Judge: David J. Birnbach, MD
Judges: David H. Chestnut, MD; Michael Greene, MD; Anne May, MBBS, FRCA; Alan C. Santos, MD; Stephen H. Halpern, MD; Susan K. Palmer, MD

9:00 - 10:00 am  What's New in Neonatology: Vignettes in Neonatal Resuscitation
   Introduction: Gary M.S. Vasey, MD; Presenter: Robert Chantigian, MD

10:00 - 10:10 am  Presentation of the Zuspan Award by Perinatal Resources, Inc
   Frederick P. Zuspan, MD;

10:10 - 10:30 am  Break with Exhibitors & Posters

10:30 - 11:30 am  What's New in Obstetrics?
   Introduction: Joy L. Hawkins, MD; Presenter: Michael Greene, MD

11:30 am - 12:30 pm  Poster Review #2
   Moderator: Robert R. Gaiser, MD

1:30 pm  Fun Run/Walk, Tennis Tournament, and Golf Tournament (12:45 pm)

6:30 pm  Banquet — Beach Music Party (Hilton Head Island Marriott)

Saturday, May 4, 2002

6:30 am  Registration
7:00 - 8:00 am  Breakfast with Exhibitors & Posters
7:00 - 8:00 am  Multidisciplinary Obstetric Simulated Emergency Scenarios (MOSES)
   (Limited Registration - By Ticket Only)
   Christopher Sadler, PhD, MBBS, FRCA; Mira Razzaque, MD

8:00 - 9:30 am  Clinical Forum: Scripted Cases of Parturients with Cardiovascular Disorders
   Moderators: Carole Warnes, MD; Kirk Ramin, MD; William R. Camann, MD

9:30 - 10:00 am  Break with Exhibitors & Posters

10:00 - 11:00 am  ASA Presidential Address
   Barry Glazer, MD

11:00 am - 12:00 n  Debate No. 2
   Failed Epidural for Urgent C/S: Spinal is Preferable to General Anesthesia
   Moderator: Andrew M. Malinow, MD
   PRO: David R. Gambling, MBBS
   CON: M. Joanne Douglas, MD, FRCPC

12:00 - 1:00 pm  Lunch

1:00 - 2:00 pm  Poster Review #3
   Introduction: Alan C. Santos, MD; Moderator: Holly Muir, MD, FRCPC

2:00 - 3:00 pm  Gerard W. Ostheimer Anesthesia Lecture: What's New in Obstetric Anesthesia?
   Introduction: Alan C. Santos, MD; Presenter: David H. Wlody, MD

3:00 - 3:30 pm  Break with Exhibitors & Posters

3:30 - 5:00 pm  Business Meeting

5:30 pm  Sunset Sailing (Limited Space, Ticket Only)
Scientific Program

Sunday, May 5, 2002

6:30 am  Registration
7:00 - 8:00 am  Breakfast with the Experts (Limited Registration - By Ticket Only)
1. Post-partum Analgesia - Alison J. MacArther, MD
2. Continuous Spinal Analgesia - Craig M. Palmer, MD
3. Labor Analgesia with Limited Staffing Resources - Richard N. Wissler, MD
4. International OB Anesthesia Education Opportunities - Medge Owen, MD; Sukran Sahin, MD
5. Fine Tuning Your CSE - Craig Leicht, MD, MPH
6. Answering Big Questions in Obstetric Anesthesia Research - B. Scott Segal, MD; Richard M. Smiley, MD, PhD
7. Ambulation after Labor Regional Anesthesia - Roshan Fernando, MBBS, FRCA
8. Fetal Distress and Unable to Intubate. What Next? - Maya Suresh, MD
9. The Morbidly Obese Preeclamptic Parturient - Sumedha Panchal, MD
10. Post Partum Tubal Ligation - Brenda A. Bucklin, MD
11. Billing - James P. McMichael, MD
13. Obstetrics and Family Medicine Issues in Labor and Delivery - Keith Johansen, MD; Thomas Kastner, DM; Walter Franz, MD
14. Is OB Anesthesia More LIABLE for Litigation than Other Subspecialties - Mathew Kumar, MD, JD
15. Post Dural Puncture Headache - Anil Soni, MD; Mukesh Sarna, MD
16. Legislative Issues - Andrew P. Harris, MD, MHS
17. PCEA Should Always Be Used in Preference to Continuous Epidural Infusion Analgesia in Labor - Michael J. Paech, FANZCA
18. Anesthesia for Placenta Acerra - Alex F. Pue, MD

8:15 - 9:15 am  Fred Hehre Lecture
David M. Dewan, MD

9:15 - 10:15 am  Oral Presentations #2
Moderator: Cynthia A. Wong, MD

10:15 - 10:45 am  Coffee Break

10:45 - 11:45 am  Oral Presentations — Best Paper of the Meeting Award
Moderator/Judge: Michael J. Paech, FANZCA
Judges: Sivam Ramanathan, MD; Edward T. Riley, MD; Scott Segal, MD

11:45 am - 12:00 n  Best Paper of the Meeting Award / Adjournment
Moderators: Joy L. Hawkins, MD; Gary M.S. Vasdev, MD

2002 Annual Meeting Elections
During the annual business meeting in Hilton Head, South Carolina, members will elect a Second Vice President, Secretary, Director at Large, 2006 Meeting Host and an Alternate Representative for the ASA House of Delegates.
Poster Exhibits

P-16 LEG Tourniquets to Sequester Blood During C/S in a Jehovah's Witness with Twins and Placenta Previa
Eason, D.; Palmer, S.K.

P-17 Anesthetic Management of Th Exit (Ex Utero Intrapartum Treatment) Procedure Utilizing Sevoflurane
Eilk, S.A.; Hoyt, M.

P-18 Pregnancy Complicated by Hepatocellular Carcinoma
Shih, G.; Forster, J.; Myers, S.

P-19 Oral Jewelry in the Parturient: A New Concern for the Anesthesiologist
Kuczkowski, K.M.; Benumof, J.L.

P-20 Once a Post-Dural Puncture Headache Patient, Always Post-Dural Puncture Headache Patient
Kuczkowski, K.M.; Benumof, J.L.

P-21 Another Rebound Phenomenon: Hyperkalemia After Cessation of Tocolytic Therapy
Kuczkowski, K.M.; Benumof, J.L.

P-22 Combined Spinal Epidural Anesthesia: A New Anesthetic Option for Repeat Cesarean Section in a Morbidly Obese Parturient
Kuczkowski, K.M.; Benumof, J.L.

P-23 Amphetamine Abuse in Pregnancy: Anesthetic Implications
Kuczkowski, K.M.; Benumof, J.L.

P-24 Anesthetic Considerations for Intra-Abdominal Pregnancy
Coyne, J.T.; Mitchell, J.Z.

P-25 Continuous Spinal Anesthesia for Cesarean Section in a Morbidly Obese Patient with Multiple Sclerosis
Wilson, D.C.; Goodman, S.R.; Ciliberto, C.F.; Smiley, R.M.

P-26 Intra-Operative Myocardial Infarction in a Parturient: Anesthetic Implications
Costello, J.W.; Greenberg, M.; Kuczkowski, K.M.

P-27 Anesthetic Considerations in a Parturient with Mitral Valve Atresia and Single Ven-tricle Physiology
Haret, D.M.; Fragneto, R.

P-28 Bradycardia/Asystole After Low Dose CSE Labor Analgesia - Is It Bezold-Jarisch Reflex? A Case Discussion of Etiology & Management
Pan, P.H.; Moore, C.H.

P-29 Amniotic Fluid Embolism in a Parturient with an Undiagnosed Pheochromocytoma
Arisa, E.M.; DeSimone, C.A.; Eberle, R.L.

P-30 Atypical Sensory Neurologic Change Associated with Post-Dural Puncture Headache in a Parturient: A Unique Case of Lhermitte's Sign

P-31 Case Report - sole Combined Spinal Epidural for Cesarean Section and Hemicolectomy
Dadarkar, P.; Vasdev, G.M.

P-32 Anesthetic Management of a Ventilator-Dependent Parturient with the King-Denborough Syndrome
Habib, A.S.; Millar, S.; Muir, H.A.

P-33 Anesthesia for Cesarean Section in a Patient with Spinal Muscular Atrophy

P-34 Anesthetic Management for Delivery for a Parturient with May-Hegglin Anomaly: A Case Report
Calimara, A.L.; Wong, C.A.
Scientific Program

Wednesday, May 1, 2002

8:00 am - 2:00 pm  Executive Committee / Board of Directors Meeting
2:00 - 6:00 pm  Committee Meetings
2:00 - 6:00 pm  Registration
2:00 - 6:00 pm  Poster Mounting (Both Sessions)
3:00 - 6:00 pm  Neonatal Resuscitation Course (Limited Registration - By Ticket Only)
                Coordinator: Midge Owen, MD; Lauri P. Cox, RN, BSN; Debbie Ward Gordon, RN, MSN
6:00 - 8:00 pm  Wine/Cheese Reception - (Hilton Head Island Marriott)

Thursday, May 2, 2002

7:00 am  Registration
7:00 - 7:45 am  Breakfast with Exhibitors & Posters
7:45 - 8:00 am  Opening Remarks & Welcome
                Joy L. Hawkins, MD; Gary M.S. Vasdev, MD
8:00 - 9:30 am  Gertie Marx Symposium - Joy L. Hawkins, MD (Moderator)
                Judges: Gertie F. Marx, MD; GM Bassell, MD; Geraldine O'Sullivan, FRCA;
                Robert D'Angelo, MD; Donald H. Penning, MD, MSc, FRCPC; David H. Chestnut, MD;
                Joy L. Hawkins, MD
9:30 - 9:45 am  Distinguished Service Award Presentation
                Valerie A. Arkoosh, MD
9:45 - 10:15 am  Break with Exhibitors & Posters
10:15 am - 11:15 am  Oral Presentations #1
                Moderator: Christopher James, MD
11:15 am - 12:15 pm  Debate No. 1
                Anesthesiologists May Leave the Hospital When a Patient Has an Indwelling Epidural Catheter
                Moderator: Kathryn J. Zuspan, MD
                PRO: Gerald A. Burger, MD
                CON: Theodore G. Cheek, MD
12:15 - 1:15 pm  Lunch with Exhibitors and Posters
1:15 - 2:15 pm  Poster Review #1
                Introduction: Valerie A. Arkoosh, MD
                Moderator: Yaakov Beilin, MD
2:15 - 2:30 pm  Break with Exhibitors and Posters

"Hands on" Airway Workshop
                (Limited Registration - By Ticket Only)
2:30 - 4:00 pm  Group 1
4:15 - 5:45 pm  Group 2
                Coordinators: Barry Harrison, MD; Gerard S. Kamath, MD

2:30 - 3:30 pm  Parenteral Medications for Labor & Delivery
                David C. Campbell, MD, MSc, FRCPC

4:00 - 5:00 pm  Covering Labor & Delivery in a Community Hospital
                Patricia A. Dailey, MD
Neonatal Resuscitation

Coordinator: Medge Owen, MD; Lauri P. Cox, RN, BSN;
Debbie Ward Gordon, RN, MSN

3:00 - 6:00 pm

Course material will be distributed at the beginning of the session.

In this course, the participant will be trained in neonatal resuscitation.
Following examination, the participant will be certified by the American Academy of Pediatrics.
Gertie Marx Symposium

Judges: Gertie F. Marx, MD; GM Bassell, MD; Geraldine O'Sullivan, FRCA; Robert D’Angelo, MD; Donald H. Penning, MD, MSc, FRCPC; David H. Chestnut, MD; Joy L. Hawkins, MD

8:00 - 9:30 am

GM-1 THE EFFECT OF OVARIAN HORMONES ON ISOFLURANE HYPERALGESIA
Flood, P.; Daniels, D.

GM-2 PEAK POINT CORRELATION DIMENSION: A NOVEL PREDICTOR OF ADVERSE HEMODYNAMIC RESPONSE TO SPINAL ANESTHESIA.

GM-3 EFFECT OF EPIDURAL TEST DOSE ON AMBULATION AFTER A COMBINED SPINAL EPIDURAL TECHNIQUE FOR LABOR ANALGESIA
Calimaran, A.L.; Strauss-Hoder, T.P.; McCarthy, R.J.; Wong, C.A.

GM-4 PLATELET COUNT & PLATELET FUNCTION: AN IN VITRO MODEL FOR PRODUCING WHOLE BLOOD WITH LOW PLATELET COUNTS
Patel, N.; Fernando, R.; Riddell, A.; Brown, S.

GM-5 EARLY LABOR IS MORE PAINFUL IN PARTURIENTS WHO EVENTUALLY DELIVER BY CESAREAN SECTION FOR DYSTOPIA
Panni, M.K.; Spiegel, J.; Segal, S.

GM-6 THE IMPORTANCE OF METHODOLOGICAL VARIABLES IN THE STUDY OF HYPOTENSION AFTER SPINAL ANESTHESIA FOR CESAREAN SECTION: PENTASTARCH VS. NORMAL SALINE
Bach, P.S.; Kamani, A.A.; Douglas, J.M.; Gunka, V.; Esler, M.

All Abstracts listed on this page are in the Anesthesiology Supplement.
Oral Presentations #1

Moderator: Christopher James, MD

10:15 - 11:15 am

BP-4 SPECTRAL ECG ANALYSIS PREDICTS LABOR OUTCOME IN NULLIPAROUS INDUCED-LABOR PATIENTS
Leighton, B.L.; DiMaria, L.J.; Whittaker, M.S.; Malhotra, S.; Kligfield, P.D.

O1-2 HERPES SIMPLEX LABIALIS REACTIVATION WITH INTRATHecal MORPHINE IN SEROPositIVe PARTURIENTS
Shannon, K.T.; Ramanathan, S.

O1-3 LEVOBUPIVACAINE IS UNRELIABLE FOR USE AS A SPINAL TEST DOSE.
Owen, M.D.; Hood, D.D.

O1-4 INTRATHecal FENTANYL AS AN ADJUNCT TO BUPIVACAINE/MORPHINE SPINAL ANESTHESIA FOR CESAREAN SECTION
Velickovic, I.A.; Leicht, C.H.

All Abstracts listed on this page are in the Anesthesiology Supplement.
Debate No. 1

Anesthesiologists May Leave the Hospital When a Patient Has an Indwelling Epidural Catheter

Moderator: Katheryn J. Zuspan, MD
PRO: Gerald A. Burger, MD
CON: Theodore G. Cheek, MD

1:00 - 2:00 pm

Supporting manuscripts will be available online after the meeting.

Following this debate, the participants will be able to outline the medical, medicolegal and administrative issues involved in the decision to leave the hospital when a parturient has an indwelling epidural catheter for labor analgesia.
Poster Review #1
Moderator: Yaakov Beilin, MD

1:15 - 2:150 pm

P-35 RELATIVE MOTOR BLOCKING POTENCIES OF BUPIVACAINE AND LEVO-BUPIVACAINE IN LABOUR
Lacassie, H.J; Columb, M.O.

P-36 DO DIFFICULT EPIDURAL PLACEMENTS OR INEXPERIENCED STAFF CAUSE MORE LOW BACK PAIN ON
DAY ONE POSTPARTUM?
Goodman, E.J; Dumas, S.D.; Lilly, M.H.

P-37 PATIENT CONTROLLED ANALGESIA USING FENTANYL FOR SECOND TRIMESTER LABOR ANALGESIA.
VARYING BOLUS DOSE AND LOCKOUT INTERVAL
Castro, C.; Tharmaratnam, U.; Tam, K.; Brockhurst, N.; Tureanu, L.; Windrim, R.; Mowbray, M.

P-38 THE EFFECTS OF LOW-DOSE EPIDURAL TECHNIQUE FOR LABOR ANALGESIA ON FETAL HEART RATE
(FHR)
Hill, J.; Alexander, J.M.; Sharma, S.K.; McIntire, D.D.; Leveno, K.J.

P-39 EPIDURAL ROPIVACAINE VS BUPIVACAINE FOR LABOR: A META-ANALYSIS
Halpern, S.; Walsh, V.; Joseph, G.

P-40 EPIDURAL ANALGESIA LENGTHENS THE FREIDMAN ACTIVE PHASE OF LABOR
Alexander, J.M.; Sharma, S.K.; McEntire, D.D.; Leveno, K.J.

P-41 Influence of Height, Weight and Patient Position on Sensory Level After Intrathecal Labor Analgesia with a Hypobaric Solution
Wong, C.A.; Johnson, E.; Strauss-Hoder, T.P.; Caras, D.F.; McCarthy, R.J.

P-42 ASSESSING THE OUTCOME OF A TEST DOSE
Dalai, P.; Gertenbach, K.; Harker, H.; O'Sullivan, G.; Reynolds, E.

P-43 FETAL HEART RATE AND UTERINE CONTRACTION PATTERN ABNORMALITIES AFTER COMBINED
SPINAL/EPIDURAL VS. SYSTEMIC LABOR ANALGESIA

P-44 THE INFLUENCE OF CONTINUOUS LABOR SUPPORT ON THE CHOICE OF ANALGESIA,AMBULATION AND
OBSTETRIC OUTCOME

P-45 DOES PLACENTAL LOCATION AND/OR FETAL POSITION LEAD TO PROLONGED FETAL DECELERATIONS
FOLLOWING LABOR ANALGESIA?

P-46 UNIPORT VS MULTIPORT EPIDURAL CATHETERS FOR LABOUR: A META-ANALYSIS
Strehnajak, M.; Halpern, S.

P-47 HOW LOW IS LOW-RISK: WHICH PARTURIENTS MAY NOT NEED AN IV
Hess, E.P.; Mann, S.; Pratt, S.D.

P-48 DOES TYPE OF LABOR ANALGESIA ALTER THE PATTERN OF OXYTOCIN USE?
Sullivan, J.T.; Scavone, B.M.; McCarthy, R.J.; Wong, C.A.

P-49 IS FETAL BRADYCARDIA FOLLOWING COMBINED SPINAL-EPIDURAL ANALGESIA DUE TO TETANIC
UTERINE CONTRACTIONS WITH DECREASED UTEROPLACENTAL PERFUSION?
Marenco, J.E.; Birnbach, D.J.; O'Gorman, D.A.; Browne, I.M.; Stein, D.J.; Santos, A.C.

P-50 MINI-DOSE INTRATHECAL MORPHINE REDUCES ANALGESIC REQUIREMENTS WITHOUT INCREASING
SIDE EFFECTS

All Abstracts listed on this page are in the Anesthesiology Supplement.
Poster Review #1

P-51 POOLED ANALYSIS OF RANDOMIZED TRIALS OF EPIDURAL VS. OPIOID ANALGESIA ON THE RISK OF CESAREAN SECTION
Segal, S.; Su, M.

P-52 EFFECT OF LOW DOSE MOBILE VERSUS HIGH DOSE EPIDURAL TECHNIQUES ON THE PROGRESS OF LABOR: META-ANALYSIS
Angle, P.; Halpern, S.; Morgan, A.

P-53 INITIATION OF LABOR ANALGESIA WITH EPIDURAL BUPIVACAINE: EFFECT OF PARITY

P-54 COMPARISON OF THE MINIMUM LOCAL ANALGESIC CONCENTRATIONS OF BUPIVACAINE FOR NULLIPAROUS AND MULTIPAROUS WOMEN IN LABOR
Polley, L.S.; Columb, M.O.; Naughton, N.N.; Wagner, D.S.

P-55 PREGNANCY WEIGHT GAIN AND LABOR OUTCOME
Romeo, R.C.; Ramanathan, S.

P-56 EPIDURAL-PCA FOR LABOR PAIN: DO MULTIPARAE REQUIRE LESS EPIDURAL MEDICATIONS THAN PRIMIPARAE?

P-57 HISTORICAL PERSPECTIVE OF RECTAL ANALGESIA FOR LABOR AND DELIVERY
Tungpalan, I.A.; Mergens, P.A.; Caswell, R.E.; Vasdev, G.M.

P-58 TEMPERATURE OF SUFENTANIL INTRATHecal INJECTATE AFFECTS SPINAL LABOR ANALGESIA
Zhu, H.; Grodecki, V.; Huffnagle, S.; Huffnagle, J.; Audu, P.

P-59 ANESTHESIOLOGIST INTERVENTION RATE AND EFFICACY OF PARTURIENT-CONTROLLED EPIDURAL ANALGESIA (PCEA) – EFFECT OF INCREASING CONCENTRATION OF BOLUS SOLUTION USING 0.0625% BUPIVACAINE + 0.0002% FENTANYL BACKGROUND INFUSION
Eister, M.D.; Kliffer, P.; Money, P.; Douglas, J.

P-60 HOW MOBILE DO MOBILE EPIDURALS NEED TO BE?
Pharmal, S.

P-61 A PROSPECTIVE RANDOMIZED DOUBLE-BLIND COMPARISON OF OBSTETRIC OUTCOME AFTER LABOR EPIDURAL ANALGESIA USING LOW CONCENTRATION ROPIVACAINE OR BUPIVACAINE INFUSIONS WITH FENTANYL
Lee, B.B.; Ngan Kee, W.D.

P-62 EPIDURAL FENTANYL INFUSIONS IN THE PRESENCE OF LOCAL ANESTHETICS EXERT SEGMENTAL ANALGESIA: AN MLAC INFUSION STUDY IN NULLIPAROUS LABOR
Ginosar, Y.; Columb, M.; Cohen, S.; Mirikitani, E.; Tingle, M.S.; Ratner, E.F.; Riley, E.T.

All Abstracts listed on this page are in the Anesthesiology Supplement.
Poster Review #1

P-95
IS PERIODONTITIS ASSOCIATED WITH PRETERM LABOR, PRETERM LOW BIRTH WEIGHT, AND PREEC-
LEAMPSIA?
Vallejos M.C.; Daftary, A.; Riegel, A.R.; Phelps, A.L.; Kaul, B.; Mandell, G.L.; Ramanathan, S.

P-96
ASA PHYSICAL STATUS CLASSIFICATION - A PREGNANT PAUSE

P-97
ECV FACILITATION BY ANESTHESIA FOR BREECH PRESENTATION - A QUANTITATIVE SYSTEMATIC
REVIEW
Gagnon, S.; Turcu, L.M.; Macarthur, A.J.

P-98
META ANALYSTS CHALLENGE THE PUERPERAL PREDICTIONS OF MALLAMPATI ADVOCATES
Glassenberg, R.; Fredericksen, M.

P-99
EXPECTANT MANAGEMENT, POSTDURAL PUNCTURE HEADACHE AND LENGTH OF HOSPITAL STAY
Angle, P.; Tang, S.; Thompson, D.; Szalai, J.P.

P-100
INCIDENCE OF POST-DURAL PUNCTURE HEADACHE AND EPIDURAL BLOOD PATCH FOLLOWING DURAL
PUNCTURE WITH EPIDURAL NEEDLE IN 15,411 OBSTETRIC PATIENTS IN A LARGE, TERTIARY CARE
TEACHING HOSPITAL
Toyama, T.M.; Ranasinghe, J.S.; Siddiqui, M.N.; Steadman, J.L.; Lai, M.

P-101
A COMPARISON OF THE USE OF ATRAUMATIC SPINAL NEEDLES BETWEEN ANESTHESIOLOGY AND
EMERGENCY MEDICINE TRAINING PROGRAMS
Kerimoglu, B.; Birnback, D.J.; Marenco, J.E.; Stein, D.J.

P-102
EXPANDED ANTIGEN-MATCHING FOR ERYTHROCYTE TRANSFUSION OF WOMEN WITH SICKLE CELL
DISEASE DURING PREGNANCY REDUCES TRANSFUSION-RELATED ALLOIMMUNIZATION
Ramsey, P.S.; Winkler, D.D.; Rouse, D.J.

P-103
SUPINE POSITION DURATION FOLLOWING AN EPIDURAL BLOOD PATCH

P-104
ANESTHESIA FOR EGG RETRIEVAL IN JAPAN: THE FIRST NATIONWIDE SURVEY
Terui, K.; Taya, J.; Ishihara, O.; Takeda, S.; Kinoshita, K.

P-105
DECREASE IN THE INCIDENCE OF POST DURAL PUNCTURE HEADACHE: LONG TERM PLUGGING OF THE
DURAL HOLE WITH THE EPIDURAL CATHETER
Kuczkowski, K.M.; Benumof, J.L.

P-106
DOES THE TIME OF THE DAY AFFECT OBSTETRIC ANESTHESIA WORKLOAD?
Vogel, T.M.; Ramanathan, S.

P-107
COSYNTROPIN FOR THE TREATMENT OF POSTDURAL PUNCTURE HEADACHE

P-108
AMBULATORY GYNECOLOGICAL PROCEDURES OF CERVIX AND UTERUS CAN BE DONE SAFELY WITH
MINIDOSE LIDOCAINE AND FENTANYL
Steadman, J.L.; Siddiqui, M.N.; Ranasinghe, J.S.; Toyama, T.; Melgen, J.; Lai, M.

All Abstracts listed on this page are in the Anesthesiology Supplement.
“Hands on” Airway Workshop

Session 1: 2:30 - 4:00 pm
Session 2: 4:15 - 5:45 pm

Coordinators: Barry Harrison, MD; Gerard S. Kamath, MD

Following this course, the participant will be familiar with the use of equipment for difficult airways. Participants will utilize mannequins and simulated surgical airways with these devices.
Management of the Difficult Airway in Obstetrics:
- Brief Overview of Workshop Aims and Objectives

BA Harrison, MD; GS Kamath, MD;
Mayo Medical Center, Rochester, MN

Regional Anesthesia has largely supplanted general anesthesia in the management of the obstetric patient requiring surgical intervention. However, general endotracheal anesthesia is required in a variety of situations.

- Acute fetal distress.
- Maternal bleeding emergencies with hemodynamic instability.
- Failure of regional anesthesia.
- Refusal of regional anesthesia
- Other contraindications to regional anesthetic

Endotracheal intubation may also be required emergently in the eclamptic mother or following high spinal anesthesia or local anesthetic toxicity.

Epidemiology of the obstetric difficult airway.

<table>
<thead>
<tr>
<th>Study</th>
<th>Intubation Measurement</th>
<th>Obstetric Incidence</th>
<th>General Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cormack and Lehane</td>
<td>Difficult: Mallampati grade III</td>
<td>1:2000</td>
<td></td>
</tr>
<tr>
<td>Yeo and Thomas</td>
<td>Difficult: Laryngoscopy grade</td>
<td>1:46 (2.1%)</td>
<td>1:50 (2.0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gynecologic 1:56 (1.8%)</td>
<td></td>
</tr>
<tr>
<td>Lyons and MacDonald</td>
<td>Failed</td>
<td>1:294 (0.34%)</td>
<td>1:2330</td>
</tr>
<tr>
<td>Sampson and Young</td>
<td>Failed</td>
<td>1:283 (0.35%)</td>
<td></td>
</tr>
<tr>
<td>Rocke, Murray, Rout et al</td>
<td>Failed</td>
<td>1:750 (0.13%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prospective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benumof</td>
<td>Cannot ventilate cannot intubate</td>
<td></td>
<td>0.00-1% to 0.02%</td>
</tr>
</tbody>
</table>

Several studies have suggested that difficulties in airway management are more frequent in obstetric anesthesia than in the general surgical population due to a combination of anatomical and physiological changes. In addition, the risk of aspiration exists with every parturient because of higher gastric volumes, increased gastric acidity, and altered upper and lower esophageal sphincter competencies. Several factors make management of the difficult airway altogether more challenging in obstetrics than in other surgical situations:

- Fetal priorities may preclude attention to complete airway assessment of the mother.
- Frequently, this makes the option of waking the mother one that may severely compromise fetal outcome.
- Injudicious and frequent attempts at intubation increase incrementally the risk of aspiration and airway trauma. The resultant edema and bleeding may make previously possible mask intubation difficult and even impossible.
- The parturient has a lower oxygen reserve ($\downarrow$ FRC) and a rate of $O_2$ utilization that can be up to twice that of the non-pregnant individual.

The consequences of failure to maintain ventilation and oxygenation, therefore, result in more disastrous outcomes more readily.

Airway management in obstetrics is also more challenging for a variety of factors other than those already enumerated:

- The Obstetric Suite and OR’s are frequently physically removed from the general OR’s. This makes rapid access to skilled help and technical assistance more challenging.
- As these are frequently emergencies, they occur at least as often “after hours” when additional assistance is unavailable.
- The full time obstetric anesthesiologist has fewer opportunities at “routine” endotracheal intubation than his “non-obstetric” colleagues.
The aim of this airway workshop is to familiarize the anesthesia practitioner with current techniques and equipment for the management of the difficult and failed intubation. It is hoped that the course participants will familiarize themselves with these techniques and have the equipment required readily available for their use in their practice.

It is beyond the scope of this outline to detail essentials like airway assessment. These are well-covered in standard resources. However, it is important to note that despite rigorous detail to airway assessment, some will prove unexpectedly difficult and some assessed difficult will prove to be easily managed.

The reasons that the predictive tests fail are:
1. The problem has a low prevalence.
2. The predictive tests are subject to observer variation.
3. They require patient cooperation.
4. They utilize absolute measurements across a varying patient population.
5. They measure “difficulty” which is hard to define. A prediction of failure is more appropriate, since difficulty can be managed by definition!

The following table indicates the sensitivity, specificity and positive predictive value of a variety of airway assessment tests and the definition of difficulty utilized in these studies.

Table II. Reported sensitivities, specificities and positive predictive values (PPVs) of various tests for predicting difficult tracheal intubation.

<table>
<thead>
<tr>
<th>Derivation studies* Reference</th>
<th>Sample to which the derived scoring system was applied</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>Definition of “difficulty”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Original sample</td>
<td>96%</td>
<td>82%</td>
<td>31%</td>
<td>C &amp; L 3-4</td>
</tr>
<tr>
<td>2</td>
<td>Original sample</td>
<td>-75%</td>
<td>-75%</td>
<td>&lt;20%</td>
<td>C &amp; L 34/4</td>
</tr>
<tr>
<td>3</td>
<td>Original sample</td>
<td>87%</td>
<td>96%</td>
<td>31%∞</td>
<td>Combination of view and no. of intubation attempts</td>
</tr>
<tr>
<td>4</td>
<td>New sample</td>
<td>&lt;92%</td>
<td>&lt;74%</td>
<td>&lt;15%</td>
<td>C &amp; L 3-4</td>
</tr>
<tr>
<td>5</td>
<td>New sample</td>
<td>&lt;94%</td>
<td>&lt;96%</td>
<td>37%</td>
<td>Intubation aid, e.g. bougie or different blade required</td>
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<tr>
<td>Validation Studies*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Thyromental distance</td>
<td>62%</td>
<td>25%</td>
<td>16%</td>
<td>C &amp; L 3-4</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>7-17%</td>
<td>99%</td>
<td>15-39%</td>
<td>C &amp; L 3-4/4</td>
</tr>
<tr>
<td>7, 8</td>
<td>Mallampati test (original)</td>
<td>65-91%</td>
<td>81-82%</td>
<td>8-15%</td>
<td>C &amp; L 3-4 or bougie required</td>
</tr>
<tr>
<td>6, 9</td>
<td>Mallampati test (modified)</td>
<td>42-56%</td>
<td>81-84%</td>
<td>4-21%</td>
<td>C &amp; L 3-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45-60%</td>
<td>87-89%</td>
<td>5-21%</td>
<td>C &amp; L 3-4/4</td>
</tr>
<tr>
<td>10</td>
<td>Mallampati test (modified)</td>
<td>68%</td>
<td>53%</td>
<td>2%</td>
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<tr>
<td>7, 8</td>
<td>Thyromental distance plus Mallampati test</td>
<td>65-81%</td>
<td>66-82%</td>
<td>8-9%</td>
<td>C &amp; L 3-4 or bougie required</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>81%</td>
<td>98%</td>
<td>64%</td>
<td>C &amp; L 3-4 pr bougie required</td>
</tr>
<tr>
<td>9, 10</td>
<td>Wilson score</td>
<td>42-55%</td>
<td>86-92%</td>
<td>6-9%</td>
<td>Epiglottis only visible/C &amp; L 3-4</td>
</tr>
<tr>
<td>8</td>
<td>Sternomental distance</td>
<td>82%</td>
<td>89%</td>
<td>27%</td>
<td>C &amp; L 3-4 or bougie required</td>
</tr>
<tr>
<td>2</td>
<td>Mouth opening</td>
<td>26-47%</td>
<td>94-95%</td>
<td>7-25%</td>
<td>C &amp; L 3-4/4</td>
</tr>
<tr>
<td>2</td>
<td>Neck movement</td>
<td>10-17%</td>
<td>98%</td>
<td>8-30%</td>
<td>C &amp; L 3-4/4</td>
</tr>
<tr>
<td>2</td>
<td>Jaw protrusion</td>
<td>17-26%</td>
<td>95-96%</td>
<td>5-21%</td>
<td>C &amp; L 3-4 or bougie required</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>29%</td>
<td>85%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Indirect laryngoscopy</td>
<td>69%</td>
<td>98%</td>
<td>31%</td>
<td>C &amp; L 3-4</td>
</tr>
</tbody>
</table>

*Derivation studies = features of patients measured and used to derive a test such as a scoring system; validation studies = predefined test(s) applied to a group of surgical patients in order to assess its (their) performance.

±Original sample = the one from which the scoring system was derived.

* C & L = Cormack & Lehane scoring system for laryngoscopy (16); grades 3 or 4 defined in the original reference as no part of the glottis visible.

Assuming an incidence of “difficulty” of 2%.
Illustration 1 indicates the rate of desaturation in various individuals without adequate ventilation. As indicated earlier, the parturient mother has a lower reserve and higher oxygen utilization. Fatal desaturation may thus occur before an intubating dose of succinylcholine wears off sufficiently to allow adequate spontaneous respiration to resume.

Airway Techniques

A. Visualization Decreases
   This workshop will emphasize techniques that allow direct ventilation of the airway and passage of the tube through the cords.
   1. Flexible fiberoptic bronchosopes
   2. Rigid fiberoptic devices

B. Rescue Ventilation
   1. Devices that allow "rescue" ventilation when two persons bag mask ventilation with oral and/or nasopharyngeal airways has failed.
   2. LMA
   3. Combitube
   Emphasize the role of the LMA "family" of devices (ILMA, LMA, Poro-Seal) as both ventilation devices and conduits that enable subsequent ET tube placement.

C. Surgical techniques, when the above fail:
   1. Cricothyroidotomy
   2. Jet ventilation
   3. Tracheostomy

For the purpose of completeness, other devices on the ASA algorithm will be demonstrated. (Retrograde intubation/light wand, etc)
Pathology and the difficult obstetric airway

The main disorder quoted extensively is difficult airway associated with pregnancy-induced hypertension. Several papers report case reports of pregnancy-induced hypertension and eclampsia with significant facial and laryngeal edema contributing to difficult endotracheal intubation. Although difficult, it was still possible to intubate using a small sized ETT. The suggestion is to have small sized endotracheal tubes available at the time of intubation. However, in their prospective study, Rooke et al. found that neither facial edema nor swollen tongue predicted difficult intubation. Other pregnancy related diagnosis related to hemorrhage and respiratory distress may indirectly contribute to the obstetric difficult airway.

With improved medical care, many patients with congenital abnormalities are now able to conceive and deliver babies. However, these congenital abnormalities may contribute to airway problems. It is also important to evaluate acquired medical diagnosis with respect to airway problems. Obesity and obstructive sleep apnea both contribute to the difficult obstetric airway.

Intubation In Obstetrics: There is no easy airway in obstetrics!

Indications: Apart from endotracheal intubation for elective cesarean section all intubations are emergencies. During emergency endotracheal intubation, corners may be cut, a full airway assessment may not be performed, inductions drugs, monitors and equipment may not have been checked and these items may not be readily available. Pre-existing and pregnancy related diagnoses, maternal hypovolemia, or coagulopathy may not be fully appreciated. Skilled help may also not be readily available. All these factors contribute to the emergency airway posing higher risk than the elective airway.

Common indications for endotracheal intubation are general anesthesia for cesarean section. However, a failed regional technique, high spinal or high epidural block, local anesthesia toxicity, cardiac arrest, respiratory and neurological emergencies may all result in the need for endotracheal intubation. Although much debate exists, fetal distress requiring cesarean section is probably the most common indication for endotracheal intubation and general anesthesia. The purported advantages include faster onset and less hemodynamic disturbance. However, studies comparing onset of anesthesia and fetal outcome judged by Apgar scores at 1 minute, neonatal blood gas analysis have demonstrated no difference between general anesthesia and regional anesthesia for fetal distress.

Obstetric Airway Assessment: An airway assessment is essential prior to all anesthesia and analgesia procedures on the labor floor. A complete assessment can be performed in approximately 1-2 minutes. Table 3 outlines an airway assessment. Some advocate that all patients on the labor floor should undergo an airway assessment examination on admission. A committee report of American College of Obstetrician and Gynecologists state that the obstetric care team should "be alert" for the general anesthesia risk factors, specialist consultation obtained and consideration given for the planned placement of an epidural catheter in early labor.

Table 3. Essentials of airway assessment

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<tbody>
<tr>
<td>1</td>
<td>Facial edema</td>
</tr>
<tr>
<td>2</td>
<td>Obesity and short neck</td>
</tr>
<tr>
<td>3</td>
<td>Neck flexion and extension – atlanto-occipital extension</td>
</tr>
<tr>
<td>4</td>
<td>Mandibular space - thyromental distance</td>
</tr>
<tr>
<td>5</td>
<td>Mouth opening</td>
</tr>
<tr>
<td>6</td>
<td>Dentition - Protruding maxillary incisors, missing teeth</td>
</tr>
<tr>
<td>7</td>
<td>Oropharyngeal structures – Mallampati Classification</td>
</tr>
</tbody>
</table>

Unfortunately, only a few obstetric studies have evaluated airway assessment prospectively. Rooke et al. performed an airway assessment in 1500 parturient undergoing emergency and elective cesarean section under general anesthesia. Their group discovered a significant correlation (p<0.01) between oropharyngeal structures and the laryngoscopy view and difficulty at intubation. Multivariate analysis demonstrated visualization of oropharyngeal structures, short neck (obesity), receding mandible and protruding maxillary incisors all to be significant. It is important to note that one of the end points in this study was difficult intubation, as judged by a scoring system developed by the authors. In there study, there were actually only two cases of failed intubation, giving an incidence of 1.75% or 0.13%. Yeo, Chung and Thomas demonstrated a significant (p<0.05) prediction between Mallampati score and difficult intubation. Their end point was the laryngeal view. In this study, there were also difficult
Intubations noted even though the Mallampati was Grade 2. In this study, the race was predominantly Asian while in the Rocke paper the race was not stated; but as the paper was from South African maternity hospital, a proportion of the patients may have been African. An English paper demonstrated that racial origins influenced the difficulty of intubation. Therefore, in airway assessment the racial origin may be an important clue of difficulty.

Preparation for Intubation: Routinely, 30 mls 0.3 M sodium citrate is administered to neutralize the stomach’s acidity. To prevent further production of acid, a H2 blocker can also be administered. Metoclopramide will facilitate gastric emptying, provided that it is administered before systemic opioids are administered. Although the use of these medications is routine, it is difficult to prove that these medications have decreased the incidence or outcome of aspiration pneumonitis.

The presence of personnel in the delivery suite trained in airway management is essential. Because the delivery suite is usually isolated from the main operating room and personnel not always available, it is advisable to have midwives trained in airway management, importantly cricoid pressure. In papers detailing the difficult and failed airway assessment in obstetrics, it is usually defined as the most senior anesthesia care personnel attempting, assessing and failing. Standardization and quantification of skills is difficult.

All essential monitoring, drug and equipment must be checked and ready prior to any regional or general anesthetic procedure in the obstetric operating room. Emergency airway adjuncts such as oral and nasal airways, COPA airway, endotracheal tube stylets, a gum elastic bougie and a light wand should be readily available. An emergency airway cart should be readily available.

Endotracheal Induction and Intubation: Because of the anatomical and physiological changes of pregnancy and labor, the techniques of endotracheal intubation need to be adapted. The patient needs to be correctly positioned. The neck needs to be flexed at the cervico thoracic junction and extended at the atlanto occipital joint. Properly positioned pillows help to exaggerate the position, optimizing it and improving success. Measuring end tidal nitrogen, and watching the level reach a plateau, infers complete denitrogenation and optimal pre-oxygenation.

Anesthesia is usually induced intravenously with thiopentone, propofol or ketamine. Cricoid pressure is in position at the onset of induction and fully applied as the patient is induced. There may be difficulty inserting the scope due to poor positioning of the patient, the increased size of the chest wall and improperly positioned cricoid pressure. Surprisingly, there has been no study suggesting which blade is optimal. At present the blade the operator is most familiar with should be used. Following endotracheal intubation, confirmation is necessary by quantitative or qualitative measurement of end-tidal CO2.

Difficult Airway Algorithms and Failed Intubation Drills

ASA difficult airway algorithm: The ASA Difficult Airway Algorithm has standardized the approach to the difficult airway. Standards or guidelines aim to minimize the mortality and morbidity associated with the difficult airway and also aids education and research. However, the ASA difficult airway algorithm needs to be adapted to obstetrics.

Significant differences between the obstetric and ASA algorithm are:
1. Most cases are emergency and not elective.
3. Both mother and fetal needs to be assessed.
4. Spontaneous breathing is preferred.

Assessment and decisions: Similar to the ASA Difficult Airway Algorithm, initial assessments and then decisions must be made. The initial assessments include:
1. Maternal status
2. Fetal status
3. Airway status

The decisions that need to be made following these assessments are:
1. Expected versus unexpected difficult airway
2. Expected difficult airway
   - Regional technique versus Awake technique
   - Awake: Surgical technique versus non-surgical technique
Cardiac arrest: Difficult or failed intubation may lead to a cardiac arrest. Therefore, the potential for maternal cardiac arrest must be assessed. Aspiration and lung injury will exacerbate the hypoxia of the difficult and failed airway also increasing the potential for cardiac arrest. Protocols for cardiopulmonary resuscitation in pregnancy advocate perimortem cesarean delivery within 5 minutes of cardiac arrest. In the difficult or failed intubation, earlier cesarean section may aid resuscitation.

Obstetric difficult and failed airway algorithm: Many difficult and failed obstetric airway algorithms exist. Most are complicated aiming to cover all contingencies related to the expected and unexpected difficult obstetric airway. For these algorithms, the quality of evidence for the algorithm is neither stated or they are mainly a compilation of case reports. Importantly, there is no evidence of efficacy.

Simplifying the algorithm has the potential to make it easier to use and also to assess its efficacy. Usually, this approach is related to failed intubation, and is referred to as drills. A 17-year review of a failed intubation drill illustrated some of the benefits of this approach. Out of 5802 cesarean sections between 1978 and 1994, there were 23 (0.4%) failures to intubate the trachea. The algorithm used was simple and specific for unexpected failed intubation. Most of the failures were for emergency situations. Eighteen patients were allowed to waken and regional techniques utilized. Manual ventilation was difficult in seven and impossible in two. Four patients had an LMA inserted. Using the LMA in this situation, the lungs were difficult to ventilate in two episodes and impossible to oxygenate on one occasion.

No anesthesia or anesthesia obstetric association or society has developed evidence based guidelines for the obstetric difficult airway or failed obstetric intubation. As stated to be complete such guidelines are extremely complicated and lack evidence making their value questionable. An approach to the expected and the unexpected difficult airway algorithm are outlined in Figures 3 and 4, respectively. The main aim of these guidelines is intended for discussion of the airway management techniques.

Expected Difficult Intubation

Once the assessment and decision has determined that it is an expected difficult airway then the decision is between regional and awake intubation. If awake intubation is decided, then the decision is between surgical versus non-surgical technique. Though an awake surgical airway technique is included for completeness, for the obstetric difficult airway it is most likely to be of benefit during upper airway trauma affecting the parturient or when an obvious pre-existing airway problem exists. There have been two case reports in the literature where the tracheotomy was inserted prior to delivery. In one case, the patient subsequently underwent cesarean section under regional anesthesia with the tracheotomy used as a backup.

Regional Technique
- Spinal anesthesia
- Epidural anesthesia
- Combined spinal-epidural
- Local anesthetic agent

Awake Intubation Technique
- Non Surgical Technique
  - Non fiberoptic
  - Laryngoscope
  - Light wand
  - Fiberoptic
  - Bronchoscope
  - Bullard blade
  - Upsher blade
- Wu scope Surgical Technique
  - Tracheostomy

Figure 3: The “expected” difficult airway algorithm.

Regional anesthesia and the difficult obstetric airway: Regional is the usual selection in the expected difficult airway. In non-emergency obstetric situations the choice of regional technique is dependent on the anesthesiologist.
Emergency situations with severe time limitations are no contraindications to a regional technique. Although the literature supports equal outcome comparing regional to general anesthesia in emergency situations, there is no literature to support the optimal regional technique. Usually, the regional technique is between a spinal anesthetic or loading a functioning epidural or loading an epidural from a continuous spinal epidural. In severely pre-eclamptic patients undergoing cesarean section, spinal versus epidural, the hemodynamic and fetal outcome showed no significant difference. When comparing combined spinal epidural anesthesia (CSEA) and epidural anesthesia for cesarean section, CSEA had greater efficacy and fewer side effects.

Although conventional wisdom endorses a regional technique in the expected difficult airway, complications or failure of the regional technique may make it necessary to intubate the trachea. Thus, a backup plan is necessary with the appropriate equipment being available. A case report described a patient with a failed combined spinal epidural, who failed an endotracheal intubation, was then woken and underwent an awake, fiberoptic intubation. This is one of many case reports illustrating potential difficulties of regional anesthesia. The absolute contraindications to regional anesthesia in obstetric anesthesia are patient refusal and a coagulopathy.

When deciding on the regional technique, it is important to select the technique that minimizes airway, cardiac, and respiratory emergencies for the individual parturient.

Local anesthesia and the upper airway: Either the use of selected nerve blocks or direct application of local anesthetic agents will provide adequate anesthesia of the upper airway. The hormonal changes in pregnancy increase the sensitivity of peripheral nerves to local anesthetic agents. With pregnancy the upper airway membranes have increased vascularity, increasing the uptake of the local anesthetic, decreasing the duration of action of the local anesthetic. Thus, these two factors may balance out; however, it is important to be vigilant for local anesthetic toxicity. The local anesthetic agent, prilocaine, may induce a dose related methemoglobinemia. The fetus may be more susceptible due to the inability to metabolize the compound due to metabolics and the administration of other drugs.

Awake Non-fiberoptic Techniques: Following adequate anesthesia to the upper airway, non-fiberoptic techniques can be utilized for endotracheal intubation. Different sized MacIntosh and Miller blades, as well as specialized laryngoscopes with fiberoptic light sources or different shapes can be used. Airway adjuncts, such as stylets, intubating bougies, and external manipulation of the larynx may all play a role in aiding intubation. The lithe stylet can also aid intubation in the awake fiberoptic intubation. Although blind nasal intubation can be used in awake non-fiberoptic techniques, bleeding from the vascular membranes may further complicate the already difficult intubation.

The use of the LMA, ILM or the ProSeal can be utilized in the awake endotracheal intubation. The ILM is probably a preferred choice as a definitive cuffed airway can be introduced. However, a literature survey found no case reports of the ILM in cesarean sections. There are two case series of the LMA being used for cesarean section. Positive pressure ventilation with peak airway pressure up to 20 cm H₂O was used with no reports of aspiration. However, both of these were reported in abstract form, and review of the English literature failed to show that they have been published in a peer review journal. There are no reports of the ProSeal LMA and the obstetric airway.

Awake Fiberoptic Techniques: Fiberoptic techniques are popular for the expected difficult airway, especially in the parturient. Fiberoptic techniques use expensive equipment, have steep training curves and usually are not easily portable. The fiberoptic devices should allow the delivery of supplemental oxygen, as hypoxia is a common complication during these procedures.

There are multiple case reports of the success of the fiberoptic bronchoscope in the expected and also the unexpected difficult obstetric airway. However, there has been no case series, the failure rate is unknown as well as the complication rate. Potential complications include failure, hypoxia, and risk of bleeding from the vascular membranes, especially if the nasal route is chosen. Difficulty passing the ETT may be seen in preeclampsia where patients may have laryngeal edema.

One case report exists concerning the use of the Bullard and the difficult obstetric airway. Although there have been no published case reports concerning the Wu scope in the obstetric airway, the inventor, Dr Wu, has used the scope for parturients with difficult obstetric airways undergoing cesarean section. (Personal communication, Dr Wu)
Retrograde Technique: Retrograde intubation techniques can be utilized in the expected or unexpected difficult obstetric airway. In the expected difficult obstetric airway, it can utilize when an awake fiberoptic technique has failed. Many times when the initial technique has failed, bleeding and edema results increasing the difficulty of subsequent attempts. Once the guide wire has been passed through the cricothyroid membrane and exits the mouth or nose, it can be threaded up the suction channel of the fiberoptic scope. The fiberoptic scope is then advanced along the guide wire under direct vision through to the trachea.

Unexpected Difficult Intubation: — ???? Ventilation

Manual ventilation: With non-obstetric unexpected difficult airway the ability to demonstrate that mask ventilation is possible is done before the administration of neuromuscular blockers and an attempt at intubation. In obstetric anesthesia, due to the aspiration risk, a rapid sequence induction is usually performed. Thus, it is unknown if mask ventilation is successful before intubations attempts. Thus, when intubation is difficult, as demonstrated by the laryngeal view or there is failure to intubate, then mask ventilation must be attempted to insure oxygenation and ventilation. Because of the increased weight and edema in pregnancy, mask ventilation can be difficult.

Oral airways are introduced to improve the efficiency of mask ventilation. Nasal airways can also be utilized; however, the increased vascularity of the nasal mucosa increase the potential for bleeding and further make the already difficult airway more difficult. Manipulation of the airway with the aim of improving the seal of the mask airway is important. Many algorithms and authors suggest that two people may be necessary, one to maintain a seal of mask and airway while the other needs to ventilate the patient. While this is occurring, it is advocated to maintain cricoid pressure. If mask ventilation is inadequate with cricoid pressure, then it should be relieved to see if improved ventilation occurs. In the British literature, it is advocated to place the patient in the Trendelenburg position. In this position, if vomiting or regurgitation does occur, they advocate that it is less likely to enter the trachea and lungs. Throughout the mask ventilation, left lateral tilt is maintained.

The first step in the difficult or failed obstetric airway is to maintain oxygenation and ventilation through bag mask ventilation. Once this first essential step has been undertaken then the assessment of the maternal fetal status is undertaken. The obstetric team present needs input at this stage and a decision made with respect to the immediacy of delivering the baby.
Unexpected difficult intubation - Can ventilate

**Non-urgent delivery**: The suggested course of action is to awake the mother and then to use either a regional or an awake intubation technique. Case series have demonstrated that this approach works.

**Immediate delivery**: A suggested course of action is to continue to mask ventilate, with or without cricoid, induce anesthesia with a volatile anesthetic, allow for resumption of spontaneous ventilation and maintain left lateral tilt and Trendelenburg position. Again, case series suggests that this is practical.

**LMA**: The LMA has been used with success in the can ventilate non-urgent and immediate delivery. These are published usually as “one off” case reports. With all case reports, there is a selection bias. If complications or negative outcomes are present, they are least likely to be published.

Unexpected Difficult Intubation - Cannot ventilate

**Non-urgent delivery**: The implicit aim is to waken the patient and then use a regional or awake intubation technique. However, it is still essential to maintain oxygenation of the patient. Apneic oxygenation may be able to maintain adequate oxygen saturation during this period. Although adequate ventilation may be impossible, partial incomplete bag mask ventilation may suffice in the interim allowing oxygenation and ventilation while the patient wakens. Evidence, even case reports, is difficult to discover to provide documentation for this step. Additionally, the use of non-surgical techniques (as described below) to maintain oxygenation and ventilation has also been described while waiting for the patient to waken.
Urgent delivery: With urgent delivery, the decision must be made to go to an urgent non-surgical, surgical rescue ventilatory mode. Cesarean delivery with local infiltration anesthesia may be considered. The technical or comfort factor of the anesthesia care provider determines which technique to go to first in this situation. It is important to note that the anatomical and physiological changes with pregnancy may make oxygenation and ventilation difficult with a LMA, Combitube or needle jet ventilator technique. High airway pressures will need to be generated by these devices due to the decreased lung compliance associated with pregnancy and also any lung injury. Therefore, the high pressures may lead to barotrauma and inadequate oxygenation and ventilation. It is important to determine the efficacy of each intervention at this stage in the cesarean delivery.

Non-surgical – urgent delivery

LMA: Case reports have described the successful use of the LMA in the cannot intubate cannot ventilate, failed obstetric intubation. In a survey of obstetric anesthesia consultants in the United Kingdom, 71% of the respondents stated that they would use the LMA in the cannot intubate, cannot ventilate obstetric airway with 91% of the obstetric units stating that the LMA was available. Twenty-four of the consultant anesthetists had personal experience with the use of the LMA. Although complete details of the use was not stated, eight stated that it was life saving, two stated that attempts to pass a gum elastic bougie through the LMA failed and three had used the LMA; but without success, removed it and established mask ventilation. Twenty-two consultant anesthetists were against the use of the LMA--risk of aspiration being the principle reason given. The ProSeal has the potential to offer advantage of being able to ventilate and decrease the risk of aspiration, but it is still only FDA approved to 30 cm H2O. The FasTrach LMA or intubating LMA has potential advantages as will allow the introduction of a definite airway. However, the lack of expertise and time may limit this technique. To date there are no case reports describing either the Proseal or the intubating LMA in the cannot intubate, cannot ventilate failed obstetric airway.

Combitube: There are no case reports in the literature describing the use of the Combitube in the difficult or failed obstetric intubation. The Combitube has been used with success in the cannot intubate, cannot ventilate non-obstetric difficult airway. It has also been used with success in anesthetic cases in the operating room. Aspiration is the main potential complication with this device. There is a case report suggesting an esophageal perforation; however, multiple airway devices were used. The perforation also occurred distal to the site in the esophagus that the Combitube had been inserted. In a can not intubate, can not ventilate failed obstetric an esophageal gastric tube airway was inserted. Following insertion into the esophagus, the EGTA was attached to the anesthesia machine. Anesthesia was then administered, the baby delivered and the mother had an uneventful recovery.

Surgical - urgent delivery

Transtracheal jet ventilation: There are no case reports of the use of transtracheal jet ventilation in the difficult or failed obstetric airway. High airway pressure may be required to overcome the decreased lung compliance seen in pregnancy. Acute lung injury secondary to pulmonary aspiration will decrease lung compliance even further making it difficult to maintain oxygenation and ventilation with jet ventilation. Also, without a definitive secured airway, pulmonary aspiration may result.

Cricothyrotomy: There is not an abundance of case reports of cricothyrotomy, either surgical or using the Seldinger techniques in the difficult or failed obstetric airway. These techniques are used infrequently by anesthesiologists in the difficult airway. Emergency room physicians and surgeons tend to use this technique, if the airway has proven difficult. When using either the Seldinger or surgical cricothyrotomy on Cadavers by naive medical personnel, both techniques were equally poorly performed. Essential equipment is a surgical blade size, dissectors/introducer and tracheotomy tube.

Tracheotomy: In the obstetric setting, it is difficult to find a case report detailing an emergency tracheotomy in the difficult or failed airway. Obstetricians usually do not have as much familiarity with the technique of tracheotomy compared with general surgeons. This may, in part, describe why it has not been used in the labor and delivery room.

Without anecdotal case reports to guide, no definitive conclusion is possible. The advice is to use whatever technique the anesthesia provider is the most comfortable. Thus, becoming familiar and practicing with difficult airway equipment is crucial. In the emergency room, cricothyrotomy has become the default airway to use in the difficult or failed airway.
**Difficult airway equipment in obstetrics – not if, but when!**

With the difficult and failed obstetric airway, it is more a question of “when” than “if.” Therefore, it is essential to have difficult airway equipment available. There are different approaches. One is to have every anesthesia machine equipped with one or two pieces of emergency airway equipment. This may consist of a gum elastic bougie to be used as an intubating guide and or a disposable LMA. These two pieces of equipment, or their equivalents, will be of benefit in most airway emergencies. Although each piece of equipment is inexpensive, fitting out each anesthesia location will add to the expense. Many anesthetic departments have developed “difficult airway carts”. The aim is to have all difficult airway equipment available in one cart. It is usually portable, being able to be wheeled to where needed. There is continued upkeep needed to insure the equipment is in working order. The equipment on the airway cart can vary; the selection is dependent on the preference and experience of the anesthesia care team. The carts can go from either basic to very sophisticated. Price of the equipment and the numbers required will also influence the decision on the cart’s equipment. Table 4 lists the specialized intubation equipment of one such airway cart used at the Mayo Clinic.

**Table 4 List of Difficult Airway Cart Major Equipment**

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<tr>
<td>1</td>
<td>Intubating flexible fiberoptic bronchoscope</td>
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<tr>
<td>2</td>
<td>Bullard portable laryngoscope</td>
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<tr>
<td>3</td>
<td>Proseal LMA</td>
</tr>
<tr>
<td>4</td>
<td>Fastrach LMA</td>
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<td>5</td>
<td>Combitube</td>
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<td>Jet ventilation apparatus</td>
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<td>7</td>
<td>Cricothyrotomy kit</td>
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<td>Trachlight</td>
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To be able to use the equipment in an emergency it is important to gain previous exposure to develop the necessary skills. Practice with equipment can be obtained on models. An additional approach is to use the equipment with every day patient use. This can be safe and “real life” with small modifications. Increasingly, airway simulators both aid the skill level with the difficult airway equipment and also, importantly, the relevance of the use of the difficult airway equipment in the airway algorithm.

**Conclusions**

The difficult and failed obstetric airway is a problem for all involved in the care of the pregnant patient in the labor and delivery room. All must be trained in the assessment and care of the obstetric airway--this means the non-difficult as well as the difficult airway. The anesthesia care provider must provide leadership in this endeavor, both at the local and national levels. Locally, they must be responsible for the education and training of all obstetric staff. They must measure outcomes through continuous quality assurance. Although poor outcomes have been decreased substantially, other outcomes, example number of maternal intubations and morbidity are necessary. A difficult and failed airway algorithm needs to be developed for each labor and delivery room. Although there is an increase in the specialized obstetric anesthesiologist, it is necessary to insure that all anesthesia care practitioners are aware and skilled in carrying out the protocol. Situational awareness and optimal progression from one step of the algorithm to the next is key to prevent morbidity. At the national level, general and specialized societies caring for the obstetric patient must cooperate and act mutually to optimize airway management in obstetrics especially for the difficult and failed airway.
44. Hawksworth CRE, Purdie J. Failed combined spinal epidural the failed intubation at an elective caesarean section. Hospital Medicine.59,1998: 173
Refresher Course Lectures

*Parental Medications for Labor & Delivery*

David C. Campbell, MD, MSc, FRCPC

2:30 - 3:30 pm

Following this lecture, the participants will be able to choose appropriate parenteral medications and methods of administration for providing analgesia during labor.

*Covering Labor and Delivery in a Community Hospital*

Patricia A. Dailey, MD

4:00 - 5:00 pm

Following this lecture, the participants will be able to describe and compare several different options for billing for obstetric anesthetics, newer coding procedures in obstetric anesthesia, VBAC standby issues, staffing issues, JCAHO compliance issues, and realities of community practice.
Parenteral Medications for Labor and Delivery

David C. Campbell, MD, MSc, FRCPC
Associate Professor
Chairman (acting)
Director of Obstetric Anesthesiology
Department of Anesthesia
College of Medicine
University of Saskatchewan
E-mail: CAMPBELLD@SDH.SK.CA

Refresher Course Outline:

Review Indications for Epidural Labor Analgesia

Review “State-of-the-Art” Initiation of Epidural Labor Analgesia

Review “State-of-the-Art” Maintenance of Epidural Labor Analgesia

Review Absolute Contraindications to Epidural Labor Analgesia

Review Parenteral Analgesic Options when Epidural Labor Analgesia Contraindicated

Review Patient Controlled Intravenous Analgesia (PCIA) Options

Review the University of Saskatchewan Experience

References:

Covering Labor and Delivery in a Community Hospital
Staffing and Reimbursement Issues

Patricia A. Dailey, M.D.

I. What is required if your hospital provides labor and delivery services?

A. Guidelines for Perinatal Care, 4th Edition:  
   Basic Care Facility
   - Capability to begin an emergency CS within 30 min of the decision to do so
   - Detection and care of unanticipated maternal-fetal problems
   - Availability of anesthesia on 24-hour basis

   Specialty Care Facility
   - Above +
   - Care of high-risk mothers and fetuses
   - Care of preterm infants with a birth weight of 1500 g or more; stable or moderately ill
     newborns who have problems expected to resolve rapidly
   - Director of obstetric anesthesia services should be board certified in anesthesia and
     should have training and experience in obstetric anesthesia

   Subspecialty Care Facility
   - Above +
   - Personnel qualified to manage obstetric or neonatal emergencies should be in-house
   - 24 hours/day in-house availability of anesthesia
   - Board-certified anesthesiologist with special training or experience in maternal-fetal
     anesthesia should be in charge of obstetric anesthesia services

B. Joint Commission on Accreditation of Healthcare Organizations (JCAHO)
   Standard TX.2.1 A presedation or preanesthesia assessment is performed for each patient
   before beginning moderate or deep sedation and before anesthesia induction.
   Intent of TX.2.1 (per JCAHO)—The following is buried in the intent of TX.2.1:
   "Hospitals providing obstetric or emergency operative services can provide anesthesia
   services within approximately 30 minutes after anesthesia is deemed necessary.

   In organizations providing labor services for patients seeking vaginal delivery after
   previous cesarean delivery, appropriate facilities and personnel, including obstetric anesthesia
   and nursing personnel, are immediately available to perform emergency cesarean delivery when
   conducting a trial of labor for women with a prior uterine scar."
C. California Health and Safety Code 1256.2 (effective 1/1/1999)

"It is unprofessional conduct for a physician to deny or to threaten to withhold pain management services, from a woman in active labor, based upon that patient's source of payment, or ability to pay for medical services."

Signs must be posted in Labor and Delivery Units that attest to the hospital's compliance with this policy.

Comment: 1256.2 does not explicitly state that we must provide regional analgesia. If the hospital does not have the resources to provide labor epidurals to anyone, 1256.2 does not require regional analgesia availability. Rather, we cannot discriminate. In other words, we cannot provide epidurals to our friends or the wives or daughters of our colleagues unless we offer epidurals to all women delivering at the institution. Small hospitals don't have to have a labor epidural service, but if the occasional VIP receives an epidural, then the same service should be provided for all. I urge you to read Dr. Sheila Cohen's editorial written for the California Society of Anesthesiologists Jan-Feb 1999 Bulletin and reprinted in IJOA.

D. EMTALA (Emergency Medical Treatment and Labor Act)

The general principle of EMTALA is "Access to care and non-discriminatory treatment". Patients may not be coerced into being transferred or seeking care elsewhere, even if their insurance will not pay for their visit or is required by their insurance. For a pregnant woman who is having contractions, an emergency medical condition exists if there is inadequate time for a safe transfer or may pose a health risk to the woman or baby.

E. Vaginal Birth after Cesarean Delivery (VBAC)

The ACOG Practice Bulletin of July 1999 on VBAC has generated much controversy among obstetricians and anesthesiologists. This bulletin recommends that:

- Because uterine rupture may be catastrophic, VBAC should be attempted in institutions equipped to respond to emergencies with physicians immediately available to provide emergency care.
- A physician be immediately available throughout active labor capable of monitoring labor and performing an emergency cesarean delivery
- Anesthesia and personnel for emergency cesarean delivery be available

The previous Practice Bulletin of October 1998 said readily available vs. the current immediately available. Dictionary definitions of "immediately" include "without delay", "as soon as", and "without interval of time". Definitions for "readily" include "in a prompt, timely manner" and "without hesitating".

In our hospital, we have asked the obstetricians to notify the oncall anesthesiologist when a VBAC patient is in active labor so that we can be immediately available. This was recently inserted into the rules and regulations of the Department of OB/Gyn.

In addition, the "30 minute rule" between decision to delivery may not be valid with VBAC. A federal court decision, in a case in which the time elapsed from the onset of FHR deceleration to delivery was 27 minutes, concluded that the 30 minute rule represented the maximum period of
elapse and did not represent a minimum standard of care. A retrospective study of uterine rupture after previous CS determined that significant neonatal morbidity occurred when > 18 minutes elapsed between the onset of prolonged deceleration and delivery. A recent ASA newsletter includes the statement: “In contrast to other obstetric emergencies such as prolapsed cord or placenta accreta, VBAC is a completely elective procedure that allows for reasonable precautions in assuming this small but significant risk.”

F. Nurse Midwives
Nurse midwives are increasingly managing the labor and delivery of patients. Is it necessary for an obstetrician to become involved in the care of a patient once we are asked to provide neuraxial analgesia? Our current ASA Guidelines say “yes”.

The ASA “Guidelines for Regional Anesthesia in Obstetrics” state: “Regional anesthesia should not be administered until 1) the patient has been examined by a qualified individual; and 2) a physician with obstetrical privileges to perform operative vaginal or cesarean delivery, who has knowledge of the maternal and fetal status and progress of and who approves the initiation of labor anesthesia, is readily available to supervise the labor and manage any obstetric complications that may arise.”

The clinical and legal implications of anesthesiologists providing regional analgesia/anesthesia to nurse midwife patients are discussed in an article in the ASA Newsletter and many letters to the editor in response. In some states, certified nurse midwives only need to collaborate with a physician, in California they must be supervised. There are many issues involved. A major issue is “the ability to rescue” in the case of either maternal or fetal distress.

G. AWHONN (Association of Women’s Health, Obstetric and Neonatal Nurses)
AWHONN has published a new position statement on the role of RN’s in the care of women receiving regional analgesia. Since publication of this statement, labor and delivery nurses at some institutions are refusing to decrease the epidural infusion rate or restart an infusion that has been stopped.

The AWHONN statement is noteworthy in what it states a non-anesthetist registered nurse should not perform. These include:

- “Rebolsus an epidural either by injecting medication into the catheter or increasing the rate of a continuous infusion
- Increase/decrease the rate of a continuous infusion
- Re-initiate an infusion once it has been stopped
- Manipulate PCEA doses or dosage intervals
- Be responsible for obtaining informed consent for analgesia/anesthesia procedures; however, the nurse may witness the patient signature for informed consent prior to analgesia/anesthesia administration.”
It is the view of the California Society of Anesthesiologists Board of Directors that a RN should be allowed to adjust an infusion rate, on a patient-specific order from the physician, provided that the RN has adequate education and training involving complications of labor regional anesthesia and programming of the pumps. Of course, a physician with appropriate privileges must be readily available during the regional anesthetic to manage anesthetic complications.

The AWHONN restrictions can be challenged provided we educate and train the nurses. The AWHONN position statement says:

“The requisite education and clinical skill acquisition necessary to provide safe management of regional analgesia/anesthesia for the pregnant woman are not included in basic education programs for entry into practice as a registered nurse; therefore such analgesia/anesthesia management should be reserved exclusively for licensed, credentialed anesthesia care providers.”

We should take the lead and organize educational in-services on anesthesia and analgesia for the registered nurses in Labor and Delivery. As we all know, a new RN is not allowed to manage an OB patient without additional training. This knowledge is acquired. But once acquired, the L & D RN manages the laboring patient by examining the patient, interpreting the fetal heart rate strip, adjusting oxytocin infusions, and administering potentially-toxic medications such as IV magnesium; often with no obstetrician or nurse midwife present in the facility.

II. How can we afford to provide an OB anesthesia service?

A. Size of Service
When is it possible to provide continuous obstetric anesthesia coverage? In the mid-1990’s, before the current penetration of HMOs and discounted fee for service, Ostheimer suggested that 2000 deliveries/year is the borderline for full-time coverage of an obstetric service by a designated anesthesiologist:

1. C/S rate of 20% (2000 x 20% = 400 cesarean deliveries)
2. 50% of vaginal deliveries would require epidural/spinal anesthesia (=800)
3. 400 + 800 = 1200 deliveries/365 days = 3 - 4 deliveries/day

Dr. Ostheimer suggested that 3-4 deliveries/day requiring anesthesia services provides enough work assuming at least 50% of the patients will completely pay their bill (at UCR rates).

What about the reimbursement for the 3-4 deliveries/day in the “real world” of HMO’s, capitation, and discounted fee-for-service? Depending on the patient demographics, these patients could all be Medicaid/indigent or in the increasingly rare situation, all fee-for-service. In my practice (~2500 deliveries/yr; 55-65% epidural rate), it is a blend of Medicaid, HMO, and fee-for-service. Over the past few years, the Medicaid population has increased as financial incentives have been provided to the obstetricians. Unfortunately pediatricians and anesthesiologists have not seen the same incentives. Our reimbursement does not cover our manpower cost to provide 24/7/365 dedicated OB anesthesia coverage even with 2500 deliveries/year.

An excellent paper by Elizabeth Bell and coworkers looks at manpower cost and reimbursement for an obstetric analgesia service at Duke University. The authors examined only the direct attending physician costs ($206,405 average attending anesthesiologist compensation), without
including dependent providers, supplies, or equipment. They found that around-the-clock dedicated obstetric staffing cannot operate profitably under any reasonable circumstances at their institution; they had 2351 obstetric anesthesia cases in fiscal year 1998. The cost per patient during the study period was $325 if the obstetric anesthesia service was staffed on an intermittent basis (2.5 FTEs); dedicated staffing (4.4 FTEs) cost $728/patient. Medicaid in North Carolina paid $204/patient; indemnity paid $300-430/patient. I suggest that you read this article and the accompanying editorial by David Chestnut.

The above article uses figures from North Carolina in 1998. You need to determine how many FTEs you need to cover an obstetric anesthesia service. Are they on an intermittent basis or dedicated staffing? What does an FTE cost in your geographic area? Will you be an all MD practice or use the anesthesia care team model?

In many areas there has been regionalization of perinatal care. However, with the emergence of HMOs/hospital alliances, many requiring their own Labor and Delivery Suite, there has been a return to smaller units. This is happening all over the country and is being reported on in newspapers and gaining the attention of legislators. If the HMO/hospital sees 24 hour/day obstetric anesthesia coverage as a selling point for their hospital and the number of deliveries do not justify full-time coverage, then anesthesiologists need to negotiate with HMOs/hospital to supplement the income of the anesthesiologists on a "break even" basis.

This issue was addressed in a newspaper article about a hospital 15 minutes outside of Sacramento: "A Right to Relief? In some small hospitals, women in labor are being refused what they have come to consider their childbirth right: the pain-blocking epidural." The following is my letter to the editor.

"A Right to Relief" (January 26) discusses the availability of labor epidurals for childbirth in small hospitals. Anesthesiologists are committed to minimizing the pain and discomfort of childbirth. However, we should not lose focus of our foremost commitment; safety of the mother and baby.

Unfortunately, emergencies may occur during childbirth. When selecting a hospital, expectant parents should consider the capabilities of the hospital and whether physicians skilled in managing obstetric and anesthetic complications are available.

Optimally, an anesthesiologist should be available to provide the mother with access to all options for pain relief. However, hospitals must decide if optimal patient care justifies obstetrical anesthesia services, particularly if there are not enough deliveries to support a dedicated anesthesiologist around the clock. Hospitals must recognize that, to meet 2002 standards of care, there are costs to provide such services. The trend is for small obstetric services to merge so they may offer the safest care possible."
B. How to provide an OB anesthesia service

1. Know your practice (see sample calculation)
   - Number of patients
   - Regional analgesia rate
   - Cesarean section rate
   - Insurance mix
     - How is this changing?
     - Percentage of Medi-Cal OB vs non-Medi-Cal OB
     - Is this increasing?
   - OB style of practice
     - Timing of epidurals, induction rates, CS rate, patient expectations

2. Get hospital to provide stipend
   - Learn what hospitals in the area or hospital system are providing as stipends.
   - Review state laws re physician on call services.
   - Negotiate with your hospital to obtain financial support to facilitate provision of 24-hour obstetric analgesia coverage.

3. Have your anesthesia group provide stipend
   - We have recently gone to income pooling and pay a stipend for OB coverage; any services provided while on OB go into the pooled units.

4. Maximize time on OB while being immediately available-do interruptible tasks
   - Cover acute pain management service
   - Attend hospital administrative meetings
   - Help cover preoperative evaluation clinic
   - Continuing education
   - Computer with on-line capability in call room

5. Improve collection rates; audit billing and payments

6. Attract insurers/HMOs/obstetricians with better payment/payer records

7. Increase the size of the service/merge services: increase patients, increase epidural rate

8. Negotiate with insurers; write better contracts
III. Billing for your services

A. New ASA RVG Base Codes—effective 1/1/2002

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>01960</td>
<td>Anesthesia, vaginal delivery</td>
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<tr>
<td>01961</td>
<td>Anesthesia, cesarean section</td>
<td>7</td>
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<tr>
<td>01962</td>
<td>Anesthesia, emergency hysterectomy</td>
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<tr>
<td>01963</td>
<td>Anesthesia, cesarean hysterectomy</td>
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1967 Neuraxial labor analgesia/anesthesia for planned vaginal delivery (this includes any repeat subarachnoid needle placement and drug injection and/or any necessary replacement of an epidural catheter during labor

1968 Anesthesia, cesarean delivery following neuraxial labor analgesia/anesthesia (list separately in addition to code for primary procedure) (Use in conjunction with 01967)

1969 Anesthesia, cesarean hysterectomy following Neuraxial labor analgesia/anesthesia (list separately in addition to code for primary procedure) (Use in conjunction with 01967)

B. Neuraxial analgesia—time documentation

The ASA Committee on Economics has worked for the many years to develop guidelines for a charge system to standardize time documentation for regional analgesia for labor. The ASA “Relative Value Guide” (RVG) for 2002 suggests four options for anesthesiologists to consider when billing for neuraxial labor analgesia. The guide states that professional charges and reimbursement policies should reasonably reflect the intensity and time involved in performing and monitoring any neuraxial labor analgesic.

Methods to determine professional charges consistent with these principles include:

1. Basic units plus patient contact time (insertion, management of adverse events, delivery, removal) plus one unit hourly.
2. Basic units plus time units (insertion through delivery), subject to a reasonable cap.
3. Single fee
4. Incremental fees (e.g., 0<2 hrs, 2-6 hrs, >6hrs).

Most practitioners decide on a standard accounting method and use it for all their cases. However, you need to know how the different insurance carriers, HMO’s, and state agencies handle the time charges. For example, you may be billing based on method #1 but the carrier may assume you are billing according to method #2 and they may pay based on the time units billed/4. Some state agencies may not pay except for direct patient contact time, i.e. they may not pay one unit/hour for the continuous infusion.
C. Medicaid Billing

In many states, Medicaid uses the "base units plus patient contact time" for OB Anesthesia. For example, in California, Medi-Cal states:

- "If billing for regional anesthesia ... only the time actually spent with the patient is reimbursable. For example, if the patient is under anesthesia for 9 hours and 15 but the application of anesthesia and subsequent check-back periods total only 3 hours and 15 minutes, then the claim should read:
  Epidural anesthesia start time: 0500. Stop time: 14:15. Time actually spent with the patient: 195 minutes."

- "The modifier – ZB (adds one unit) may be used to bill for anesthesia services during an emergency procedure on an otherwise healthy or medically stable and uncompromised patient. Examples ... are a patient who requires a non-elective cesarean section."  

As Larry Sullivan, MD (past President California Society of Anesthesiologists) writes:

"The ability to document physician-patient direct contact time accurately in an obstetrical setting is nearly impossible and ignores the point of the anesthesiologist’s overall responsibility, even when not at the bedside.” It is his opinion that the CSA should pursue a FLAT or GLOBAL fee arrangement for obstetrical anesthesia under the Medi-Cal program ONLY, rather than depend on time-based methodology.

Several states pay a flat fee for obstetrical anesthesia for Medicaid patients. For example, North Carolina Medi-Caid in 1999 paid a flat fee of $204 for continuous epidural analgesia during labor and delivery, whether vaginal or CS. (This is equal to 12 units x $17/unit.)

D. Billing for VBAC Standby: good and BAD news

In light of the new ACOG guidelines for VBAC, many anesthesiologists are questioning how they can bill for being immediately available. The following is one possibility:

The CPT book has a code for Physician Standby Services:

99360 Physician standby service, requiring prolonged physician attendance, each 30 minutes (e.g. operative standby, standby for frozen section, for cesarean/high risk delivery, for monitoring EEG).

The CPT book even provides an example:

A 24 y.o. patient is admitted to OB unit attempting VBAC. Fetal monitoring shows increasing fetal distress. Patient’s blood pressure is rising and labor is progressing slowly. A primary care physician is requested by the OB/GYN to standby in the unit for possible cesarean delivery and neonatal resuscitation.
The code is used to bill for physician standby services, requested by another physician, that involve prolonged physician attendance without direct (face-to-face) patient contact. The physician may not be providing care or services to other patients during this period. It is also not used if the period of standby ends with the performance of a procedure subject to a "surgical package" by the physician who was on standby.

Code 99360 is used to report the total duration of time spent by a physician on a given date on standby. It is billed at a flat fee in 30-minute increments. A full 30 minutes of standby must be provided for each unit of service reported. The code is used to report the total amount of time spent by a physician on a given day on standby.

Here's the BAD news. The code has a value of "0" under the Medicare's RBRVS—this makes it likely that many private payers would also fail to recognize the service. Alternative coding would be to use an E & M code provided the anesthesiologist evaluates the patient, interviews her, and discusses the anesthetic options. If the anesthesiologist provides a service, the service would be billed and not the E & M code.
Example of a practice analysis

**Assumptions:**

- 1000 deliveries / year
- 20% cesarean section rate:
  - 10% no labor epidural:
    - 1 hr anesthesia time = 7 unit base + 5 time units: total 12 units
  - 10% labor epidural to CS:
    - 1 hr anesthesia time = 3 unit base + 4 time units: total 7 units
  - 50% epidural rate
    - 30 minutes to place + 5 hours infusion = 5 unit base + 2 units to place + 5 units: total 12 units

**Insurance breakdown:**

- 10% indemnity @ $60/unit
- 60% HMO @ $40/unit
- 30% MediCal @ $17/unit

1000 x 10% c/s = 100 cs/ year x 12 units/cs = 1200 units/year

Indemnity (10%) 120 x $60/unit = $ 7,200
HMO (60%) 720 x $40/unit = $ 28,800
MediCal (30%) 360 x $17/unit = $ 6,120

Total expected reimb for C/S (no labor) = $ 42,120

1000 x 10% c/s = 100 cs/ year x 7 units/cs = 700 units/year

Indemnity (10%) 70 x $60/unit = $ 4,200
HMO (60%) 420 x $40/unit = $ 16,800
MediCal (30%) 210 x $17/unit = $ 3,570

Total expected reimb for C/S (had labor) = $ 24,570

1000 x 50% epidural = 500 epid/year x 12 units = 6000 units/year

Indemnity (10%) 600 x $60/unit = $ 36,000
HMO (60%) 3600 x $40/unit = $144,000
MediCal (30%) 1800 x $17/unit = $ 30,600

Total expected reimb for epidural = $210,600

Grand total expected reimbursement for L & D for 1 year = $277,290
Reimbursement for 24 hours = $ 760

Less cost of billing
Less uncollectable

Cost of 4-5 FTE /year = cost of providing dedicated OB Anesthesiologist
References

3. ACOG Practice Bulletin Vaginal Birth after Previous cesarean Delivery. Number 5, July 1999. Contact ACOG telephone 202-863-2518 or e-mail <resources@acog.org> for more information
Scientific Program

Friday, May 3, 2002

6:30 am — Registration
7:00 - 8:00 am  Breakfast with Exhibitors & Posters
8:00 - 9:00 am  The Zuspan Award by Perinatal Resources Inc

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<tr>
<td>9:00 - 10:00 am</td>
<td>What's New in Neonatology: Vignettes in Neonatal Resuscitation</td>
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<td>Introduction: Gary M.S. Vasdev, MD; Presentor: Robert Chantigian, MD</td>
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<td>10:00 - 10:10 am</td>
<td>Presentation of the Zuspan Award by Perinatal Resources, Inc</td>
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<td>Frederick P. Zuspan, MD;</td>
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<td>10:10 - 10:30 am</td>
<td>Break with Exhibitors &amp; Posters</td>
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<tr>
<td>10:30 - 11:30 am</td>
<td>What's New in Obstetrics?</td>
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<td>Introduction: Joy L. Hawkins, MD; Presentor: Michael Greene, MD</td>
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<td>11:30 am - 12:30 pm</td>
<td>Poster Review #2</td>
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<td>Moderator: Robert R. Gaiser, MD</td>
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<td>1:30 pm</td>
<td>Fun Run/Walk, Tennis Tournament, and Golf Tournament (12:45 pm)</td>
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<td>6:30 pm</td>
<td>Banquet — Beach Music Party (Hilton Head Island Marriott)</td>
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Zuspan Award by Perinatal Resources, Inc.

Moderator/Judge: David J. Birnbach, MD
Judges: David H. Chestnut, MD; Michael Greene, MD; Anne May, MBBS, FRCA; Alan C. Santos, MD; Stephen H. Halpern, MD; Susan K. Palmer, MD

8:00 - 9:00 am

Z-1
PULSE PRESSURE AS AN EARLY PREDICTOR OF PREECLAMPSIA
Adumeli, R.S.; Elimian, A.

Z-2
A RANDOMISED CONTROLLED TRIAL COMPARING TRADITIONAL WITH TWO “MOBILE” EPIDURAL TECHNIQUES: EFFECT ON URINARY CATHETERISATION IN LABOR
Comet, S.; Wilson, M.J.

Z-3
ENDOTHELIAL DYSFUNCTION IN PREECLAMPSIA: A PILOT STUDY WITH NON-INVASIVE BLOOD PRESSURE WAVEFORM ANALYSIS
Pian-Smith, M.C.; Ecker, J.; Hsu, K.; Leffert, L.; Loughrey, J.

Z-4
A DOUBLE-BLIND PLACEBO-CONTROLLED TRIAL OF PROPHYLACTIC ACETAMINOPHEN TO PREVENT EPIDURAL-FEVER: PILOT STUDY DATA
Goetzl, L.; Evans, T.; Rivers, J.; Lieberman, E.

All Abstracts listed on this page are in the Anesthesiology Supplement.
What's New in Neonatology: Vignettes in Neonatal Resuscitation?

Robert Chantigian, MD

9:30 - 10:00 am

Following this lecture, the participant will be familiarized with clinical aspects of neonatal care as illustrated by study cases.
Vignettes In Newborn Resuscitation

Robert C. Chantigian, M.D.

I. Introduction

The basic approach to resuscitating a newborn is similar to that of resuscitating an adult: "ABC's": Airway, Breathing, Circulation, Drying and Drugs, Evaluation, and Finish.

A. Mother - 21-year-old G1P0, term pregnancy, few early decelerations, CSE for labor and NSVD.
   Newborn - Newborn appears term, active, crying, but blue. What do you do now?

B. Mother - 22 year old G1P0, term pregnancy. CSE for labor and a NSVD
   Newborn - Apgar 9/9, looked normal at birth but 15 minutes after birth is cyanotic. What do you do now?

C. Mother - 23 year old G1P0, 33 weeks SPROM. No analgesia for labor, but had a pudendal for her forceps delivery.
   Newborn - Apgar scores 8/8, baby weighs 2000 grams. 20 minutes after birth the, baby had a "respiratory arrest" for 30 seconds. What do you do now?

D. Mother - 24-year-old G2P1, term pregnancy, good FHR tracing, epidural for labor and for a difficult vaginal breech delivery.
   Newborn - Newborn is depressed, few respirations, little movement, and is very blue. What do you do now?

E. Mother - 25 year old G1P0, term pregnancy, epidural for labor and NSVD.
   Newborn - Apgar 8/9. Normal at birth but very cyanotic when crying. What do you do now?

F. Mother - 26 year old G1P0, term pregnancy, narcotics for analgesia. Variable decelerations with little variability noted, vaginal delivery soon was performed and the nuchal cord was cut for delivery.
   Newborn - At delivery respirations were poor and you quickly intubate the newborn. After a few breaths the newborn looks OK and is extubated. Apgar scores are 5/7 but something is not right. Baby has nasal flaring, tachypnea, grunting, and is getting worse. What do you do now?

G. Mother - 27 year old G4P3 with blood type O negative. Her previous child died at birth from hydrops fetalis, which she attributes to medical care. Now she is about 38 weeks by history with no prenatal care. Her baby is about to be delivered.
   Newborn - A severely swollen newborn is delivered. Respirations are absent so you attempt to intubate the trachea despite the obvious whole body edema. You get the tube in but cannot get the chest to move. What do you do now?
H. **Mother** – 28-year-old G4P3 woman, 43-weeks pregnant has variable decelerations noted on the fetal monitor. Meconium staining is apparent when the membrane ruptures. A forceps vaginal delivery is performed, and you are asked to take care of the newborn.  
**Newborn** – The newborn has obvious meconium staining. What do you do for the newborn this year?

I. **Mother** – 29-year-old G1P0, 42-weeks EGA, labor induced, two doses of narcotic and epidural anesthetic for pain. Non-reassuring FHR tracing is noted and forceps vaginal delivery quickly performed.  
**Newborn** – Initially active, Apgar 8; then develops obvious depression (little respiratory effort, floppy, blue, heart rate 60-80 beats/minute). Initial treatment is unsuccessful, now what? The UV cord gas from the time of delivery comes back pO2 - 30, pCO2 - 35, pH - 7.29. What does this mean?

J. **Mother** – 30-year-old G1P0 has SPROM at 32-weeks EGA. Received an epidural for labor and has a normal vaginal delivery.  
**Newborn** – A small baby is delivered. What do you do now?

K. **Mother** – 31 year old G1P0, term pregnancy, good FHR tracing, epidural for labor and NSVD.  
**Newborn** – healthy active newborn with a birth defect, the left hand is missing. What do you do now?

L. **Mother** – 32-year-old G5P3 woman, 41-weeks pregnant has a sudden onset of vaginal bleeding. The fetal heart rate is rapidly decreasing, and a STAT cesarean section is performed with general anesthesia.  
**Newborn** – The newborn is very pale, and your initial Apgar score is zero. What do you do now? The 5-minute Apgar score is zero. Now what do you do? The 10-minute Apgar score is zero. Now what do you do?

II. Basic Approach

- **Airway** (suction mouth and nose, intubate as needed)  
- **Breathing** (watch chest for expansion, listen for crying or auscultate for breath sounds, assist breathing as needed)

  - Newborns are obligate nasal breathers. The nasal passages are narrow, prone to obstruction, and should be suctioned in all newborns.  
  - Extraterine breathing usually begins by 30 seconds (average time 9 seconds) after delivery.  
  - The tidal volume is similar to adults; 6 to 7 ml/kg. After a few minutes, the resting respiratory rate becomes about 30 to 40 breaths per minute. Slight nasal flaring, rales, and mild retractions are not uncommon at birth and usually clear spontaneously in less than an hour.
The cricoid cartilage is the narrowest part of the upper airway. If an endotracheal tube is needed, I use a 2.5 I.D. ETT for preterm and a 3.0 I.D. ETT for term or postterm newborns. If a large air leak exists, the next larger size tube can then be placed. When intubating newborns, keep in mind that the normal tracheal length is about 4 cm; therefore, put the tip of the oral endotracheal tube 1 to 2 cm past the vocal cords. For a typical 27-week EGA newborn, the lip to mid-trachea distance is about 7 cm; for a 40-week EGA newborn, the lip to mid-trachea distance is about 10 cm.

If respirations are weak after stimulation or the heart rate is less than 100, start positive pressure ventilation with 100% oxygen and watch the chest rise.

### NORMAL BLOOD GASES AT BIRTH

<table>
<thead>
<tr>
<th></th>
<th>UMBILICAL</th>
<th>ARTERIAL (minutes after delivery)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vein</td>
<td>Artery</td>
</tr>
<tr>
<td>pO₂</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>pCO₂</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>pH</td>
<td>7.32</td>
<td>7.24</td>
</tr>
</tbody>
</table>

### Circulation (check heart rate and, if needed, blood pressure and oxygen saturation)

- The newborn cardiovascular system undergoes significant changes at the time of delivery (fetal to transitional to adult circulatory patterns).
- The heart rate for the first 30 minutes is quite labile with rates of 100 to 200 beats per minute. After 30 minutes, the heart rate is about 120 beats per minute and varies with the newborn's activity. Heart rate can easily be checked by palpating the base of the umbilical cord or by auscultating the chest for heart tones.
- Bradycardia is poorly tolerated in newborns. Start CPR (3:1 ratio = 3 compressions / 1 ventilation or 90 compressions and 30 respirations per minute) when the heart rate is less than 60 beats per minute after 30 seconds of positive pressure ventilation. Compress the lower third of the sternum to a depth of approximately one third of the anterior-posterior diameter of the chest.
- Blood pressure in the term newborn is about 70/45. A systolic blood pressure less than 50 torr in a term newborn requires treatment, usually with volume expansion.
- The blood volume in the term newborn is 80 to 100 ml/kg.
- The hemoglobin level is 15 to 20 gm per 100 ml (Hct 45 to 60).
Drying (drying helps stimulate breathing and often increases the heart rate as well as preventing heat loss)

Drugs

- **Oxygen**
  - Indication - hypoxia, bradycardia
  - Concentration - 100% or with a blender 21 to 100%
  - Dose - Start with 100% (although some are now suggesting room air); rapidly decrease the concentration as tolerated to keep the oxygen saturation between 85 to 95%

- **Epinephrine** (needed in about 0.2% of all deliveries)
  - Indication – Heart rate < 60 after 30 seconds of PPV and chest compressions
  - Concentration - 1:10,000 (0.1 mg/ml)
  - Dose - Start with 0.1 to 0.3 ml/kg (0.01 to 0.03 mg/kg) then q 3-5 minutes prn

- **Naloxone**
  - Indication - respiratory depression due to acute use of narcotics (avoid in the drug-addicted newborn)
  - Concentration - 0.4 mg/ml or 1.0 mg/ml
  - Dose - 0.1 mg/kg

- **Volume Expansion**
  - Indication - hypovolemia
  - Crystalloid (Saline, Lactated Ringer’s Solution)
  - Blood (O negative)
  - Dose - 10 ml/kg and repeat prn (usually more than 20 ml/kg are needed)

- **Sodium Bicarbonate**
  - Indication - suspected or documented metabolic acidosis
  - Concentration - 0.5 mEq/ml or 4.2 percent solution
  - Dose - 2 mEq/kg (or 4 ml/kg) given over at least 2 minutes (after adequate ventilation has been established). Further doses are based on blood gas results.

- **Surfactant**
  - Indication - Respiratory Distress Syndrome (RDS)
  - Drugs – Beractant (Survanta), Colfoscercil (Exosurf), Calfactant (Infasurf), Poractant alfa (Curosurf)
  - A neonatologist, should be involved as soon as possible. Administer down the ETT with positive pressure ventilation.

- **Prostaglandin E1**
  - Indication - Maintain patency of the ductus arteriosus in children with certain complex cardiac defects
  - Dose - 0.05 to 1.0 ug/kg/min
  - A neonatologist, pediatric cardiologist, or pediatric intensivist should be involved as soon as possible.

Evaluate (assign Apgar Scores, look for birth defects, and diagnose and treat newborn problems)
Finish (clamp umbilical cord, if the newborn is doing well, and find help if needed)

III. Gestational age, birth weight and ETT size and distance inserted

<table>
<thead>
<tr>
<th>Gestational Age (weeks)</th>
<th>Mean Weight (grams)</th>
<th>ET Tube Size (mm I.D.)</th>
<th>ET Tube Distance (Lips to Mid-trachea cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>500</td>
<td>2.5</td>
<td>7</td>
</tr>
<tr>
<td>27</td>
<td>1000</td>
<td>2.5-3.0</td>
<td>8</td>
</tr>
<tr>
<td>33</td>
<td>2000</td>
<td>3.0-3.5</td>
<td>9</td>
</tr>
<tr>
<td>38</td>
<td>3000</td>
<td>3.5-4.0</td>
<td>10</td>
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<tr>
<td>40</td>
<td>3300</td>
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IV. References


What's New in Obstetrics?

Michael Greene, MD

10:30 - 11:30 am

Following this lecture, the participant will understand some of the current concerns in obstetrics and their possible ramification in obstetric care.
Every medical student is taught early in his or her career the basic principle that no tissue heals to produce a scar that is as strong as the native tissue was before it was disrupted. This is true despite our best efforts at surgical repair and pertains to skin, fascia, bone and uterine muscle. Thus, as cesarean sections became more commonplace, it came as no surprise when hysterotomy scars from cesarean deliveries ruptured under the stress of subsequent pregnancies and labors. Douglas recognized this 40 years ago in a series that he published from the New York Lying-In Hospital. At that time, the overall cesarean delivery rate was 4% with half of those done for the indication of a prior cesarean section. Among more than 2,000 women with prior cesarean section scars, uterine rupture during labor occurred in just over 1%, and more than a third of those involved fetuses died. Douglas concluded that, “Probably the most vehement objections to the policy of vaginal delivery after cesarean section allude to the occurrence of catastrophic ruptures of the uterine scar.” That kind of experience and reason coupled with the dogmatic proclamation of “once a cesarean section, always a cesarean section”, cast the practice of vaginal birth after cesarean (VBAC) into widespread disrepute for decades.

Subsequently, cesarean sections went from commonplace to epidemic with the U.S. national rate peaking in the late 1980s at nearly 23%. This attracted the attention of medical academicians, health care policy analysts, public health officials and those who paid the nation’s escalating health care bills, because cesarean sections generally result in greater short term and long term maternal morbidity, mortality, and expense than vaginal deliveries. A third of the cesarean sections were elective repeat procedures with absolute numbers rising as the primary cesarean section rate rose. An obvious opportunity to curb the overall cesarean section rate was to revive the practice of vaginal birth after cesarean. Enthusiastic reports of success and optimistic assessments of meta-analyses propelled the VBAC juggernaut. Insurers assembled programs to promote VBAC and educate doctors and patients regarding their benefits. Some insurers even felt justified in refusing to pay for repeat cesarean sections that were not preceded by attempts at VBAC. Individual physicians, and to some extent their professional organizations, were cajoled or coerced into supporting these programs, lest they be dropped from the provider roster or portrayed as uncooperative and non-progressive. As experience again accumulated however, so too did reports of maternal and perinatal morbidity and mortality associated with VBAC, most of which was attributable to uterine rupture.

Efforts to improve the safety of VBAC have focused on attempts to identify risk factors for uterine rupture. Zelop et al. found that 1,021 women with a history of a successful vaginal delivery were at significantly lower risk of uterine rupture (0.2%) than 2,762 women without a vaginal delivery (1.1%). Ironically, the two women who ruptured their uteri in the prior vaginal delivery group, each had two prior successful VBACs. Thus, even a history of a successful VBAC is not a guarantee that a patient will not rupture her uterus in a subsequent VBAC attempt. Not surprisingly, women with two prior cesarean sections are at significantly greater risk of uterine rupture during VBAC.
an attempt than women with only one prior scar (3.7% vs. 0.8%). Neither length of labor, nor use of epidural anesthesia, were associated with an increased risk for uterine rupture during VBAC attempt.9

Investigations into the effects of labor induction and oxytocic agents used to induce labor have yielded inconsistent results. Compared to spontaneous labor, Ravasia et al.10 found a significantly higher incidence of uterine rupture associated with labor induced with PGE2 gel (2.9% vs. 0.5%) but not with oxytocin (0.7%). In contrast, Zelóp et al.11 found induction of labor with oxytocin to be associated with a statistically significant increase in risk for uterine rupture (2.0% vs. 0.7%) compared to spontaneous labor. Although their data suggested an increased risk for uterine rupture with PGE2 induction of labor, the number of events was small, their confidence interval for this risk estimate was wide and included unity. Rageth et al.12 observed a modest but statistically significant increase in risk for uterine rupture with induction of labor but they do not specify the oxytocic agent(s) used. Reports of two small uncontrolled case series13,14 suggested a 5-10% risk of uterine rupture associated with use of the very potent oxytocic synthetic prostaglandin E1 analog, misoprostol.

The most recent study to heat up the controversy appeared in the New England Journal of Medicine in July 2001. In that study, Lydon-Rochelle et al.15 used a large state-wide database of 20,000 women in Washington state to examine the risk of uterine rupture associated with induction of labor. All of the women were delivering their first singleton babies after one prior cesarean section. The overall risk of uterine rupture was 4.5 per 1,000, which is very consistent with many other studies. The risks of rupture associated with spontaneous labor and non-prostaglandin induction of labor were 5.2 and 7.7 per 1,000 respectively. These were both significantly greater than the 1.6 per 1,000 rate seen with repeat cesarean section without labor but not different from one another. Most striking was the 24.5 per 1,000 rate of uterine rupture observed with prostaglandin induction of labor. Their database did not contain information regarding the type of prostaglandin used. To examine the possibility that all or most of the observed increase in risk associated with prostaglandin induction might be due to misoprostol, the authors stratified their analysis by time prior to 1996 and during 1996. Misoprostol has been used for this purpose only relatively recently and there was no suggestion of a recent increase in incidence in rupture with prostaglandin induction. This suggests that the risk is not associated with misoprostol alone but extends to other prostaglandin preparations. Purists will object that prostaglandins are not approved, indicated or intended for use to induce labor at term but only to prepare the unfavorable cervix. Extensive clinical experience with these agents suggests that they frequently do induce labor regardless of the intent and that this is a semantic difference. The authors demonstrate that their 91 patients with diagnoses of uterine ruptures had substantially greater incidences of a variety of postpartum complications, suggesting that these were truly clinically important ruptures and not merely asymptomatic dehiscences. Finally, there was an eleven-fold difference in infant death (0.5% vs 5.5%) between the 20,000 women who did not rupture their uteri and the 91 who did. It is important to emphasize that this study, like all others to date, was an observational study of the results of clinical practice and not a randomized trial.
The relative risk of 3.3 for uterine rupture with a trial of spontaneous labor as compared to elective repeat cesarean section is consistent with the odds ratio of 2.1 for a similar comparison calculated by Mozurkewich and Hutton in their meta-analysis of 11 studies with 39,000 subjects. Mozurkewich and Hutton also calculated statistically significant increases in risk for fetal death (odds ratio 1.7) and Apgar score less than 7 at 5 minutes (odds ratio 2.2) associated with a trial of labor as compared to elective repeat cesarean delivery. These risks reflect broad experience with large numbers of subjects over many years in a wide range of clinical practice settings. There is no evidence or reason to believe that they can be substantially reduced by improvements in clinical care.

What benefits might offset these risks? Women who successfully complete trials of labor generally have less post partum discomfort and shorter lengths of hospital stay than women who undergo repeat cesarean section. There is evidence that a trial of labor is associated with a lower risk for febrile morbidity than elective repeat cesarean section. The findings of reduced risks for transfusion and hysterectomy with trial of labor are likely due to patient selection because they are not driven by uterine ruptures, which are more common with trial of labor.

Slovic recognized that “experts” (e.g. health care policy wonks, public health officials and insurance company executives) perceive “risk” differently from lay people (patients). Experts judge risk according to technical estimates of actual numbers of fatalities, which for perinatal mortality is 5.8 per 1,000 with trial of labor after cesarean section compared to 3.4 per 1,000 with elective repeat cesarean section. The absolute difference between the two is 2.4 per 1,000 (1/417), a relatively small number. Lay people judge “risk” more according to their degree of “dread” for the unwanted outcome. "Dread" in turn is determined by the degree to which the outcome is irreversible, potentially lethal, and uncontrollable. By these criteria, perinatal mortality during a trial of labor would seem to be associated with a high degree of dread.

The process of obtaining informed consent for medical care requires that physicians provide patients with the information that a “reasonable person” would want to know under the circumstances. Most reasonable persons would want to know that attempt at VBAC is associated with a higher risk of perinatal mortality than elective repeat cesarean section. People have different abilities to tolerate or accept risk. Some people would see the 5.8 per 1,000 risk of perinatal mortality associated with VBAC as very small and acceptable. Others would ask if there is a way to further reduce that risk and, if there is, to take that alternative course.
BEATING THE ODDS OF A FAILED INTUBATION: NUMBER NEEDED TO TREAT OR THE TRICK OF TURNING TO BINOMIAL TABLES
Glasenberg, R.; Fredericksen, M.

SUPPLEMENTARY OXYGEN IMPROVES UMBILICAL CORD BLOOD GASES IN OBESE MOTHERS UNDERGOING ELECTIVE CAESAREAN SECTION
Bullough, A.; Taylor, I.; Van Hamel, C.; Watters, M.

THE URGency OF CAESAREAN CLASSIFICATION AND FETAL OUTCOME

FIBEROPTIC ENDOTRACHEAL INTUBATION OF THE ENDOMORPH: METAMORPHOSIS IN AIRWAY MANAGEMENT
Glasenberg, R.; Fredericksen, M.

SUPPLEMENTARY OXYGEN IMPROVES UMBILICAL CORD BLOOD GASES IN OBESE MOTHERS UNDERGOING ELECTIVE CAESAREAN SECTION
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Glasenberg, R.; Fredericksen, M.

THROMBOPROPHYLAXIS IN EMERGENCY LSCS: AN AUDIT CYCLE COMPLETED
Sashidharan, R.; Leschinskiy, D.

SPINAL ANESTHESIA FOR CESAREAN SECTION FOLLOWING SUBOPTIMAL LABOR EPIDURAL ANALGESIA
Dadarkar, P.; Philip, J.; Perez, B.; Makhudum, A.; Slawmaker, E.; Weidner, C.; Tabaczewska, L.; Wiley, J.; Sharma, S.

DOES DENSITY INFLUENCE THE SPREAD OF INTRATHECAL BUPIVACAINE IN THE PROLONGED SITTING POSITION BEFORE ELECTIVE CESAREAN SECTION?
Sodhi, V.; Fernando, R.; Hallworth, S.; Sarang, K.; Patel, N.

LOW-DOSE ROPIVACAINE VS. BUPIVACAINE FOR SPINAL ANESTHESIA FOR CESAREAN SECTION
Velickovic, I.A.; Leicht, C.H.

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Sodhi, V.; Fernando, R.; Hallworth, S.; Sarang, K.; Patel, N.

LOW-DOSE ROPIVACAINE VS. BUPIVACAINE FOR SPINAL ANESTHESIA FOR CESAREAN SECTION
Velickovic, I.A.; Leicht, C.H.

SHORT STATURE IS ASSOCIATED WITH A HIGHER CESAREAN SECTION AND EPIDURAL RATE
Dimarco, C.S.; Ramin, K.D.; Ramsey, P.S.; Vasdev, G.M.

EPIDURAL MORPHINE FOR POST-cesarean ANALGESIA - DOES ADDING FENTANYL MAKE A DIFFERENCE?

MORPHINE-INDUCED HYPOOTHERMIA AFTER CESAREAN DELIVERY AND ITS REVERSAL WITH LORAZEPAM
Wang, J.; Snowman, C.; Pratt, S.; Hess, P.E.

FACTORs PREDICTING FAILURE OF LABOR EPIDURAL CATHETERS DURING CESAREAN SECTION
Habib, A.S.; Drysdale, S.; Olofulabi, A.J.; Phillips-Bute, B.G.; Muir, H.A.

PERIPARTUM HYSTERECTOMIES: ANESTHETIC AND OBSTETRIC OUTCOMES
Zinner, T.R.; Khan, K.; Lee-Parritz, A.; Camann, W.R.

FETAL ACIDEMIA AND ANESTHESIA
Frolich, M.A.; Caton, D.

FETAL EFFECTS OF MATERNAL ANALGOSEDA TION
Frolich, M.A.; Bifulco, T.Y.; Caton, D.

FIBEROPTIC INTUBATION IN PARTURIENTS UNDERGOING CESAREAN SECTION
Kruszuski, P.; Shukla, N.; Wali, A.; Kim, Y.; Vadhera, R.; Longmire, S.; Munnur, U.; Rivers, J.; Tran, C.; Palacios, Q.; Suresh, M.S.

DOES THE TYPE OF PRENATAL CAREGIVER INFLUENCE THE RATE OF EPIDURAL USAGE AMONG PARTURIENTS?
Friedman, J.D.; Ramin, K.D.; Vasdev, G.M.; Ramsey, P.S.

All Abstracts are in the Anesthesiology Supplement.
Poster Review #2

P-81 ANALGESIA AFTER CESAREAN SECTION: DOES THE PRE-EMPTIVE EFFECT OF EPIDURAL DIAMORPHINE AFFECT OUTCOME?
Mok, M.U.; Thompson, J.; Vanarase, M.; Grange, C.

P-82 EXAMINING THE INFORMATION REQUIREMENTS OF WOMEN HAVING ELECTIVE CESAREAN SECTION
Dr Julia Morch-Siddall, Dr Valerie Bythell Department of Anaesthesia, Royal Victoria Infirmary, Newcastle Upon Tyne UK
Morch-Siddall, J; Bythell, V.

P-83 DOES INCREASED INTRAVENOUS HYDRATION DECREASE THE INCIDENCE OF NAUSEA/VOMITING FOLLOWING CESAREAN SECTION?
Gaiser, R.R.; Dong, Y.; Cheek, T.G.; Gutsche, B.B.

P-84 GENERAL ANAESTHESIA FOR CESAREAN SECTION: CURRENT PRACTICE PATTERNS
Satya-Krishna, R; Grange, C; Russell, R.

P-85 PRURITIS ASSOCIATED WITH INTRATHECAL MORPHINE FOR CESAREAN SECTION: A COMPARISON BETWEEN 100 AND 200 MCG
Habib, A.S; Drysdale, S; Phillips-Bute, B.G.; Muir, H.A.

P-86 ARE ROUTINE TYPE & SCREEN ORDERS NECESSARY FOR CESAREAN SECTION?
DeBalli, R; Spahn, T.; Muir, H.A.

P-87 THE EFFECT OF THE ADDITION OF EPINEPHRINE ON EARLY SYSTEMIC ABSORPTION OF EPIDURAL ROPIVACAINE IN HUMANS
Lee, B.B; Ngan Kee, W.D.; Plummer, J.L.; Wong, A.S.

P-88 IS 6% HETASTARCH PREFERRED OVER PROPHYLACTIC IV EPHEDRINE FOR PREVENTION OF HYPOTENSION FROM INTRATHECAL ROPIVACAINE FOR C/S?
Cohen, S; Denenberg, H.; Alptekin, B; Ginsberg, S; Bokhari, F; Burley, E; Zada, Y; Freeman, L.

All Abstracts are in the Anesthesiology Supplement.
Scientific Program

Saturday, May 4, 2002

6:30 am  Registration
7:00 - 8:00 am  Breakfast with Exhibitors & Posters
7:00 - 8:00 am  Multidisciplinary Obstetric Simulated Emergency Scenarios (MOSES)  
(Limited Registration - By Ticket Only)  
Christopher Sadler, PhD, MBBS, FRCA;  
Mira Razzaque, MD

8:00 - 9:30 am  Clinical Forum: Scripted Cases of Parturients with Cardiovascular Disorders  
Moderators: Carole Warnes, MD; Kirk Ramin, MD; William R. Camann, MD
9:30 - 10:00 am  Break with Exhibitors & Posters
10:00 - 11:00 am  ASA Presidential Address  
Barry Glazer, MD

11:00 am - 12:00 n  Debate No. 2  
Failed Epidural for Urgent C/S: Spinal is Preferable to General Anesthesia  
Moderator: Andrew M. Malinow, MD  
PRO: David R. Gambling, MBBS  
CON: M. Joanne Douglas, MD, FRCPC

12:00 - 1:00 pm  Lunch
1:00 - 2:00 pm  Poster Review #3  
Introduction: Alan C. Santos, MD; Moderator: Holly Muir, MD, FRCPC

2:00 - 3:00 pm  Gerard W. Ostheimer Anesthesia Lecture: What's New in Obstetric Anesthesia?  
Introduction: Alan C. Santos, MD; Presentor: David H. Wlody, MD

3:00 - 3:30 pm  Break with Exhibitors & Posters

3:30 - 5:00 pm  Business Meeting

5:30 pm  Sunset Sailing (Limited Space, Ticket Only)
Multidisciplinary Obstetric Simulated Emergency Scenarios (MOSES)
Christopher Sadler, PhD, MBBS, FRCA; Mira Razzaque, MD
7:00 - 8:00 am

During this presentation, the participant will learn about the multidisciplinary management of emergency situations in obstetrics.
The NHS litigation bill in the UK stands at £400 million; half of this is from the field of Obstetrics and Gynaecology\(^1\). Substandard care was identified in over 60\% of direct deaths in the latest confidential enquiry into maternal deaths (CEMD)\(^2\). Healthcare providers in Obstetrics and Gynaecology have been charged with achieving a 25\% reduction in the instances of harm resulting in litigation by 2005\(^1\). What risk reduction strategies might make an impact on these figures?

Failure of communication and team working between professionals is the main cause of major substandard care (42\%) in direct and indirect deaths reported in the CEMD\(^2\). In an attempt to improve team efficiency, previous enquiries have recommended that obstetric units run regular fire drills to ensure that all members of staff know exactly what to do in an emergency\(^3\). Simulation centres have been identified as possible tools to help in risk reduction strategies by allowing healthcare professionals to practice emergency drills without any risk to real patients\(^1\).

Human factors courses, which examine how behaviour can influence development and resolution of crisis situations, are available in Anaesthesia\(^4\). However, we are unaware of any courses that look at behaviour and team working in a multidisciplinary setting. Consequently, we have devised the MOSES course for obstetricians, anaesthetists and midwives with the goals of (1) teaching effective multidisciplinary team working (2) demonstrating the role human behaviour can play in crisis prevention and resolution and (3) practicing obstetric emergency drills.

The MOSES course is run in a High Fidelity Medical Simulation Centre using a computerized manikin (Laerdal SimMan) as the pregnant mother. The simulation centre includes a clinical area housing the manikin that can be arranged as labour ward or the obstetric operating theatre. The manikin is controlled by a laptop behind a one-way mirrored window looking onto the clinical area.

The clinical area is fully equipped and staffed. The manikin breathes spontaneously, has breath sounds and heart sounds, peripheral pulses, talks and can be anaesthetised and ventilated. Modifications have been made to the manikin to allow assessment of cervical dilation and delivery of a simulated fetus by Lower Segment Caesarean Section. A simulated auditory and visual cardiotocograph adds to the realism.

Course participants manage real time multidisciplinary scenarios lasting about 30 minutes. Participants are required to make diagnoses and treat as they see appropriate using real drugs and simulated blood products when required. Several cameras record
different views of the scenarios onto videotape. After the scenario participants are debriefed using video playback to demonstrate teaching points. Trained facilitators from anaesthesia, obstetrics and midwifery direct the discussion to concentrate on team working and behavioural issues that can impact on crisis development and resolution.

This workshop will:

Introduce the MOSES course.
Involve the audience in a team working exercise to identify good/bad team working behaviours.
Ask the audience to analyse some video footage of an obstetric emergency for good/bad team working behaviours.
Demonstrate how Laerdal SimMan can be used for Obstetric ‘fire drill’ training.

References:

Research Works in Progress
Moderators: Robert D’Angelo, MD, Richard M. Smiley, MD, PhD
7:00 - 8:00 am

Notes:
Clinical Forum: Scripted Cases of Parturients with Cardiovascular Disorders

Moderator: Carole Warnes, MD; Kirk Ramin, MD; William R. Camann, MD

8:00 - 9:30 am

Participant will learn about multidisciplinary management of obstetric patients with life-threatening cardiovascular disease. These will be illustrated using study cases.
MEDICAL PRESENTATION: (Dr. Warnes)

30-year-old woman transported by helicopter emergently and she is 30 weeks pregnant. Her past medical history reveals 2-weeks of dyspnea and cough treated with antibiotics, now in extremis with orthopnea. On admission: BP 85/60, profoundly dyspneic, sitting upright, coughing. Low-volume pulses with a sinus tachycardia at 120 BPM. A Harsh systolic murmur was heard in the aortic area and a third heart sound. Investigations: Chest x-ray: Severe pulmonary edema with cardiac enlargement. Echocardiogram: Severe aortic stenosis with calcified valve (probably bicuspid valves) area approximately 0.7 cm², mean gradient 50 mm Hg, peak 95 mm Hg. Aortic regurgitation grade 1-2/4. Left ventricular ejection fraction 36% 

OBSTETRIC MANAGEMENT: (Dr. Ramin)

General Principles - All Obstetric Patients

I. Physiologic changes of pregnancy
   A. 50% increase in intravascular volume
   B. Decreased systemic vascular resistance (SVE)
      1. Potential right-to-left shunts
      2. Preeclampsia has opposite effect
   C. Hypercoagulable state of pregnancy
      1. All clotting factors increase except factors XI and XIII
      2. Marked fibrinogen increase
      3. Free protein S falls by second trimester
   D. Marked fluctuations in cardiac output during labor and delivery
Specific

I. General
   A. Aortic stenosis
      1. Significant stenosis uncommon among women of childbearing age
      2. Majority secondary to congenitally stenotic aortic valves
         a. Bicuspid
         b. Unicuspid
         c. Supra/subvalvular stenosis
   B. Mortality
      1. Maternal 17%
      2. Perinatal 32%
      3. Greatest risk gradient >100 mmHg
      4. Risk of sudden death out of proportion to degree of clinical symptoms
   C. Management
      1. Varies with degree of disease
      2. Fixed cardiac outflow
      3. Tachycardia – avoid
         a. Reduced preload
         b. Shortened ejection period
         c. Increased myocardial oxygen consumption
         d. Coronary perfusion
            (1) Increased ventricular diastolic pressure
            (2) Reduced systemic afterload
      4. Prenatal
         a. Reduce physical activity
         b. Bedrest
         c. Maintenance of venous return
      5. Labor and delivery
         a. Factors
            (1) Increased cardiac effort
            (2) Systemic peripheral dilation
            (3) Blood loss with delivery
            (4) Supine hypotension
            (5) Valsalva
         b. Pulmonary artery catheter
            (1) Optimize preload to avoid decreased output or pulmonary edema
         c. Avoid Valsalva in second stage
            (1) Forceps
            (2) Vacuum
         d. Aggressive management of third stage
            (1) Avoid postpartum hemorrhage
            (2) Critical disease
   D. Valvuloplasty
   E. Valvotomy
ANESTHESIA MANAGEMENT: (Dr. Camann)

I.  Vaginal:
Invasive monitoring with arterial line and CVP/PA. Maintain CVP/PAWP at high-normal levels. Maintenance of sinus rhythm is important to preserve ventricular filling. Oxygen administration throughout labor should be used. Careful attention to adequate uterine displacement is vital. Regional analgesia/anaesthesia, previously thought to be contraindicated in patients with AS, has been used. Caution is essential, and a slow onset of block should be sought. Intrathecal opioids (without local anesthetics) may be used for early labor, with gradual instillation of a low-dose epidural local anesthetic infusion as labor progresses. No epinephrine should be added, as unintentional IV injection could cause life-threatening tachycardia. A dense anesthetic level of T10-T8 should be slowly obtained as the patient approaches delivery, with consideration for an assisted second stage and minimal maternal expulsive efforts.

II. Cesarean:
General anesthesia would be advocated by most anesthesiologists. Thiopental or propofol may result in unwanted myocardial depression, while ketamine may result in undesirable tachycardia. A combination of etomidate and opioid represents a good choice for induction. Arterial and central monitoring are warranted. Regional anesthesia has been used for cesarean delivery in the presence of severe AS. Single-shot spinal should be avoided. An epidural with slow titration of anesthetic level can be used. Oxygen, adequate uterine displacement and judicious sedation are all important.

REFERENCES:


Case II

MEDICAL PRESENTATION: (Dr. Warnes)

23-year-old with complex cyanotic congenital heart disease and severe pulmonary vascular disease referred urgently with a 16 weeks gravid uterus. Patient was known to have complex pulmonary atresia with hypoplastic pulmonary arteries. Husband considers urgent referral unnecessary, and states that doctors are “completely mad”. Her medical history: Patient cyanotic at an early age treated with a Right Blalock-Taussig shunt at aged 10 and a Left Blalock-Taussig shunt at aged 11. She underwent cardiac catheterization at aged 15, which demonstrated the left Blalock-Taussig shunt was not working. One-year previously (1996) she had an ascending aorta-to-left pulmonary artery shunt. The pulmonary arteries severely hypoplastic with systemic pressures in the pulmonary arteries; i.e., Eisenmenger physiology, patient functional class II. Patient had never been given any counseling regarding pregnancy or contraception. The patient presented at 16 weeks pregnant feeling slightly more short of breath but has no ankle swelling or palpitations, or on any medications.

Her examination revealed: moderate cyanosis, bounding pulse 80 BPM and sinus rhythm, BP 110/70, jugular venous pressure elevated 2 cm, left and right ventricular lifts, continuous murmur over the sternum, an additional continuous murmur over the right side, and no peripheral edema. Hemoglobin: 14.3 g/dL

Patient would not consider termination of pregnancy.

At 20 weeks gestation: Getting a little more tired, resting saturation 84%, on prenatal vitamin supplements and baby aspirin.

At 28 weeks: Patient more cyanotic, on modified bedrest and limited activity in the house, jugular venous pressure elevated 3 cm, pulse 85 BPM and sinus rhythm, BP 100/70. Auscultation of the chest was clear. No hepatomegaly or peripheral edema.
OBSTETRIC MANAGEMENT: (Dr. Ramin)

Counseling

I. Risks with cyanotic heart disease
   A. Fetal
      1. Increased risk for fetal conotruncal abnormality 6-10%
      2. Increased risk for spontaneous abortion
      3. Increased risk intrauterine growth restriction, stillbirth, and prematurity
      4. Increased cesarean delivery rates
   B. Maternal
      1. Increased risk of DVT, pulmonary infarction, stroke
      2. Increased risk of arrhythmia
      3. Increased risk of death (up to 50%)
      4. Risk of aortic rupture given baseline dilation
   C. General
      1. Termination option
      2. Delivery in tertiary care center

II. Management
   A. Fetal imaging
      1. Early fetal ultrasound
         a. Establish dates as delivery will be premature
         b. Document intrauterine pregnancy as ectopic rupture and hemorrhage would be hazardous
      2. 18-week anatomy scan
         a. Document normal anatomic relationships
         b. Multiple anomalies that would be incompatible with life important considerations given maternal risks
      3. Fetal echocardiogram
         a. 20-22 weeks’ gestation
      4. Ultrasound every 4-6 weeks throughout gestation for fetal growth and fluid assessment
      5. Fetal testing; biophysical profile (BPP) or nonstress testing (NST) weekly beginning at 28 weeks until delivery
   B. Maternal imaging
      1. Cardiac echocardiogram early in pregnancy if not performed in past year
      2. Repeat echocardiogram late second trimester to early third trimester to assess change in function
   C. General prenatal care
      1. Diet and weight gain
         a. Nutrition consult
         b. Keep weight gain at 20-25 pounds
         c. Limit exercise
2. Rest periods
   a. Adjust per symptoms
   b. Admission rest late second or early third trimester
3. Baby aspirin/anticoagulation

D. Labor and delivery
1. Hemodynamic changes
   a. Autotransfusion
   b. Hemorrhage
   c. Regional/general analgesia
   d. Maternal positioning
   e. Hemodynamic monitoring
2. Route of delivery
   a. Vaginal
   b. Cesarean
3. Timing of delivery
   a. Prematurity risks
   b. Maternal risks
4. Medications
   a. Oxytocin
   b. Prostaglandins
   c. Steroids (lung maturity)
   d. Anticoagulation
   e. Vasodilators
5. Postpartum issues
   a. Two-week admission
   b. Sterilization

ANESTHESIA MANAGEMENT: (Dr. Camann)

General Principles:
Pulmonary hypertension is poorly tolerated in pregnancy. Chronic hypoxemia may result in restricted fetal growth. Fixed pulmonary vascular resistance may not allow for normal adaptation to pregnancy. Pregnancy-associated decrease in SVR may exacerbate right-to-left shunting.

Arterial monitoring should be used, but central/PA would be relatively contraindicated, hazardous and unlikely to offer useful information. Oxygen should be continuously administered. If responsive to pulmonary vasodilation, nitric oxide or prostacyclin may be administered. Concerns for regional vs. general are similar to those discussed in the previous case (aortic stenosis). Thromboembolic prophylaxis would likely be used, and this may complicate regional techniques. Pulmonary or systemic embolism is the leading cause of maternal mortality in pregnancy patients with Eisenmenger's syndrome. Life-threatening pulmonary hemorrhage from excessive pulmonary tree pressures is often a terminal event.
REFERENCES:

MEDICAL PRESENTATION: (Dr. Warnes)

A 24-year-old woman referred at 12 weeks of pregnancy. She had a known history of Holt-Oram syndrome, secundum ASD closed at 7 years of age. She was found to be in atrial flutter while pregnant, duration unknown. On examination: Overweight, functional class 2, JVP normal, pulse 75 BPM, apical systolic murmur of mitral regurgitation.

Echocardiogram: Enlarged LV, EF=50%, moderate tricuspid and mild-to-moderate mitral regurgitation.

Next steps in her medical management.
Options:
- A. Leave in atrial flutter
- B. Anticoagulation
- C. DC cardioversion
- D. Pharmacological Cardioversion
- E. Optimization of Cardiac function

OBSTETRIC MANAGEMENT: (Dr. Ramin)

I. Genetic Counseling
   A. Holt-Oram Syndrome
      1. “Atriodigital dysplasia,” “cardiac-limb,” “hand-heart”
         a. Congenital heart defect (secundum ASD)
         b. Upper extremity defects
            (1) Polydactyly
            (2) Syndactyly
            (3) Radial defects (including thumb)
   2. Autosomal dominant
      a. High degree penetrance
      3. Antiepileptic medications

II. Arrhythmia
   A. Cardioversion
      1. Electrocardioversion
         a. Little risk to fetus
      2. Pharmacologic - antiarrhythmics
         a. Risk drug dependent
         b. Interferes directly with depolarization
            (1) Lidocaine – may cause uterine artery spasm
            (2) Procainamide – chronic use lupus-like syndrome
            (3) Encainide – no human studies
            (4) Flecainide – no human studies
            (5) Tocainide – no human studies
            (6) Disopyramide – embryotoxic lab animals/uterine contractions
(7) Mexiletine – no human studies
(8) Quinidine – probably safe; no well-controlled trials

C. Antisypathetic effects
(1) Propranolol – intrauterine growth retardation, bradycardia, apnea, and respiratory depression, hypoglycemia

D. Markedly prolonged duration of action potential
(1) Bretylium – no human studies
(2) Amiodarone – no human studies/possible fetal cretinism

E. Blockade of slow inward (calcium-sodium channel) depolarization current
(1) Verapamil – may affect uterine blood flow

F. Cardiac glycosides – many years of use, no reported adverse fetal effects or teratogenicity

B. Anticoagulation
1. Coumadin
   a. Crosses placenta
   b. Warfarin syndrome
2. Heparin
   a. Fetal safety
   b. Osteoporosis
   c. Thrombocytopenia

III. Pregnancy management
A. Fetal surveillance
B. Labor and delivery
   1. Regional analgesia
   2. Anticoagulation
   3. Forceps delivery

ANESTHESIA MANAGEMENT: (Dr. Camann)

Anesthetic management for cardioversion:
Sedation using propofol until loss of eyelid reflex, usually not more than 75-100 mg. Oral antacid prophylaxis, but not metoclopramide, as this may exacerbate tachycardia. No opioids, as post-procedure emesis may be induced. My preference is to avoid airway instrumentation, even in later stages of pregnancy, as induction of GA and endotracheal intubation is likely to be associated with more problems than a brief sedative with GI prophylaxis in an appropriately fasted patient.
REFERENCES:


ASA Presidential Address
Barry Glazer, MD

10:00 - 11:00 am

NOTES:
Debate No. 2

Failed Epidural for Urgent C/S: Spinal is Preferable to General Anesthesia

Moderator: Andrew M. Malinow, MD
Pro: David R. Gambling, MBBS
Con: M. Joanne Douglas, MD, FRCPC

11:00 am - 12:00 n

Supporting manuscripts will be available online after the meeting.

Following this debate, the participants will be able to compare and contrast the risks and benefits of spinal versus general anesthesia when an epidural catheter has failed for an urgent cesarean delivery.
Poster Review #3
Moderator: Holly Muir, MD, FRCPC
11:30 am - 12:30 pm

P1 LOWER LIMB NEUROLOGICAL SEQUELAE AFTER LABOR EPIDURAL ANALGESIA
Kaul, B.; Darwich, A.A.; Vallejo, M.C.; Ramanathan, S.; Mandell, G.L.

P2 SPINAL ANESTHESIA FOR CESAREAN SECTION AFTER FAILED LABOR EPIDURAL ANALGESIA: RETROSPECTIVE ANALYSIS OF TWO DOISING REGIMENS
Vadhera, R.B.; Sisawawa, F.J.; Portnoy, D.; Koutrouvelis, A.P.

P3 RESEARCH: AN INNOVATIVE TOOL FOR INITIATING AN OBSTETRIC ANESTHESIA SERVICE
Owen, M.D.; Sahin, S.; Uckunkaya, N.

P4 DEVELOPING OUTCOME MEASURES FOR OBSTETRIC ANESTHESIA EDUCATION
Owen, M.D.; Sahin, S.; Ayfar, U.; James, R.

P5 NATIONAL IN-TRAINING EXAM TRENDS: BACK TO THE FUTURE OR FORWARD TO THE PAST
Glassenberg, R.

P6 COMBINED SPINAL-EPIDURAL WITH PATIENT-CONTROL EPIDURAL ANALGESIA FOR LABOR: QUALITY ASSURANCE SURVEY FROM A UNIVERSITY HOSPITAL IN SWITZERLAND
Landaau; Giraud; Kern

P7 ESTABLISHING A HIGH RISK REGISTRY TO IMPROVE PATIENT CARE AND RESIDENT EDUCATION
Finegold, H. Ramanathan, S.

P8 HOW DO WE EDUCATE OUR PATIENTS ABOUT OBSTETRIC ANESTHESIA? (ANIMATED WEBSITE: WWW.PAINFREEBIRTHING.COM)
Kodali, B.

P9 MEDICAL STUDENT EDUCATION IN OB ANESTHESIOLOGY: CONNECTING BASIC AND CLINICAL SCIENCES IN A NEW MEDICAL SCHOOL CURRICULUM
Wissler, R.

P10 INITIAL FEEDBACK ON MOSES (MULTIDISCIPLINARY OBSTETRIC SIMULATED EMERGENCY SCENARIOS): A COURSE ON TEAM TRAINING, HUMAN BEHAVIOUR AND 'FIRE DRILLS'
Davis, C.; Gregg, A.; Thornley, D.; Razzaque, M.; Woods, M.; Ayida, G.; Sadler, C.

P11 COMBINED OBSTETRIC AND ANESTHESIA JOURNAL CLUB SERIES: A FORUM FOR COLLABORATION
SHANKAR B KODALI, CAMANN WR, DEPARTMENT OF ANESTHESIA BRIGHAM AND WOMEN'S HOSPITAL,
HARVARD MEDICAL SCHOOL BOSTON, MA 02115
Camann, W.; Kodali, B.

P12 IS THERE A RELATIONSHIP BETWEEN RESPONSE TIME FOR LABOR EPIDURAL AND PATIENT SATISFACTION?
Megally, M.; Joseph, N.J.; Salem, M.

P13 NITROGLYCERIN FOR MANUAL REMOVAL OF PLACENTA
Sabzposh, S.A.; Sabzposh, N.A.; Sultana, K.

P14 REGIONAL ANESTHESIA USE IN PARTURIENTS WITH FACTOR V LEIDEN MUTATION
Walsh, M.E.; Harnett, M.J.; Tsen, L.C.

All Abstracts are in the Anesthesiology Supplement.
Poster Review #3

P-89 IN VITRO INVESTIGATION: DURAL TRAUMA PATTERNS, CSF LEAK AND EPIDURAL NEEDLE PUNCTURE
   Angle, P.; Kronberg, J.; Thompson, D.

P-90 SODIUM NITROPRUSSIDE (SNP) INHIBITS HYPOXIC FETO-PLACENTAL VASOCONSTRICTION (HFPV) IN THE DUAL PERFUSED, SINGLE ISOLATED HUMAN PLACENTAL COTYLEDON
   Downing, J.W.; Ramasubramanian, R.; Minzter, B.H.; Paschall, R.L.; E.L.; Johnson, B.; Johnson, R.

P-91 SPINAL PROSTAGLANDINS MODULATE PAIN FROM UTERINE CERVICAL DISTENSION
   Tong, C.; Eisenach, J.C.

P-92 USE OF NIRS TO MONITOR PLACENTA TISSUE OXYGENATION
   Olufolahi, A.; James, A.; Coates, E.; El-Moalem, H.; Reynolds, J.

P-93 EXTRACELLULAR REGULATED KINASE-MEDIATED PHOSPHORYLATION OF MYOMETRIAL CALDESMON DURING PREGNANCY AND LABOR
   Li, Y.; Malek, S.; Morgan, K.G.

P-94 EPIDURAL BOLUS ADMINISTRATION AND CONTINUOUS EPIDURAL INFUSION OF FENTANYL DIFFER IN THEIR MECHANISM OF ACTION
   Ginosar, Y.; Riley, E.T.; Angst, M.S.

All Abstracts are in the Anesthesiology Supplement.
Gerard W. Ostheimer: What's New in Obstetric Anesthesia Lecture

David H. Wlody, MD

2:00 - 3:00 pm

Following this lecture, the participant will know the current obstetric anesthesia literature and its impact on anesthetic management of the pregnant woman.
The Gerard W. Ostheimer Anesthesia Lecture:
What's New in Obstetric Anesthesia?

David Wlody, M.D.
Clinical Associate Professor of Anesthesia
Vice Chair for Clinical Affairs
State University of New York
Downstate Medical Center
Methods
A hand search of the table of contents of the following anesthesia, OB-GYN, midwifery, and general medicine journals was performed:

- Acta Anaesthesiologica Belgica
- Acta Anaesthesiologica Scandinavica
- Acta Obstetrica et Gynecologica Scandinavica
- AANA Journal
- American Journal of Hypertension
- American Journal of Obstetrics and Gynecology
- Anaesthesia
- Anaesthesia and Intensive Care
- Der Anaesthesist
- Anesthesiology
- Annales Francaises d'Anesthesie et de Reanimation
- Birth
- British Journal of Anaesthesia
- British Journal of Obstetrics and Gynaecology
- British Medical Journal
- Canadian Journal of Anaesthesia
- Chest
- Circulation
- European Journal of Anaesthesiology
- European Journal of Obstetrics & Gynecology and Reproductive Biology
- International Journal of Obstetric Anesthesia
- Journal of the American Medical Association
- Journal of Clinical Anesthesia
- Journal of Human Lactation
- Journal of Nurse Midwifery and Women’s Health
- Journal of Pediatrics
- The Lancet
- Middle East Journal of Anaesthesiology
- New England Journal of Medicine
- Obstetrics and Gynecology
- Pediatrics
- Regional Anesthesia and Pain Medicine

In addition, PUBMED (http://www.pubmed.gov) and NLM Gateway (http://gateway.nlm.nih.gov) searches were performed for a number of topics that were felt to be pertinent to the practice of obstetric anesthesia, including coexisting diseases, medicolegal and economic issues in obstetric anesthesia, and the effect of maternal analgesia on the progress of labor and newborn behavior. A LEXIS-NEXIS search was also performed to identify articles published in the popular press, in both the US and the UK, which might affect the public’s view of obstetric anesthesia, for both good and ill.

This review defines “What’s New in Obstetric Anesthesia” quite broadly. I have attempted to identify all those papers published in 2001 that deal specifically with the anesthetic management of the pregnant patient. I have also chosen papers dealing with local anesthetic pharmacology, spinal and epidural anesthesia, and postoperative pain management, which, while not specifically dealing with obstetric anesthesia, are certainly applicable to the field. A broad range of articles dealing with obstetric management issues (VBAC, labor induction, preterm labor, obstetric complications) was selected. I have chosen a number of papers that deal with the prevention of RDS, the mechanisms of newborn neurologic injury, and the pathophysiology of meconium aspiration syndrome, even when they do not address anesthetic management issues. Finally, I have undoubtedly cited more articles about preeclampsia than is absolutely necessary, but I am sure that many of you find this disorder as fascinating as I do.
Outline

Alternative medicine
Cesarean section
Coagulation
Coexisting disease
  Cardiac
  Endocrine
  Hematologic
  Hepatic
  HIV
  Neoplasm
  Neurologic
  Orthopedic
  Psychiatric/substance abuse
  Renal
  Respiratory
Complications-anesthetic
  Airway
  Allergy
  Cardiac arrest
  Equipment
  High spinal
    Hypotension
  Infection
  Local anesthetic neurotoxicity
  Neurologic
  Spinal headache
  Complications-obstetric
  Abdominal pregnancy
  Amniotic fluid embolism
Hemorrhage
Hyperemesis gravidarum
Incontinence
Maternal mortality
Multiple gestation
Preterm labor-antenatal steroids
Preterm labor-Surveillance/tocolysis
Retained placenta
Shivering
Debates
Economics and staffing
Fetal monitoring
Labor analgesia
  Alternative techniques
  Epidural techniques-ambulation
Epidural techniques-anatomy
Epidural techniques-CSEA
Epidural techniques-equipment
Epidural techniques-fetal effects
Epidural techniques-maternal satisfaction
Epidural techniques-PCEA
Epidural techniques-pharmacology
Epidural techniques-physiology
Epidural techniques-test dose
Intrathecal techniques
Local anesthetic pharmacology
Mass media
Maternal fever and neonatal sepsis workup
Medicolegal issues/medical ethics
Newborn
  Behavior
  Brachial plexus injury
  Cerebral palsy
  Chorioamnionitis
  Meconium aspiration
  Respiratory distress
  Resuscitation/evaluation
  Nonobstetric surgery
  Obstetric management issues
Breech
Induction of labor
Instrumental delivery
Intrapartum care
VBAC
Pharmacologic/physiologic alterations of pregnancy
Postoperative pain management
  Adjuvant drugs
  Complications
  Epidural
  Intrathecal
Preeclampsia
  Anesthetic management
    Blood pressure management
    HELLP
  Outcome
  Pathophysiology
  Prediction/Prevention
Progress of labor
Epidural anesthesia
Risk factors for cesarean section
Alternative medicine

Women who bathed during the first stage of labor used analgesics as frequently as controls; their infants were more likely to require resuscitation.

More than half of the women surveyed have used an alternative therapy.

Reduces need for analgesic interventions.

In women with breech presentation noted at 28 weeks EGA, 92% who underwent moxibustion therapy converted to vertex compared to 74% of controls.

The investigators concluded that there was insufficient published evidence to support the efficacy of sexual intercourse for induction of labor. They surmise that it may prove difficult to standardize sexual intercourse for future studies.

Breast stimulation reduced the number of patients not in labor at 72 hours compared with women receiving no intervention; There were no significant differences compared to an oxytocin group.

Acupuncture and sham acupuncture were equally as effective in reducing nausea in the first trimester.

No difference in the use of epidural analgesia; unlike #1, no evidence of deleterious effect on the newborn.


*Neither of these studies demonstrated any adverse effect on growth or development.*


*While no adverse effects could be identified, neither did raspberry leaf have any significant effect on the duration of the first stage of labor.*


*None of the published trials of acupuncture met the inclusion requirements for this review.*


*There were no differences in the incidence of 1st and 2nd degree tears or episiotomies between the massage and control groups.*


*28/32 patients receiving 1 gm ginger daily had improvement in nausea scores compared to 10/35 controls.*

Cesarean section
*In patients undergoing GU surgery, injection of bupivacaine 15 mg over 10s led to a more rapid onset (20 minutes vs 30 minutes) and more rapid recovery (180 minutes vs 270 minutes) compared to injection over three minutes.*

*Cefoxitin prophylaxis had no effect on infectious morbidity.*

*Unlike #21, this meta-analysis showed significant decreases in maternal fever and endometritis, and a trend toward reduction in wound infections.*

*18 mg 0.5% hyperbaric ropivacaine compared to 12 mg 0.5% hyperbaric bupivacaine; time to complete recovery of motor function 159 minutes vs. 114 minutes.*

24. Connolly C, McLeod GA, Wildsmith JAW. Spinal anaesthesia for caesarean section with bupivacaine 5 mg ml\(^{-1}\) in glucose 8 or 80 mg ml\(^{-1}\). Anaesthesia 86:85-7, 2001. 
*No difference in onset time, dose of ephedrine required, or patient satisfaction. Median block was higher (2 dermatomes) in 8 mg ml\(^{-1}\) group for first 120 minutes.*

*69% of obstetricians in the UK would perform a cesarean section upon maternal request.*

*Effective, yes. Safe?-the jury is out. Would any of you electively use an LMA for Cesarean section in the absence of a failed intubation?*

*No difference.*

*ED\(_{50}\)=16.7 mg, estimated ED\(_{95}\)=26.8 mg*
*Alkalinization decreased time to surgical anesthesia from 9.7 to 5.2 minutes.*

*Discusses ambulatory anesthesia, CSEA, TNS, spinal headache, anticoagulation.*


*Epidural anesthesia was as safe as general anesthesia in “stable” patients.*


*Early feeding (regular diet <8 hrs postop) led to shorter hospital stays. When surgery exceeded 40 minutes, ileus was more likely to develop.*

*No effect on wound infection, fever, endometritis.*

*Suggests that loss of touch sensation is more reliable than loss of pinprick or cold for identifying adequate block.*

*15% of trainees preferred elective cesarean delivery for themselves.*

**Coagulation**


Coexisting disease

CARDIAC


49. Easterling TR, Carr DB et al. Treatment of hypertension in pregnancy: effect of atenolol on maternal disease, preterm delivery, and fetal growth. Obstet Gynecol 98:427-33, 2001. Maternal blood pressure was well-controlled; fetal growth was better maintained when maternal hemodynamics were optimized.
During subsequent pregnancies, heart failure developed in 44% of those with persistent LV dysfunction after a previous episode of peripartum cardiomyopathy and, surprisingly, in 21% of women with normalization of LV function by echo. Stress echocardiography may be a more sensitive method of evaluating women who have apparently recovered from peripartum cardiomyopathy.


Lee M-J, Huang A et al. Labor and vaginal delivery with maternal aortic aneurysm. Obstet Gynecol 98:935-8, 2001. Good outcome in a patient with a 4.5 cm aortic aneurysm unassociated with Marfan’s syndrome. LEA was used, 2nd stage was shortened with low forceps delivery.


No significant change in transthoracic impedance at term.


32% of patients estimated to have pulmonary hypertension by echocardiography had normal PA pressures when catheterized.


LMWH may not be a suitable substitute for coumadin.


Survey of 562 women with a wide variety of cardiac disorders. 13% of pregnancies were complicated by significant morbidity or mortality.


Good outcomes in five patients. Invasive monitoring was not used.
ENDOCRINE

HEMATOLOGIC

HEPATIC

HIV
No increase in major postoperative complications compared to age-matched controls.

Asserts need to respect a woman's wishes if she declines antiretrovirals or elective C/S.

NEOPLASM
Severe hypertension developed after C/S. A rare etiology that must always be ruled out.


A successful epidural anesthetic was administered; a cardiac surgeon was prepared to initiate fem-fem bypass should cardiopulmonary collapse occur.

NEUROLOGIC
In this slowly-growing tumor, surgery was delayed until one week post-cesarean section. VP shunting made this delay acceptable.

General anesthesia was indicated due to symptomatic intracranial hypertension and significant local mass effects in the posterior fossa.

Three cases with severe preop neurologic deficits, successfully treated surgically, two performed under LEA.

Cesarean section was elected to avoid straining in the second stage; general anesthesia was administered to avoid changes in CSF dynamics.


*Epidural analgesia during labor prevented autonomic hyperreflexia.*

*Birth defects were secondary to drug treatment, not epilepsy itself.*


*Dural puncture may lead to neurologic deterioration.*

*In selected patients in experienced centers, a viable alternative to surgery.*

*This patient required large doses of morphine (150 mg t.i.d.) for pain control due to her desire to avoid surgery or radiotherapy during pregnancy.*

*First reported case of regional anesthesia.*


*This patient with resolving Guillain-Barre syndrome underwent cesarean section under epidural anesthesia. There was no evidence of unusual drug sensitivity.*
ORTHOPEDIC

104. Michel TC, Rosenberg AL, Polley LS. Obstetric anesthetic management of a parturient with Larsen syndrome and short stature. Anesth Analg 92:1266-7, 2001. Cesarean section performed under epidural anesthesia in a 130 cm parturient. $T_3$ level was obtained with 15 ml 2% lidocaine.

PSYCHIATRIC/SUBSTANCE ABUSE


RENAL


RESPIRATORY
Leading causes: infection, preeclampsia, aspiration. Maternal mortality was 39%. One third of cases were felt to be preventable.


Seven patients with worsening symptomatic pulmonary AVMs underwent successful embolotherapy

Maternal asthma was significantly associated with preterm birth, SGA infants, preterm labor, preeclampsia, and cesarean section.

Maternal symptoms and non-reassuring fetal heart rate resolved with hyperbaric oxygen therapy.


Complications-anesthetic

AIRWAY
A comprehensive review written for obstetricians, but a valuable resource for anesthesiologists as well.

An extensive review of the anatomy and physiology of the LES, npo status, and the risks of aspiration with some of the newer airway devices.
ALLERGY
121. Browne IM, Birnbach DJ. A pregnant woman with previous anaphylactic reaction to local anesthetics: a case report. Am J Obstet Gynecol 185:1253-4, 2001. Local anesthetic allergies are best evaluated prior to pregnancy; this patient underwent uncomplicated skin testing at 29 weeks EGA.


123. Stannard L, Bellis A. Maternal anaphylactic reaction to a general anaesthetic at emergency caesarean section for fetal bradycardia. Br J Obstet Gynaecol 108:539-40, 2001. Patient was later found to be allergic to atracurium and succinylcholine. Prompt resuscitation was lifesaving.

CARDIAC ARREST

125. Krismer AC, Hogan QH et al. The efficacy of epinephrine or vasopressin for resuscitation during epidural anesthesia. Anesth Analg 93:734-42, 2001. Response to a single dose of vasopressin was more prolonged and acidosis after multiple doses was less than after epinephrine.


EQUIPMENT


HIGH SPINAL

Although the incidence of high regional block is lower than failed intubation, the absolute number of such high blocks is likely to increase as the administration of regional anesthesia becomes more frequent. The editorial provides a detailed protocol for the management of high block.


Etiology was unclear: subarachnoid or subdural.

HYPOTENSION

Phenylephrine 4 mg and ephedrine 45 mg significantly reduced incidence of hypotension (33% and 48 % incidence, respectively) compared to controls (70%).


Survey of UK practice.


No intervention was found to eliminate the need to treat hypotension during SAB. Effective methods of reducing hypotension were crystalloid 20 ml/kg, colloid vs crystalloid, prophylactic ephedrine, and lower limb compression.


In a non-obstetric population, volume kinetic analysis suggested 350 ml crystalloid administered over 2 minutes immediately prior to anesthetic induction could prevent hypotension.


Addition of phenylephrine decreased the incidence of hypotension by 50%. UA pH values were significantly higher.


Crystalloid preload had no additional benefit in patients receiving a metaraminol infusion to maintain BP.


Metaraminol improved pH values and more closely maintained BP in target range.


INFECTION


Chlorhexidine more effectively reduced catheter colonization.


Bacterial colonization at exit site: 40% controls, 3.4% biopatch.


Are masks necessary during neuraxial anesthetic placement?
LOCAL ANESTHETIC NEUROTOXICITY


150. Oka S, Matsumoto M et al. The addition of epinephrine to tetracaine injected intrathecally sustains an increase in glutamate concentrations in the CSF and worsens neuronal injury. Anesth Analg 93:1050-7, 2001. These two studies support the hypothesis that epinephrine increases the toxicity of intrathecal local anesthetics. Is there any rationale for using this technique?


154. Schneider MC, Birnbach DJ. Editorial: Lidocaine neurotoxicity in the obstetric patient: is the water safe? Anesth Analg 92:287-90, 2001. “We believe that, for the present, there is still insufficient safety evidence to suggest that spinal hyperbaric 5% lidocaine be routinely used in obstetrics”


NEUROLOGIC


Seventh nerve palsy is more common in pregnancy. The authors postulate a possible role for otherwise uncomplicated epidural analgesia in precipitating this disorder.


The combination of a borderline platelet count, LMWH, and ibuprofen undoubtedly predisposed this 63 year old to the development of a neuraxial hematoma.


Seven patients with conus medullaris damage, all of whom underwent dural puncture at what was thought to be the L2-3 interspace. Because of the difficulty of identifying spinal interspaces accurately utilizing Tuffer’s line, the author recommends avoiding puncture above the L3 vertebra.


Most neurologic symptoms resolved within 1-2 days.


Only 20% of patients with paresis secondary to epidural abscess had made a successful recovery by discharge. 44% of survivors had persistent bowel or bladder dysfunction on long term follow up.
SPINAL HEADACHE

165. Banks S, Paech M, Gurrin L. An audit of epidural blood patch after accidental dural puncture with a Tuohy needle in obstetric patients. Int J Obstet Anesth 10:172-6, 2001. 81% of patients with an accidental dural puncture developed headache. In patients who received a blood patch, 31% had recurrence of headache, and 28% required more than one patch. Volume of blood used did not affect the success rate.


172. Landau R, Ciliberto CF et al. Complications with 25g and 27g Whitacre needles during combined spinal-epidural analgesia in labor. Int J Obstet Anesth 10:168-71, 2001. In patients undergoing CSE for labor, the incidence of PDPH was 4% in the 25g group and 0.7% in the 27g group.


175. Safa-Tisseront V, Thomann F et al. Effectiveness of epidural blood patch in the management of post-dural puncture headache. Anesthesiology 95:334-9, 2001. Contrary to common belief, EBP produced complete relief in only 75% of patients. Success rate was related to the size of the dural puncture.


Complications-obstetric

ABDOMINAL PREGNANCY


AMNIOTIC FLUID EMBOLISM

180. Awad IT, Shorten GD. Amniotic fluid embolism and isolated coagulopathy: atypical presentation of amniotic fluid embolism. Eur J Anaesthesiol 18:410-3, 2001. Hypoxemia and hypotension were absent; was it AFE?


HEMORRHAGE


190. Elbourne Dr, Prendiville WJ et al. Prophylactic use of oxytocin in the third stage of labor (Cochran Review). In: The Cochrane Library, 1, 2002 Less blood loss, more manual removals of placetas compared to controls.


44 times more likely to die from hemorrhage despite optimum presurgical preparation. Early hysterectomy may be lifesaving.


“In an institution that has in-house obstetric, anesthesia and surgical staff, uterine rupture does not result in major maternal morbidity or mortality or neonatal mortality.”

HYPEREMESIS GRAVIDARUM


Olfaction was unchanged; gustatory function was diminished. The authors hypothesize that this encourages nutrient intake.

INCONTINENCE


Cesarean protects against development of incontinence. Forceps delivery increased risk of incontinence by 1.5 compared with NSVD.


Vacuum extraction unassociated with increased likelihood of fecal incontinence; forceps delivery increased risk of fecal incontinence by a factor of two.

MATERNAL MORTALITY


In Maryland, a pregnant or recently pregnant woman is more likely to be the victim of a homicide than to die of any other cause.


Cesarean delivery is a marker for preexisting conditions that increase maternal mortality, rather than being an independent risk factor for maternal death.


MULTIPLE GESTATION


PRETERM LABOR-ANTENATAL STEROIDS


214. Walfisch A, Hallak M, Mazor M. Multiple courses of antenatal steroids: risks and benefits. Obstet Gynecol 98:491-7, 2001. #210-214 all suggest that there is insufficient evidence to support the routine administration of repeated doses of antenatal corticosteroids outside the setting of a randomized controlled trial.
PRETERM LABOR-SURVEILLANCE AND TOCOLYSIS


RETAINED PLACENTA

Despite numerous case reports, there is scant evidence demonstrating the efficacy of nitroglycerine to provide acute uterine relaxation.

Safe and effective.

SHIVERING

Maternal-fetal blood group incompatibility is significantly more common among shivering than non-shivering parturients.


Tramadol is as effective as meperidine and produces less somnolence.

Debates

229. The use of CSEA for elective caesarean section is a waste of time and money.

230. Should nurses manage epidural or intrathecal analgesia/anesthesia by rebolusing or adjusting dosages of continuous infusions during labor and birth?

231. Research on women in labour is ethically unsound.

Economics and staffing

Provides a mathematical model for staffing based on the assumption that patient census follows a Poisson distribution. The editorial points out that this represents a first approximation that will of necessity be modified by local conditions.
An exchange on the problem of diminishing third party reimbursement for labor analgesia. Does LEA increase the cost of medical care through increased section rates, prolonged labor, and neonatal sepsis workup?

234. Obst TE, Nauenberg E, Buck GM. Maternal health insurance coverage as a determinant of obstetrical anesthesia care. J Health Care Poor Underserved 12:177-91, 2001. Women in northern New York State were less likely to receive epidural analgesia if they were insured by Medicaid. Are anesthesiologists refusing to provide LEA to these patients, are they admitted to hospitals that do not offer an epidural service, or are they less likely to request LEA because of other factors?

Fetal monitoring


238. Sheiner E, Hadar A et al. Clinical significance of fetal heart rate tracings during the second stage of labor. Obstet Gynecol 97:747-52, 2001. Late decelerations and FHR<70 in the second stage were associated with fetal acidemia.


240. Tan KH, Sabapathy A. Fetal manipulation for facilitating tests of fetal well being (Cochrane Review). In: The Cochrane Library, 1, 2002. Published studies do not demonstrate that fetal manipulation reduces the incidence of non-reactive tracings.

241. Thacker SB, Stroup D, Chang M. Continuous electronic heart rate monitoring for fetal assessment during labor (Cochrane Review). In: The Cochrane Library, 1, 2002. The only significant benefit of continuous EFM was a reduction in the incidence of neonatal seizures.


**Labor analgesia**

**ALTERNATIVE TECHNIQUES**

244. Alehagen S, Wijma K, Wijma B. Fear during labor. Acta Obstet Gynecol Scand 80:315-20, 2001. *Primiparous women reported higher levels of fear. Fear during the first stage was correlated with the total amount of pain relief received.*


248. Roelants F, De Franceschi et al. Patient-controlled intravenous analgesia using remifentanil in the parturient. Can J Anesth 48:175-8, 2001. *0.05 mcg/kg/min basal infusion, 25 mcg bolus, 5 minute lockout provided adequate analgesia with minimal sedation and no reported newborn depression.*


EPIDURAL TECHNIQUES-AMBULATION


EPIDURAL TECHNIQUES-ANATOMY


EPIDURAL TECHNIQUES-CSEA


257. Norris MC, Fogel ST, Conway-Long C. Combined spinal-epidural versus epidural labor analgesia. Anesthesiology 95:913-20, 2001. *Labor outcome and progress were similar in both groups. Incidence of accidental dural puncture, headache, and blood patch were similar.*

258. Deleted
EPIDURAL TECHNIQUES-EQUIPMENT

EPIDURAL TECHNIQUES-FETAL EFFECTS
Suggests that bradycardia may be secondary to changes in uterine contraction patterns. Reaffirms that these changes need not lead to maternal or fetal morbidity.

Oxygen saturation measured by fetal pulse oximetry was unchanged by epidural analgesia. Saturation increased during contractions, but then fell significantly below baseline levels.

In a high risk population, epidural analgesia was cost neutral and led to better neonatal outcomes.

IT sufentanil 7.5 mg was more likely to lead to fetal bradycardia than conventional epidural or IT bupivacaine 2.5 mg/sufentanil 1.5 mcg. This did not result in more cesarean deliveries or adverse fetal outcome.

EPIDURAL TECHNIQUES-MATERNAL SATISFACTION
Despite lower pain scores, women who planned an unmedicated birth but received epidural analgesia reported less satisfaction with their birthing experience than women who delivered without analgesia.


EPIDURAL TECHNIQUES-PCEA
EPIDURAL TECHNIQUES-PHARMACOLOGY


270. Chua NP, Sia AT, Ocampo CE. Parturient-controlled epidural analgesia during labour: bupivacaine vs. ropivacaine. Anaesthesia 56:1169-73, 2001. *Equal amounts of 0.25% bupivacaine and 0.25% ropivacaine were consumed.*


273. Fernandez-Guisasola J, Serrano ML. A comparison of 0.0625% bupivacaine with fentanyl and 0.1% ropivacaine with fentanyl for continuous epidural labor analgesia. Anesth Analg 92:1261-5, 2001. *Analgesia was equivalent, suggesting that bupivacaine is more potent than ropivacaine.*


MLAC=0.13% plain, 0.09% when sufentanil 0.75 mcg/ml was added.


MLAC=0.091% in controls, 0.047% with fentanyl 2 mcg/ml, and 0.050% with fentanyl 3 mcg/ml; i.e., the effect of fentanyl was not dose dependent.

No clinically useful effect; signs of intracranial hypertension developed in one patient who received 4 times the volume of the initial LA dose.

Two 15 ml boluses of normal saline administered 15 minutes apart at the end of surgery reduced time of full recovery from a T4 level block from 153 to 108 minutes.

A review of the drugs that can be added to local anesthetics to improve the quality of block: opioids, ketamine, α-adrenergic agents.

The NO synthase inhibitor L-NAME prevents the development of tachyphylaxis to sciatic nerve blockade. It is much more effective when administered intrathecally rather than systemically, suggesting that tachyphylaxis has a spinal site of action.

EPIDURAL TECHNIQUES-PHYSIOLOGY

No preload vs. 7 ml/kg bolus: no difference in cardiac index or mean BP after 20 ml bupivacaine + 2 mcg/ml fentanyl.

Redistribution of blood flow renders esophageal Doppler measurement of CO unreliable.

Epidural Techniques—Test Dose/IV Injection


Discusses limitations of standard epinephrine test dose and possible advantage of isoproterenol, once neurotoxicity concerns are allayed.


An increase in systolic BP and a decrease in T-wave amplitude are more reliable than tachycardia for detecting IV injection of an epinephrine-containing test dose in sedated patients.

Intrathecal Techniques


Addition of spinal neostigmine produces severe nausea in parturients (53%) with no useful prolongation of analgesia.


IT ropivacaine 2.5 mg with fentanyl 25 mcg provided equivalent analgesia and less motor block than bupivacaine 2.5 mg with fentanyl. If the local anesthetic dose was decreased would the difference in motor block persist?


Addition of fentanyl to procaine appears to be of little benefit.


Ropivacaine 3 mg provides effective analgesia; addition of sufentanil 10 mcg prolongs effective analgesia (time to first request for additional analgesia) from 41 to 95 minutes. This duration appears similar to duration of sufentanil alone; therefore, is there any benefit to adding ropivacaine?


IT sufentanil decreases both oxytocin and cortisol concentrations. Can this have any effect on the progress of labor?


Addition of either 5, 15, or 25 mcg fentanyl to IT bupivacaine produces similar decreases in minimum local analgesic dose (from 1.99 mg to 0.69, 0.71, and 0.85, respectively).


Despite its high lipid solubility, sufentanil migrates large distances in the subarachnoid space; distance from the injection site to the brainstem will influence the likelihood of respiratory depression.


IT Diamorphine 250 mcg has a similar side effect profile and a longer duration (101 minutes vs. 73 minutes) compared to fentanyl 25 mcg.


Clinically similar, except for motor block. Incidence of Bromage 1 block: bupivacaine 34%, levobupivacaine 0%.


Duration of analgesia increased from 79 to 93 minutes with the addition of epinephrine.


Addition of morphine 0.15 mg prolonged analgesia form 148 to 252 minutes.
Local anesthetic pharmacology


Ropivacaine has no antimicrobial activity; lidocaine was somewhat more active. The clinical significance is unclear.


4 mg/kg bupivacaine and 6 mg/kg ropivacaine had similar hemodynamic effects; bupivacaine had a greater effect on ventricular conduction.


Local anesthetics have only a limited ability to inhibit thromboxane-induced platelet aggregation; this mechanism is unlikely to account for the antithrombotic effects of local anesthetics.


A nice discussion of the issues in toxicity studies and the problems of assessing potency of local anesthetics.


Considers the relative toxicities of bupivacaine and levobupivacaine, and essentially concludes that the older compound should be superseded by the single isomer preparation.


Toxicity of levobupivacaine was intermediate between the other agents; less epinephrine was required to resuscitate from ropivacaine-induced asystole.


*For all three agents, the doses required to produce convulsions were lower in pregnant than in non-pregnant sheep. Cardiovascular collapse occurred at similar doses for both pregnant and non-pregnant animals.*


**Mass media**


“The latest victim of a hospital injection blunder died yesterday as an inquiry began into the tragedy. The unnamed patient had spent three days in intensive care after an ‘experienced consultant’ injected a local anesthetic into a vein instead of the spine.”


“Women who take painkillers during childbirth may have trouble breastfeeding and bonding with their babies, Swedish scientists have reported. Infants whose mothers were given an epidural anesthetic during labor were less likely to breastfeed normally in the first few hours after childbirth.”

319. Sunday Express, April 15, 2001. We must have the truth about birth pain injections

“The potential risks of epidurals remain one of the Health Service’s most closely guarded secrets. This cover-up cannot be allowed to continue.”


“Dr. Marsden Wagner, former director of women and children’s health at WHO and adviser to UNICEF, said injections into the spine to relieve labor pains were fraught with peril.”
Maternal fever and neonatal sepsis workup

Criteria for sepsis workup in afebrile women included ROM>24 hours, FHR>160 (major criteria), and temperature 99.6-100.4°, ROM 12-24 hours, WBC>15,000 on admission, and Apgar <7 at five minutes (minor criteria). Increases in the frequency of several of these criteria in women receiving epidural analgesia led to increased sepsis workups, although, once again, the incidence of sepsis was unchanged.

Maternal fever is more predictive of encephalopathy than even an abnormal FH. The authors somewhat off-handedly suggest that this relationship may have implications for the provision of epidural analgesia; they go on to say, however, that a large increase in epidural use has not been associated with an increase in neonatal encephalopathy.

In one institution, refined criteria for neonatal sepsis evaluations seems to eliminate an increased risk of sepsis workup in infants whose mothers received LEA.

Implies that the incidence of fever in mothers receiving LEA must be compared with true controls, i.e. women receiving no analgesics.

Intrapartum fever is associated with increased neonatal morbidity; it is unclear to me if this is in reality an association between infection and neonatal morbidity.

Intrauterine temperatures displayed a linear relationship with oral and tympanic temperatures. All were increased in women receiving epidural analgesia.

When women with chorioamnionitis are excluded, LEA is unassociated with fever.

The same natural experiment that demonstrates a neutral effect of epidural analgesia on C/S rates can also implicate the technique for less desirable results. Incidence of fever of >100.4°rose from 0.6% before introduction of an epidural service to 11% afterwards. Neonatal sepsis workups increased, but the proportion of infants receiving antibiotics after workup was unchanged.
Medicolegal issues/medical ethics


Guidelines of the OAA, must reading for clinical researchers.

Newborn
BEHAVIOR
The NACS is the most widely-used tool in the anesthetic literature for assessing newborn behavior. However, its reliability had never been evaluated until this study. The further usefulness of the NACS is drawn into serious question by this paper.

332. Ransjö-Arvidson A-B, Matthiesen A-S et al. Maternal analgesia during labor disturbs newborn behavior: effects on breastfeeding, temperature, and crying. Birth 28:5-12, 2001. This study, widely reported in the popular press, studied 28 newborns, two (!) of which received epidural analgesia alone and no other analgesics. The difficulties in drawing conclusions from a such a small study are apparent.

BRACHIAL PLEXUS INJURY
Greater maternal age, diabetes, and higher birth weight were associated with a higher risk of Erb’s palsy. 2/62 affected infants were born by elective cesarean section.

CEREBRAL PALSY
Congenital malformations were found in 19% of infants with CP and 4% of controls.

335. Farkouh LJ, Thorp JA et al. Antenatal magnesium exposure and neonatal demise. Am J Obstet Gynecol 185:869-72, 2001. Enthusiasm for studies suggesting that maternal magnesium sulfate therapy reduces the incidence of cerebral palsy are tempered by other studies suggesting an increase in perinatal mortality. This study of 12,876 cases failed to show any relationship between magnesium administration and neonatal death.

*Post-insult administration of magnesium protected against neuronal loss.*


**CHORIOAMNIONITIS**


**MECONIUM ASPIRATION**


*Normal acid-base status was seen in many cases of severe meconium aspiration syndrome; this implies a preexisting injury or a non-hypoxic mechanism.*


**RESPIRATORY DISTRESS**


*Maternal exposure to NSAIDs was greatly underreported and strongly associated with persistent pulmonary hypertension.*


*Discusses ventilator strategies to decrease lung injury.*


*Even in elective cesareans, the incidence of persistent pulmonary hypertension was almost five-fold higher than in vaginal deliveries.*

**RESUSCITATION/EVALUATION**


*A study of 152,000 live births that validates the Apgar score’s predictive value.*

Infants with a 5 minute Apgar score of 0-3 had a 386-fold increased risk of neonatal death compared to infants with scores of 7-10.

After widespread training in newborn resuscitation was implemented, high-risk newborns with low 1 minute Apgars were more likely to increase their 5 minute score.

Room air resuscitated infants recover more quickly than those resuscitated with 100% oxygen. Biochemical markers of oxidative stress are present up to 4 weeks after resuscitation with 100% oxygen.

Nonobstetric surgery
Both sensitive and specific.

Intravenous fentanyl administered to fetuses prior to intrahepatic vein transfusion for fetal hydrops attenuated the fetal stress response.


Hemodynamic changes were similar to those seen in non-pregnant patients.

Bupivacaine delayed discharge but was otherwise a suitable substitute for lidocaine.

Obstetric management issues

**BREECH**


"Planned vaginal delivery of a term singleton breech may no longer be appropriate."


*Success rate: 80% spinal, 33% controls.*


*Not enough evidence at present to evaluate the use of regional anesthesia. Tocolysis enhances success rates.*


*Provides support for ACOG Opinion (ref #357)*

**INDUCTION OF LABOR**


*Effective, but data on optimal regimens and safety are lacking.*


*Routine use of membrane sweeping has no apparent clinical benefit.*


*Oral prostaglandin E2 was significantly associated with GI disturbances; there were no clear advantages to its use compared with other induction techniques.*


*Effective, but uterine hyperstimulation is a concern; reviewers could not exclude the possibility of uterine rupture.*


*The reviewers concluded that data on the effectiveness of this combination are lacking. No clinical recommendations were made.*


INSTRUMENTAL DELIVERY

INTRAPARTUM CARE


Hofmeyr GJ, Gulmezoglu AM. Maternal hydration for increasing amniotic fluid volume in oligohydramnios and normal amniotic fluid volume (Cochrane Review). In: The Cochrane Library, 1, 2002. Two liters of oral fluid significantly increased amniotic fluid volume and may be useful in cases of oligohydramnios.


VBAC
379. Bujold E, Gauthier RJ. Should we allow a trial of labor after a previous cesarean for dystocia in the second stage of labor? Obstet Gynecol 98:652-5, 2001. VBAC after a previous cesarean section performed for second stage dystocia has a 75% success rate.


383. Shipp TD, Zelop CM et al. Interdelivery interval and risk of symptomatic uterine rupture. Obstet Gynecol 175-7, 2001. Interdelivery intervals of up to 18 months were associated with a higher risk of symptomatic uterine rupture during VBAC compared to longer intervals.
Pharmacologic and physiologic alterations of pregnancy


Fentanyl and meperidine appear to directly inhibit uterine contractility, but at levels 1000 times greater than those seen clinically.

Postoperative pain management

ADJUVANT DRUGS


States that the use of ketorolac is acceptable in breastfeeding women. Unfortunately, this is not supported by the manufacturer's package insert.


Diclofenac group used 52 ml of local anesthetic mixture, controls used 74 ml.


Reduced epidural meperidine usage by 30%, but did not improve quality of pain relief or reduce opioid side-effects.


COMPLICATIONS


5 mg dexamethasone reduced incidence of nausea and vomiting from 50% to 18%.


**Epidural**


No significant differences between drugs; recommends the use of 0.05% solutions to minimize motor block.


Suggests that epidural sufentanil has a primarily systemic effect.


**Intrathecal**


100 mcg provided effective relief. Maternal pain was surprisingly high in the control group; they required 40 mg PCA morphine over the first 24 hours.


Lamina 2 is densely packed with benzodiazepine receptors

Preeclampsia

ANESTHETIC MANAGEMENT


BLOOD PRESSURE MANAGEMENT

HELLP SYNDROME


OUTCOME

PATHOPHYSIOLOGY


436. Trogstad LIS, Eskild A et al. Is preeclampsia an infectious disease? Acta Obstet Gynecol Scand 80:1036-8, 2001. The risk of developing preeclampsia was greater in women who were seronegative for antibodies to HSV-2, CMV, and EBV. The authors suggest that seronegative women are more likely to acquire these infections during pregnancy, and postulate that infection during pregnancy might lead to preeclampsia.
Calcium supplementation appears to be beneficial for women at high risk of developing preeclampsia. The optimal dosage is unclear at this time.

Meta-analysis of five trials demonstrates that abnormal uterine artery Doppler studies identify women who would benefit from ASA therapy.

A meta-analysis of 39 trials consisting of 30,000 women demonstrated a 15% decrease in the incidence of preeclampsia, an 8% decrease in preterm birth, and a 14% decrease in fetal or neonatal death.

There were no differences between screened and non-screened women in the incidence of IUGR, preeclampsia, or any other markers of Perinatal morbidity.

Elevated pulse pressure at 7-15 weeks identifies women at high risk of developing preeclampsia.
Progress of labor

Epidural analgesia


No difference in the incidence of chronic backache; instrumental delivery rates were increased in the epidural group (30% vs 19%).


An alteration in technique increased the use of LEA from 38% to 63%. The cesarean section rate was unchanged (approximately 10%), as was the instrumental delivery rate.


The authors stated that the duration of labor was increased “significantly” in the epidural group, although analysis of their data showed no difference in the length of the first stage (epidural 271 minutes, IV 266 minutes) and only a slight increase in the length of the second stage (53 minutes vs. 40 minutes). The C/S rate was the same in both groups. The authors state in their abstract that the incidence of chorioamnionitis was increased in the epidural group; in reality, this was based on an increased incidence of maternal fever in the epidural group, and not on any objective measure of maternal infection. Finally, the authors were concerned about the 11% incidence of hypotension requiring treatment in the epidural group. This seems to be a fairly low incidence of what is usually a minor side-effect, and should be contrasted with the 12-fold increase in the need for neonatal naloxone administration in the IV group.


Another natural experiment from Tripler Army Medical Center (See also #328). An increase in epidural utilization from 1% to 83% had no effect on the rate of fetal head malposition.


No change in rate of cesarean section, cesarean section for dystocia, instrumental delivery, or length of first stage; second stage was prolonged (by 25 minutes).

Risk factors for cesarean section


Women who required >50 mg/hr meperidine via PCA were 10 times more likely to require cesarean section for obstructed labor.
Sheiner E, Shoham-Vardi I et al. Infertility treatment is an independent risk factor for cesarean section among nulliparous women aged 40 and above. 185:888-92, 2001. The investigators analyzed the deliveries of 115 nulliparas aged >40 years with singleton gestations. There were 80 spontaneous pregnancies, and 35 were the result of infertility treatment. There were no differences in obstetric risk factors or labor characteristics between the two groups. Interestingly, the use of epidural analgesia was not mentioned in the study. Cesarean section was more likely in the infertility group (71.4%) than in the spontaneous pregnancy group (41.3%).

ADDITIONAL ARTICLES
Some of the articles that were identified via PUBMED were published in journals that were either unavailable to me or written in languages other than English. Their abstracts seemed interesting enough, however, that I have listed them for those of you with a greater access to journals or a more well rounded education than I possess.


464. Iwama H, Furuta S et al. Extra-strong compression stocking reduces use of vasopressor agents during spinal anesthesia for cesarean section. Arch Gynecol Obstet 265:60-3, 2001. Use of ephedrine was decreased from 85% to 49%.


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*Epidural anesthesia increased the use of episiotomy but decreased the likelihood of episiotomy extension.*


**ACKNOWLEDGEMENTS**

Many thanks to Dr. James Cottrell and the SUNY-Downstate Medical Center Department of Anesthesiology for providing the time necessary for me to prepare this review. I would also like to acknowledge the invaluable assistance of the staff of the Morgan Library at Long Island College Hospital, and the Library of the New York Academy of Medicine. This review would be incomplete if I failed to recognize the many contributions of Dr. Ostheimer to this Society and to obstetric anesthesiology. Finally, special thanks to Dr. Patrick Gibson, himself a student of Dr. Ostheimer, and the person most responsible for my decision to devote my energies to obstetric anesthesia.
NOTES
Scientific Program

Sunday, May 5, 2002

6:30 am  
Registration

7:00 - 8:00 am  
Breakfast with the Experts (Limited Registration - By Ticket Only)

1. Post-partum Analgesia - Alison J. MacArther, MD
2. Continuous Spinal Analgesia - Craig M. Palmer, MD
3. Labor Analgesia with Limited Staffing Resources - Richard N. Wissler, MD
4. International OB Anesthesia Education Opportunities - Medge Owen, MD; Sukran Sahin, MD
5. Fine Tuning Your CSE - Craig Leicht, MD, MPH
6. Answering Big Questions in Obstetric Anesthesia Research - B. Scott Segal, MD; Richard M. Smiley, MD, PhD
7. Ambulation after Labor Regional Anesthesia - Roshan Fernando, MBBS, FRCA
8. Fetal Distress and Unable to Intubate. What Next? - Maya Suresh, MD
9. The Morbidly Obese Preeclamptic Parturient - Sumedha Panchal, MD
10. Post Partum Tubal Ligation - Brenda A. Bucklin, MD
11. Billing - James P. McMichael, MD
13. Obstetrics and Family Medicine Issues in Labor and Delivery - Keith Johansen, MD; Thomas Kastner, DM; Walter Franz, MD
14. Is OB Anesthesia More Liable for Litigation than Other Subspecialties - Mathew Kumar, MD, JD
15. Post Dural Puncture Headache - Anil Soni, MD; Mukesh Sarna, MD
16. Legislative Issues - Andrew P. Harris, MD, MHS
17. PCEA Should Always Be Used in Preference to Continuous Epidural Infusion Analgesia in Labor - Michael J. Paech, FANZCA
18. Anesthesia for Placenta Accreta - Alex F. Pue, MD.

8:15 - 9:15 am  
Fred Hehre Lecture

David M. Dewan, MD

9:15 - 10:15 am  
Oral Presentations #2

Moderator: Cynthia A. Wong, MD

10:15 - 10:45 am  
Coffee Break

10:45 - 11:45 am  
Oral Presentations — Best Paper of the Meeting Award

Moderator/Judge: Michael J. Paech, FANZCA

Judges: Sivam Ramanathan, MD; Edward T. Riley, MD; Scott Segal, MD

11:45 am - 12:00 n  
Best Paper of the Meeting Award / Adjournment

Moderators: Joy L. Hawkins, MD; Gary M.S. Vasdev, MD
**Breakfast with the Experts**  
(Limited Registration - By Ticket Only)

7:00 - 8:00 am

1. **Post-partum Analgesia** - Alison J. MacArther, MD
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The Morbidly Obese Preeclamptic Patient
Breakfast With The Experts

- 38 year old G1 P0000 presents at 38 2/7 weeks presents for induction of labor.
- She is 5'5" and weighs 340 lbs. Her medical history is significant for morbid obesity, gestational diabetes, and mild preeclampsia (BP 150/92, 2+ proteinuria).
- Laboratory studies include: Hgb 10.1; platelet count 142,000.
- She has a class IV airway.
- Medications include magnesium sulfate and oxytocin.
- What is your plan for labor analgesia?
- What is your plan for anesthesia if the patient requires a cesarean delivery?
Fred Hebre Lecture

David M. Dewan, MD

8:15 - 9:15 am

Participant will learn about the changes in obstetric anesthesia practice over the last 25 years and how these changes have impacted the specialty.
A personal perspective – From Consilience to Victory

OBJECTIVE: This lecture will provide an overview of the changes in obstetric anesthesia during the last 24 years. Following this lecture the audience will gain an understanding of how these changes have impacted the specialty of obstetric anesthesia, academic anesthesia training, the patients and themselves.

The period from 1977 to 2002 has been a remarkable era for obstetric anesthesia, both at my institution and nationally. We have made tremendous progress in the delivery of health care to the pregnant patient, making it more accessible, and of higher quality. We, as a specialty, have gained credibility. It has been two and a half decades of victory. A victory we won by, doing three things: 1) being there, 2) doing the right thing, and 3) being memorable. These three actions lead us to victory whether it is in our personal or professional lives or with patient care, resident education, or research. This is the path we must choose if we are to continue to move forward, for we have many challenges lying before us.

When you compare the progress made at our institution during the last 25 years and the progress we have made nationally, the similarities are remarkable. I believe the tools we utilized at our institution to achieve victory parallel those used by you to achieve national success. The tools we used are set forth in the book entitled Consilience: The Unity of Knowledge. Consilience is the concept that for a given situation the best solution is one which is compatible with social science, ethics, biology, and environmental science. In other words, the best solution is best for all parties. Something that is good for science, but detrimental to society, is not a good solution. The outcome does not meet the consilience test. By doing three things, being there, doing the right thing, and being memorable, we have victory and we have a test for consilience, a victory within itself. Doing the right thing is a good solution and a victory.

Let’s look at being memorable. To do that means we have to understand what memory is. Good solutions create good memories for you, the obstetrician, and the patient. In the same, highly difficult to read, but incredibly insightful book, the author delves into what distinguishes recall and memory. In the authors perspective, recall is simply the recollection of facts. In contradistinction, memory has associated emotions. For example, reading about the World Trade Center 100 years from now will have a significantly different impact on the reader than for those who witnessed the event when it occurred. The history reader will recall facts, we will have memories which will be felt.
Let's transfer this to our specialty. In the practice of anesthesia, reading about a dural puncture clearly has a different impact than the memory of performing an unintentional dural puncture with its astounding intensity of emotion. As one of my colleagues once said, "The room sure gets hot." According to the Consilience concept, and documented by my own personal experience, attached emotions which accompany memory may allow the brain to prioritize previously experienced scenarios. For example, as a second-year anesthesia resident I was dispatched to the labor and delivery suite to assist a medical student in providing a general anesthetic for cesarean section in an obese patient. My attending was four floors away. We proceeded with a rapid sequence induction; the medical student attempted laryngoscopy and informed me, "I don't see anything." My response was "try again"; he did — same result. I asked him to step aside, and I unsuccessfully attempted mask ventilation. As my heart rate increased I attempted laryngoscopy only to substantiate the medical students findings. Nothing recognizable was visible. Once more I attempted mask ventilation and heard the horrible sound behind me of a slowing heart rate. This patient was about to die! I inserted an oral airway to no avail and followed that with a nasal trumpet. Fortunately I was able to marginally ventilate the patient with this latter maneuver as she recovered from her succinylcholine. As she regained adequate respirations, my attending entered the room. The patient returned the subsequent day for cesarean section utilizing epidural analgesia.

It is little wonder that when my brain replays scenarios regarding the management of obese patients, general anesthesia does not top my list. I do not recall this patient, I remember this patient. The emotions attached to this memory warn me about the hazards of general anesthesia in the obese pregnant patient. Memories, both positive and negative, help determine future behavior. Memories create victories and reinforce consilience. In the next hour I will discuss the achievements we made locally and you made nationally and share with you our experience at Wake Forest and I hope to provide a template for future actions. The template is one of being visible, doing the right thing, and creating memories, resulting in victory.

Let’s go back to 1977, how our victory got started. In 1977 there were 3,326,632 live births in the United States. The cesarean section rate had increased dramatically in the preceding 10 years and was now 15.2%. Maternal mortality was at 14.3/100,000 deliveries, with anesthesia accounting for 4-6% of all maternal deaths. Obstetric anesthesia was a lonely stepchild as far as most anesthesia departments were concerned, with job advertisements promoting a benefit of employment as "no OB." The president of the Florida Society of Anesthesiologists once said, "Obstetric anesthesia, if it would just go away, we would all be happy." In 1969 an anesthesiologist was present at only 12% of deliveries and CRNAs were present at only 25%. The remainder of coverage was provided by obstetricians and "others." As late as 1981 full-time anesthesia was present at only 21% of hospitals. Regional anesthesia was utilized for 50% of cesarean sections and epidural analgesia was utilized in only 16% of labors. We were not present! As a resident at Wake Forest, I witnessed first-hand the negative aspects of this level of care. While covering the ICU, we received a transfer from a nearby hospital of a woman who received a mask anesthetic, by a CRNA, for cesarean section that resulted in massive aspiration. It was a lethal event. I vividly recall a baby, a husband, and a dying mother. There was no consilience, no being there, no doing the right thing, no positive memory.
It was in this environment that I entered, with Dr. Frank James, my Section Head and mentor, the world of obstetric anesthesia. In 1977, Winston-Salem, North Carolina, was a community of approximately 120,000 with three hospitals delivering infants. None of the hospitals were happy. The medical school had a marginal number of deliveries to provide adequate resident training. The community hospital, in part because it was new, received an inordinate (from their perspective) number of indigent patients, and the third hospital delivered insufficient numbers of patients to remain viable. In order to solve this problem, through the wisdom of Dr. Frank James, Section Head, and Dr. Frank Greis, Chairman of the department of OB/GYN at Wake Forest (both Fred Hehre lecturers), the community leaders made the decision to consolidate obstetric services in the community hospital. The medical school would provide anesthesia coverage, a high-risk perinatal service, and neonatology coverage. At that time, the physical plant we would use seemed large. We were allocated 13,831 square feet for the acute services which included 2 ORs, 2 cesarean section rooms, 3 delivery rooms, and 10 labor beds, of which half were double patient rooms. We were to provide coverage with five anesthesiologists, five CRNA’s, three residents (one of whom was an obstetric resident), and one fellow. Our workload for the first year was 2,141 gynecology cases and 4,028 deliveries. The cesarean section rate during the first year was 18.1%.

Considering the disrespect obstetric anesthesia had nationally at the time and the fact that the medical school was “invading” the community hospital, to say that our reception was “not warm” would be an understatement. The barriers we confronted were numerous: 1) fear of regional anesthesia (and its perceived impact on the progress of labor) by obstetricians, 2) perceived loss of control by the obstetricians and labor nurses, 3) the poorly received concept of residents working on private patients, 4) a community hospital with an administration that didn’t trust the “school” to the degree that they demanded the right to oversee department finances, 5) a visible and vocal lamaze community that was vigorously anti-epidural. I remember well walking in my first day, hardly finding my way to where I was supposed to be, knowing only a few people, and knowing full well that some of the others, “as yet unidentified,” clearly opposed my presence.

Fortunately, Dr. James had clearly outlined our mission, which was to provide excellent patient care, resident teaching, and research. However our more immediate goals were 1) to establish regional analgesia for labor, 2) reduce the use of general anesthesia for cesarean section, 3) provide safe regional anesthesia for cesarean section (remembering that left uterine displacement and volume preloading were new and not universally accepted advances even among anesthesia practitioners at that time), and 4) establish a working relationship with hospital administration. We would do all this by providing a 24-hour a day, in-house coverage, the first commitment by any anesthesia team in the community in that era to take in-house call. We would be visible – we would be present. One of the first steps to victory – being there.

Our first year of experience was neither good nor bad but laid the foundation for the future. Thirty-two percent of vaginal deliveries utilized epidural analgesia, 36% received inhalation analgesia, and 32% received monitored anesthesia care (we attended all vaginal deliveries). For cesarean section 5% received spinal anesthesia, 42% epidural anesthesia, and, in retrospect, an astounding 53% had general endotracheal anesthesia for the cesarean section. It is fair to emphasize endotracheal anesthesia considering the time.
How would we accomplish our mission outlined by Dr. James in this environment? By being there, doing the right thing and being memorable, establishing consilience, establishing victory, one patient at a time. As it turns out the mode of delivery of anesthesia care was perfect for the mission. It would make us visible and present. It was up to us to do the right thing and be memorable.

Let me take you back to a typical delivery. All patients were interviewed as soon as they arrived. This preanesthesia consultation was uniformly applied. If a patient opted for epidural analgesia, following catheter placement, blocks were initiated with 2% chloroprocaine and maintained with incremental injections of 0.25% bupivacaine. Every patient received a “sitting dose.” Perineal analgesia was nearly always established in the labor room prior to transfer to the traditional delivery room. Patients not utilizing epidural analgesia were also transferred to the delivery room where they either received monitored anesthesia care or inhalation analgesia. Finally, following delivery patients were transferred to the PACU prior to discharge to the ward. This was an incredibly time-consuming venture for anesthesia, but had the unanticipated benefit of forced interaction with obstetricians, nurses, and most importantly the patients. So many times we were told by the patients that they knew us better than their obstetrician because by the time delivery occurred, we had spent more time with them than their obstetrician had. Memories were being created. We had to make them memorable and we had to do the right thing.

For example if a patient has a unilateral block which you correct resulting in a comfortable patient, the memory and emotion created for you and the patient is one of satisfaction, trust and, for you, personal victory. However ignoring or missing a patchy block meant you might have the “opportunity” to be present for the exquisite pain of a mid-forceps delivery. Neither the patient, the obstetrician, nor the nurses are left with a feeling of trust regarding your services. Fortunately, the time-consuming venture of hourly redoses and forced patient interactions made us confront our failures rather than ignore them. Anesthesiologists, despite intellectually knowing that there is a minimum failure rate associated with epidural analgesia, find it difficult to revisit patients in whom analgesia is poor, thus avoiding stress. How many times in this setting when called for a redose have you said, “Oh no, not her again!” It is, however, this patient who deserves attention. Confronting and dealing with our failures and observing the outcome allows us to prioritize memories. Prioritizing memories enables us to choose a course of action in the next similar scenario which may improve the outcome. Seen from this perspective, each of our encounters with family, administrators, colleagues, and patients is not only an opportunity for us to learn but, more importantly, an opportunity for us to create a positive memory for all concerned. It is the memories we create by our individual, ethical, interactions that predict future experiences and lead us to victory.

Let’s see how being there, doing the right thing, and creating memories applies to my personal and professional life experience. Each of us has personal, professional, patient care, and, for some of us, research triumphs. In each of these doing the right thing and being ethical will create victorious memories.

I was asked the question, “What is your greatest personal triumph?” and after surprisingly little reflection I answered “Raising my daughter.” I have had the opportunity to raise a daughter from age 12 to 24 as the sole parent, a task which was unexpected and intimidating. I remember vividly while traveling by car with her at age
13 to New York State to see her grandfather for Christmas, when she suddenly made the following statement; “Dad, I don’t have any memories.” At that time I resolved to take personal responsibility for providing positive, ethical, and enriching memories. Certainly these included memorable vacations, but in retrospect memories were more about being there and doing the right thing. For example, when she was ill, thanks to my incredibly understanding colleagues, I was uniformly able to arrange to be with her. As part of her “treatment” I prepared mashed potatoes. For me this was parenting, for her it was creating an environment of warmth, trust, and safety. My mashed potatoes were attached to a memory. My daughter is now 24 and, to this day, mashed potatoes are still the best things that I can cook. Doing the right thing creates good memories and creates victories, sometimes in unanticipated ways.

Arriving at Forsyth as a junior faculty I had proven clinical skills. During my residency and two years in the Navy, however, administration was a blank area. When Dr. James left to become the Chairman of the Department of Anesthesiology and I assumed the position of Section Head, I was inexperienced and somewhat administratively unprepared. Remember, this was a hostile environment. In fact when I assumed the Section Head position and asked to meet with the chief hospital administrator, he refused because he said he only met with chairmen. Within my first four months I had my first catastrophe. At that time the department of anesthesia had a separate professional contract and a billing contract, both with a 90-day lock in. Unless renegotiation was requested within 90 days of the expiration date, the contract was automatically renewed. I met with an administrator in advance of the deadline regarding the professional contract and made the fatal assumption that I was discussing both contracts. When the executive asked to delay discussions for a week, I made the second faulty assumption that this was done in good faith. After the week passed, the administration invoked automatic renewal of the contract because negotiations had not begun regarding both contracts. I had experienced my first journey into the area of administration and the memories created for me were distasteful. I now had a scenario and a memory with attached emotions, which if not replaced by better emotions, boded ill for the future. I needed a victory. Urgently I met with the administrator, and while trying to keep my composure, stated that his actions were not consistent with the character and values I expected from an honorable person and were not compatible with developing a long-term working relationship. To his credit he came to me, sincerely apologized, and in the next few years supported our Sections position in various arenas. I subsequently returned his good faith by opting for one year not to increase rates. It was the appropriate ethical decision at that time because it was good for us (at that time our cash flow was excellent), it was good for the hospital which was worried about its public image, and it was good for the patients. It was a memory that he did not forget and is a victory about doing the right thing. He subsequently became the leader of the entire Piedmont Novant Health system of which Forsyth hospital is only a part. We have become friends, respectful of each other, and because of the mutual trust our memories have evoked, over the last 10 years have operated on a handshake contract. With his approval I recently completely a two-year tenure as Chairman of the Surgical Services Counsel which oversees the workings of all surgical services in three community hospitals. Twenty-five years previously I was one of the enemies. Who would have thought this could happen? Doing the right thing does matter. I ask each of you now to think about what is your
relationship with your hospital. What is your relationship with your administrators? Do you have one? Are you visible and present? Are you interacting? Are you taking each encounter as an opportunity to do the right and ethical thing and creating positive memories - establishing victories for both of you. Doing the right thing does matter. Sometimes you won’t even remember the event, but they will.

Patient care is simplistically no more than repetitive encounters with the public; encounters filled with memories and recall. As with your personal and professional life it can be filled with victories and defeats. Some victories will occur because of happenstance. As you recall, in our opening unit, many of the labor rooms were double patient rooms. This had unintended positive consequences for us. For example, I vividly remember interviewing a primiparous patient regarding her anesthetic options and being informed by her that she would not need anesthesia and did not need to speak with me. This felt like an immediate discounting of the need or use for my service. From the curtain behind me came the voice of the other patient, “I have already had a baby and I will listen to anything you have to say.” Immediately there was a sense of validation of our work and value. I assure you, the patient who discounted our service also heard. If we had not been visible by interviewing all patients, only those who requested our service, this would not have happened. There would be no memory of our section, of our role, and our importance. I felt victorious. In another circumstance I placed an epidural in a patient and, after removing her pain, walked over to the other patient and asked her what analgesia she wanted. She pointed to the patient I just anesthetized and said, “I don’t know what it is, but I want what she has.” A “When Harry met Sally” moment. Visible and memorable. Happenstance created memories. We did not sell epidural analgesia to the public; being there and creating memories “sold” them.

At other times being involved created the opportunity for victory. While attending a monitored anesthesia care delivery, a previously healthy gravida one experienced a pulmonary embolism. Because we were there and the equipment was there, the patient was intubated, ventilated, and ultimately had a good outcome. The nurses, obstetricians, patient, and husband all had a memory of that event. No longer were we viewed as an intrusion at delivery.

At other times creating positive memories involves doing the right, albeit uncomfortable, thing. When obstetric anesthesia arrived at Forsyth, one of the private obstetricians, who was particularly anti-anesthesia, hated left uterine displacement perceiving that it interfered with surgery. One morning, at three A.M., the surgeon was preparing to do a cesarean section. He requested that left uterine displacement be removed. We refused and the obstetrician became irate and refused to operate. The obstetrician lost his composure and proceeded to call the Dean at home in an attempt to have left uterine displacement removed. He failed. Was the memory good for all parties? Ultimately, yes. The patient received the best anesthetic, we did the right thing, and the obstetrician learned that we had principles regarding patient care. The same obstetrician became one of our strongest advocates. Being present, accepting responsibility for outcomes, both good and bad, builds a history of trust (not blame) which creates the future. What I learned over 25 years was that doing the right thing, being present, creates learning experiences and memories. Are you visible on labor and delivery? Do your patients remember you? Is your relationship with your obstetricians a relationship of trust or blame? Are you celebrating your victories one by one?
One final vignette from my own personal experience. I was informed one day that a patient was requesting me to perform her anesthetic for cesarean section. I did not recognize the patient’s name nor did she give a reason for requesting my service. I walked by the door to the interview room to see if I could recognize her and could not. I could not ever recall seeing this woman in my life. I entered the room and introduced myself and confirmed the fact that she was requesting me to perform her anesthetic. She said yes. I apologized for not remembering her and asked her why she was requesting me. She informed me that I had performed her last anesthetic. I said, “I assume all went well?” A frown crossed her face as she reflected upon her previous experience, obviously reliving it, and said, “It was horrible!” “The epidural did not work.” “You attempted to repair it, and when they started the surgery I had great pain and you had to put me to sleep.” I asked, feeling perplexed, why, considering this, she wanted me to be her attending again. Her answer was, “Because no matter how bad it got, I trusted you.” A memory I hold now from seven years ago. These are the relationships we build one patient at a time: being there, being present and committed, and doing the right thing and being memorable – developing consilience with a unity of knowledge. Are you establishing relationships with your patients? Do your patients remember you helping them achieve their victory?

Victory is also about resident education. Resident education involves a continuum from data acquisition to wisdom. Wisdom is the ability to transfer skills and expertise learned in one area to other areas. Progression through the learning process offers potential ethical conflicts between resident teaching and patient care. One of our obligations to residents is to create memories for them that will enable them in later years to subsequently prioritize scenarios when confronted with dilemmas, that is, to transfer knowledge and have wisdom. Residents, especially in early training, tend to focus on data acquisition, and, not infrequently, the data acquired conflict with a diagnosis. For example dermatomes identified utilizing a pin should not discount the patient’s complaint, “I am more numb on one side.” At our facility the attending anesthesiologist makes postoperative visits for all deliveries. One realization I have had over the years is that it is a rare patient who complains when a poor block is replaced by an effective one. In contrast, the number of patients who complained because a block is not repeated is remarkable. Not infrequently the patient will state, “I was numb on one side” while the chart documents symmetry. Distinguishing between an adequate and an inadequate block is a surprisingly difficult venture. It is hard for residents, like all of us, to accept a perceived failure. Accepting the fact that 5% of epidurals fail, despite perfect technique, is gaining expertise. Learning when to replace blocks is wisdom. How do we create memories for residents to teach wisdom without creating ethical conflict?

If we see a patient with a marginal block during labor who is proceeding to cesarean section, our action or inaction will dictate outcome. Not infrequently, a resident will maintain the blockade is adequate and that the patient is simply experiencing “pressure.” In this case we could proceed with the marginal block, allow the resident to experience first-hand the quality of the block he or she has just utilized and probably have the opportunity to do a general anesthetic. Alternatively, we may insist they repair the quality of block and an uneventful regional anesthetic will follow. In the second scenario the only emotion likely attached to this scenario is the irritation the resident has for the attending’s forcing upon them the extra work of replacing an “adequate block.”
the first scenario the patient experiences pain and suffers the risk of general anesthesia. At our institution, ethics are always for the patient, and we have to use alternative strategies to create memories for the residents. Some solutions may not be as effective as we anticipate. The department has a patient simulator which we hoped would offer an alternative strategy for acquiring skills. While this may be true, a recent paper by our physicians revealed that simple skills, taught in the anesthesia simulator lab, were forgotten relatively quickly. It is my contention that the lack of emotions, thus the lack of sustained memory, attached with the simulator accounts for the short-term retention rate.

We have to find the intermediate ground. I was recently informed about a patient who was having a cesarean section for failure to progress utilizing a preexisting epidural. The resident and I visited the patient where I was unimpressed by the quality of blockade, but the resident contended that it would work just fine. Since this was a non-emergent circumstance, I offered the resident the chance to attempt to achieve anesthesia for cesarean section. Hoping to guide him to the correct decision, I obtained an Allis clamp and asked the house-staff to use it and check for anesthesia by pinching the abdomen prior to transport to the operating room. At transfer the resident called me, I asked him about the quality of blockade, and he informed me that the patient had passed the “Allis test.” Following prep and drape the obstetrician clamped the abdomen which was accompanied by a groan of pain by the patient. I asked the resident did you use the Allis? He answered, “Yes, but not that hard.” We repaired the epidural in the operating room by manipulating the catheter and the outcome was good. Other than inconvenience for the obstetrician all parties experienced benefit, the patient remained awake, the resident learned, and the surgeon was content with regional anesthesia. Three months later the resident returned bringing his own Allis clamp with him. As the years have proceeded and technology has replaced incremental injections and the time we spend with each patient has declined, the opportunities to create memories are lost for residents, patients, and ourselves. We need to explore other ways to achieve victory.

Some of our victories have occurred in the area of research. Successful research outcomes provide value for the anesthesiologist, patient, and the obstetrician, according to the theory of consilience. In our early years one of our anesthesiologist wanted to compare end tidal CO₂ vs. arterial PCO₂ at cesarean section. Capnography was not as yet on the horizon for the anesthesia specialty. We obtained a laboratory device which measured end tidal CO₂ and proceeded with the investigation. During one of the studies, we diagnosed esophageal intubation. The endotracheal tube was replaced and the patient did well. Suffice it to say we never removed the device from the cesarean section room and later capnography became a national standard of care. A victory and a memory of doing the right thing and being there. Our institution was one of the first institutions to investigate PCEA and publish results speculating about its benefits. It appears all are winners, all are victorious. Patients like PCEA because they retain some control, obstetricians like PCEA because, with proper coaching, less dense analgesia is present at delivery, and it is good for us because it dramatically decreases our workload, freeing us to provide analgesia to others who might otherwise not have received our service. Similarly CSE because of its rapid onset has enabled us to reach even more patients. The number of required physician encounters per patient by the anesthesia team has decreased dramatically over the years since the introduction of CSE and PCEA. I did some
calculations regarding our current anesthesia delivery practice compared with 1977. It turns out that comparing these two practices resulted in 281 days saved in workload by not redosing when you compare CSE/PCEA vs. the older technique of incremental redosing. Research is good for patient care and an opportunity for victory.

So what has happened in our hospital after 25 years? We are currently redesigning and building a new LDR suite which will open in 2005. It will include 43,200 square feet for acute care services including 2 cesarean section rooms, 5 operating rooms, and 24 LDR’s. In 2001, the last year of available statistics we have had a significant growth in service. We had 6,539 deliveries which included 5,124 vaginal deliveries and 1,415 cesarean sections for a cesarean section rate of 21.16% - this, in addition to, our 3,000 gynecologic cases. For cesarean section 1.1% received CSE, 56.3% spinal anesthesia, 35.5% epidural anesthesia, and 7.1% general anesthesia. For vaginal delivery, 50.5% received epidural analgesia and 29.4% received a combined spinal epidural analgesic. A remarkable shift in the utilization of anesthetic techniques. Regional anesthesia is the preferred anesthetic.

Contrast the following scenario regarding cesarean section anesthesia with our early experience. An obstetrician, at two a.m. was to perform an emergent cesarean section for a laboring patient with a breech presentation. The patient was ASA I with a Class I airway, NPO, with no contraindications to general anesthesia. The patient refused regional anesthesia. When the obstetrician heard this he said, “This decision is not acceptable.” He walked into the patient room and again the patient refused regional anesthesia. The obstetrician said, “That is fine, and I will see if I can find you a new obstetrician.” The patient relented, had a spinal anesthetic, loved it and all parties were happy. We were victorious. We are now uniformly accepted by administration, patients, and obstetricians. Research is accepted as an important aspect of our care.

Nationally in 2000 there were 4,064,948 births. The cesarean section rate was 22.9% in 2000, and the maternal mortality rate was approximately 7.5/100,000 deliveries. Anesthesia mortality has declined from 4.3/million births in 1979-1981 to 1.7/million in 1988-1990. By 1992 eighty-four percent of cesarean sections utilized regional anesthesia, and 37% of labor patients received epidural analgesia. Regional anesthesia is more prevalent and safer than ever before. We have succeeded and have had a quarter of a century of resounding victory.

What’s left for us to do? General anesthesia mortality is 17 fold the rate for regional anesthesia. As when I entered the specialty 25 years ago, aspiration and airway problems remain. We must not rest on our laurels but bring new skills from the operating room to labor and delivery for managing difficult airways. The LMA, fiberoptic intubator, and the Fastrach LMA may be life saving. Interestingly, when asked what our faculty thought were the greatest advances in the previous 25 years were, technology advances led the list. Technology enabled us to make regional anesthesia available to more patients, and that has been one of our foci. Now we must make sure that we are not distancing ourselves from the patients with this victory. Technology can impose impediments for reliably assessing the adequacy of analgesia. We aren’t there. Today when a patient requires additional analgesia she pushes a button. In many ways we have replaced ourselves with a round, fingertip operated device. Despite the fact that the number of redoses predicts the failure rate of epidural analgesia, I have seen lockout creep. The number of cc’s allocated per hour either by continuous infusion or PCEA
bolus increases in an effort to save time by not having to personally do a redose. We are not confronting our failures as quickly or reliably as we did because we aren’t there. Up to 10% of labor epidurals may not be used for cesarean section. How many of these are inadequate? What is the conversion rate to general anesthesia rate at your institution? According to the ASA Closed Claims Survey, aspects which differentiate obstetric anesthesia suits from non-obstetric suits are the greater number of claims for minor complaints and pain during anesthesia.16 Is this an accident? Is it because we aren’t there? Will one of these inadequate blocks lead to a catastrophe?

Twenty-five years ago anesthesia personnel used the argument against placing endotracheal tubes for cesarean sections because aspiration had never happened to “them.” Today I am concerned that the same attitude is developing regarding failed intubation subsequent to failed regional blockade associated with poor labor analgesia. The frequency of failed intubation and ventilation is low. Is it likely that a failed intubation and failed ventilation will occur in your career during a conversion from regional to general anesthesia? Probably not. Yet there were over four million deliveries in the United States in 2000 so it is likely that this event did occur. Are we in danger of becoming Firestone? The individual utilizing Firestone tires was probably safe but the nation had a problem. Attention to detail is vital. Each of us should assess how often a labor analgesic is insufficient at our institution. We must do this by being visible and present.

We have been victorious in the last 25 years personally and professionally. As you look around the room remember that this audience was started by a handful of people at a time when most anesthesia provider’s viewed obstetric anesthesia as best if you didn’t have to do it. What a great victory. It is now you, the audience, who are going to write the next 25 year history. I challenge you to be ethical by doing the right thing, being visible, and present, and creating for yourself and others, positive memories, one encounter at a time. You may not remember the encounter but certainly in the case of patients, they will remember you. Practice consilience, do what’s best for all, and you will gain wisdom. Even better, you will be victorious.
References


2. Website www.cdc.gov/faststarts/births.htm CDC, NVSR vol; 29, April 2001


Oral Presentations #2

Moderator: Cynthia A. Wong, MD

9:15 - 10:15 am

02-1 CAN ROPIVACAINE AND LEVONUPIVACAINE BE USED AS AN INTRAVENOUS TEST DOSE FOR REGIONAL ANESTHESIA?
Gautier, P.; Oyen, M.D.; Hood, D.D.

02-2 THE VIRTUAL LARYNX: TEACHING INTUBATION SKILLS WITH FEWER PATIENTS
Glassenberg, R.; Glassenberg, S.

02-3 MATERNAL SURGERY DURING PREGNANCY: A POSTNATAL OUTCOME STUDY USING GUINEA PIGS
de la Fuente, S.G.; Pibeiro, J.C.; Greene, R.R.; Eubanks, S.W.; Reynolds, J.D.

P-9 THE USE OF VIDEO TAPES OF SPECIFIC ERRORS AS AN ADJUNCT TO TEACH EPIDURAL TECHNIQUE
Birnbach, D.J.; Marenco, J.E.; Kerimoglu, B.; Stein, D.J.; Santos, A.C.

All Abstracts listed on this page are in the Anesthesiology Supplement.
Oral Presentations / Best Paper of the Meeting Award

Moderator/Judge: Michael J. Paech, FANZCA
Judges: Sivam Ramanathan, MD; Edward T. Riley, MD; Scott Segal, MD

10:45 - 11:45 am

O2-4 ALPHA-1 AGONISTS VS EPHEDRINE FOR C/S HYPOTENSION: A SYSTEMATIC REVIEW
Halpern, S.; Chochinow, M.

BP-2 IN VITRO INVESTIGATION: EPIDURAL CATHETER PENETRATION OF HUMAN DURA
Angle, P.J.; Kronberg, J.; Thompson, D.

BP-3 MORPHINE'S SITE OF ACTION FOR ANALGESIA TO UTERINE CERVICAL DISTENSION IS CENTRAL AND ANTAGONIZED BY ESTROGEN
Eisenach, J.C.; Sandner-Kiesling, A.

O1-1 RANDOMIZED TRIAL OF NEURAXIAL VS. SYSTEMIC ANALGESIA FOR LATENT PHASE LABOR: EFFECT ON INCIDENCE OF CESAREAN DELIVERY
Wong, C.A.; Scavone, B.M.; Sullivan, J.T.; Marcus, R.L.; Sherwani, S.S.; Strauss-Hoder, T.P.; Yaghmour, E.A.; McCarthy, R.J.

All Abstracts on this page are located in the Anesthesiology Supplement.
The Society for Obstetric Anesthesia & Perinatology welcomes and thanks all representatives of industry for their support of this meeting, and for providing education through their exhibits.

A list of 2002 exhibitors follows...

<table>
<thead>
<tr>
<th>COMPANY NAME</th>
<th>BOOTH #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrow International</td>
<td>21</td>
</tr>
<tr>
<td>AstraZeneca</td>
<td>11</td>
</tr>
<tr>
<td>B. Braun Medical Inc.</td>
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<td>BD Medical Systems</td>
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<td>GlaxoSmithKline</td>
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<td>Imagyn Medical Technologies</td>
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Lippincott, Williams & Wilkins
Lippincott Williams & Wilkins is a global publisher of medical, nursing and allied health information resources in books, journals, newsletters, and electronic media formats. Please stop by booth #15 to review one of the many titles that we have available for display.

PNA Medical Systems
PNA Medical Systems is presenting advanced Regional Anesthesia and Plexus Anesthesia systems, the Sprotte Spinal Needle, Insulated Sprotte and Short Bevel Unipolar needles. “MultiStim Plex” for percutaneous nerve identification and “MultiStim VARIO” for percutaneous nerve identification as well as measuring depth of neuro-muscular blocks. Also being displayed, a full spectrum of innovative Continuous Plexus Anesthesia kits.

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46 - 4’ X 8’ Double-Sided Poster Boards
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Point Hilton at Squaw Peak
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May 12-16, 2004
36th Annual Meeting
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