

## WHAT'S NEW IN OBSTETRIC ANESTHESIA FROM 2013?

Joy L. Hawkins, M.D.  
University of Colorado SOM  
(\* I have no conflicts to disclose. \*)



## WHAT'S NEW IN THESE AREAS?

- Policies and Procedures
- Labor Analgesia
- Cesarean Anesthesia
- Anesthetic Complications
- Obstetric Complications
- The Fetus and Newborn

*Discovery is to see what  
everybody else has seen, and to  
think what nobody else has  
thought.*

*Albert Szent-Gyorgyi*

## POLICIES AND PROCEDURES

### PATIENT SAFETY

A national survey of L&D personnel asked about occurrence of 4 patient safety concerns: dangerous shortcuts, missing competencies, disrespect and performance problems.

- 92% of physicians, 98% of nurses said yes.
- Only 9% of physicians, 13% of midwives, and 13% of nurses shared concerns with the person involved - "Organizational silence."

Am J Obstet Gynecol 11/2013; 402

## PATIENT SAFETY

Review of California births to evaluate whether high-volume (HV) days correlate with measures of obstetric care. Used days when volume was > 75%ile for that hospital vs. low or average days.

- ↑ asphyxia on HV weekends (p=.013)
- CD rate was ↓ on HV weekends (p=.009) for nulliparous, singleton, vertex parturients

Obstet Gynecol 2013;122:851

## PATIENT SAFETY

National trends in AHRQ quality and safety indicators find overall improvement from 2000-2009. But...

- Inpatient maternal and neonatal mortality remained constant.
- Higher rates for black vs. white: 12 vs. 4.6 / 100K maternal deaths and 6.6 vs. 2.5 / 1000 neonatal deaths (p<.001 for both).

Obstet Gynecol 2013;121:1201

## ECONOMICS

Prior to ACA about half the births in the U.S. were paid for by Medicaid, but only pregnancy care (no care before or after).

KaiserHealthNews.org, 9/4/13

Will broad access to care (before and during pregnancy) lower the infant mortality rate in the U.S. – highest among developed countries.

[www.nytimes.com](http://www.nytimes.com), 10/23/2013

## ECONOMICS

What constitutes an “emergency” for billing purposes in OB anesthesia?

- A medical condition that manifests itself by acute symptoms of sufficient severity in which the absence of immediate medical attention could reasonably be expected to result in serious jeopardy to a patient’s health or serious impairment to bodily functions, organs, or parts.

## ECONOMICS

Average billed charges for a pregnancy in the U.S. = \$37,341. Costliest in the world. Ways to consider controlling costs:

- Midwives versus obstetricians for prenatal care and routine deliveries.
- Fewer routine ultrasounds, IV’s, anesthesia
- Bundled hospital rates and prices, no matter the mode of delivery.

[www.nytimes.com](http://www.nytimes.com), 7/1/2013

## CONTRACEPTION

ACOG Practice Bulletin #133: *Benefits and Risks of Sterilization*

- PPTL is associated with lower failure rates than interval tubal occlusions done via laparoscopy.
- LARC (IUD, implants) are as effective and have lower morbidity and mortality.
- Women should be counseled about failure, regret and alternatives. Age and parity should not be a barrier to sterilization.

Obstet Gynecol 2013; 121: 392

## CONTRACEPTION

**PRO:** Contraception is a fundamental, preventive health primary care service. Failure to provide is an incursion into patient and clinician autonomy.

**CON:** Religious-based organizations should not be required to provide contraceptive coverage. Pregnancy is not a health risk in developed countries, and contraception can ↑ risks (e.g., thromboembolism).

JAMA 2013;309:1997

## “CHOOSING WISELY” LIST

ASA's participation with other specialties:

1. No lab studies for ASA I,II patients having low-risk surgeries.
2. No baseline cardiac testing for low or moderate risk non-cardiac surgeries.
3. No routine PA catheter for cardiac surgeries.
4. Don't transfuse young healthy patients with Hgb  $\geq$  6 unless ongoing EBL or unstable.
5. Don't give colloids without an indication.

## NON-OBSTETRIC SURGERY

ACOG's Committee Opinion (joint with ASA):

1. Obtain an obstetric consultation preop. They should be readily available intraop.
2. No anesthetic agents are teratogenic.
3. FHR monitoring may assist in positioning, cardiorespiratory management, delivery option.
4. Operate where there are OB and pediatric services.

## NON-OB SURGERY (cont)

5. Pre and post-op FHR is adequate if pre-viable.
  6. A qualified individual should be readily available to interpret if continuous FHR monitoring is used (guidelines included).
  7. A pregnant woman should never be denied indicated surgery. Postpone elective surgery until after delivery, non-urgent until 2<sup>nd</sup> trimester.
- Obstet Gynecol 2011;117:420 (reaffirmed 2013)

## TREATMENTS

There is lack of evidence-based data to treat pregnant women for illness during pregnancy. How often do trials exclude pregnancy?

- Of industry-sponsored trials, 5/558 (1%) were designed for pregnant women.
- Of phase IV clinical trials, 348/367 (95%) excluded pregnant women.
- Need thoughtful criteria to include pregnant women to inform treatment decisions.

Obstet Gynecol 2013; 122: 1077

## CESAREAN RATES

The cesarean rate has not ↑ since 2009. Rates for 38 weeks ↓, while those at 39 weeks ↑ widely, thanks to ACOG policies.

JAMA 2013; 310: 574

However, CD rates varied from 7 to 70% at U.S. hospitals and could not be accounted for by case-mix. Even low-risk varied from 2% - 37%.

Health Aff 2013; DOI: 10.1377

## CESAREAN RATES

Trends in the rate of primary CD:

- The rate continues to increase due to ↓ labor attempts and to ↓ labor success.
- Multi-factorial: maternal factors (obesity), physician factors (no vaginal breech deliveries), preferences.

Am J Obstet Gynecol 2013; 209: 554

## CESAREAN RATES

What are the consequences of a primary CD across reproductive life?

- Morbidity ↑ in each subsequent pregnancy and is greater than morbidity associated with TOL
- 10% morbidity by the 4<sup>th</sup> pregnancy
- Increased maternal risks are not offset by reduced risks in neonatal morbidity.

Obstet Gynecol 2013; 121: 789

## CESAREAN RATES

What are the indications for primary cesarean delivery in the U.S.?

- CD rates: 31% for primip, 12% for multip
- Indications: FTP 35%, NRFHT 27%, fetal malpresentation 19%
- BUT 43% of FTP never got past 5 cm, 17% who reached 2<sup>nd</sup> stage pushed < 2 hours and only 1% had trial of forceps – many opportunities for improvement of labor mgt.

Obstet Gynecol 2013; 122: 33

## CESAREAN RATES

Compare outcomes of elective induction at term versus expectant management:

- California database of 362,154 deliveries
- Odds of cesarean were lower with induction (OR 0.43-0.57 from 37-40 weeks)
- Complications were not increased, except ↑ bilirubin at 37-38 weeks and shoulder dystocia at 39 weeks.

Obstet Gynecol 2013; 122: 761

## CESAREAN RATES

What is the relationship between the length of the first and second stages of labor (uncomplicated G1, singleton, 3-4 cm dilated)?

- 12,523 women at one hospital (Parkland)
- 95<sup>th</sup> %ile: 15.6 and 2.9 hours respectively
- Length of 2<sup>nd</sup> stage of labor increased with ↑ length of the 1<sup>st</sup> stage (P< .001)

Obstet Gynecol 2013; 122: 27

## TERM PREGNANCY

*“Pregnancy Length May Vary by 5 Weeks”*

- Study followed 125 women with daily urine samples from stopping contraception until early pregnancy, determining ovulation date.
- Pregnancy lasted 38-43 weeks; women should receive a due date range
- Older mothers, those with later implantation (by progesterone spike), and mothers whose own birth weights were larger had longer pregnancies.

JAMA 2013; 310: 893

## TERM PREGNANCY

Workshop involving NICHD, ACOG, AAP, SMFM, March of Dimes, WHO recommended these definitions of "term":

- Neonatal morbidity (RDS, NICU admit) is higher from 37<sup>0</sup>-38<sup>6</sup> and mortality is higher after 42<sup>0</sup>, so optimal delivery is 39-41<sup>6</sup>.
- New definitions: early term (37-38<sup>6</sup>), term (39-40<sup>6</sup>) and late term (41-41<sup>6</sup>).
- No deliveries < 39 weeks unless there are medical indications, labor, or SROM.

JAMA 2013; 309: 2445

## TERM PREGNANCY

Results of a process improvement program in academic and community hospitals to ↓ rate of elective scheduled early term deliveries (37-38<sup>6</sup>):

- Successful ↓ from 28% to 5% in a year for both inductions and cesarean deliveries
- No change in medically indicated or unscheduled early-term deliveries
- NICU admissions stable, term IUFD did not ↑

Obstet Gynecol 2013; 121: 1025

## TERM PREGNANCY

What are the risks of elective repeat cesarean starting at 37-38 weeks compared to 39 weeks?

- Data from 23,794 prospectively studied elective repeat cesareans
- 37 and 38 weeks: ↑ neonatal adverse outcomes (OR 2.02 and 1.39)
- Best maternal outcomes (OR 0.51) at 39 weeks

Obstet Gynecol 2013; 121: 561

## CESAREAN ON REQUEST

Should women be allowed to choose a cesarean delivery when there is no maternal or fetal indication?

- Pre-labor: JAMA 2013; 309: 1930
- During labor: Obstet Gynecol 2013; 122: 684 (+ editorial)
- ACOG statement: Obstet Gynecol 2008; 111: 243

## HOME BIRTH

- Based on 2008, term, singleton, live births (N= 2,081,753)
- 0.58% were planned home births (N=12,039)
- Home births had ↓ interventions: induction/augmentation, operative vaginal delivery
- More 5-minute Apgar scores < 4 (OR 1.87)
- More neonatal seizures (OR 3.08)

Am J Obstet Gynecol 2013; 209: 325

## HOME BIRTH

Lay discussions of the AJOG article:

- "10 times more likely to lack a pulse and be unresponsive when they are 5 minutes old" *Science News*, 10/19/13
- "the trend is a particularly risky aspect of the culture of 'mommy one-upmanship' that fetishizes everything natural." *WSJ.com* 8/25/13

## ANALGESIA FOR LABOR

### UPDATING LABOR MGT

- Friedman's labor curve (from 1955) is not accurate; active labor starts at 6cm, not 4cm.
- A high percentage of cesareans for FTP are done < 6cm – not appropriate? Perform fewer cervical exams < 6cm, longer use of oxytocin.
- Individualize labor curves based on whether labor is induced, maternal obesity, etc.
- Delayed pushing? Longer 2<sup>nd</sup> stage?

Am J Obstet Gynecol 2013; December; 531

### PAIN DURING LABOR

Can sensory tests (heat, pressure, IV cannulation) predict pain intensity during labor and epidural use? Not very well.

- Heat tolerance correlated with worst labor pain ( $r=0.33$ ). Pain AUC correlated with supra-threshold and tolerance tests ( $r=0.26$ ).
- Pain with IV cannulation correlated with time to labor epidural request ( $r=0.33$ ).

Br J Anaesth 2013; 110:600

### PAIN DURING LABOR

How can we assess pain during labor if patients cannot communicate with us?

- Pupillometry was used in laboring women before and after epidural analgesia, between and during uterine contractions.
- Changes in pupillary dilation correlated with pain scale and were abolished by epidural analgesia.

Anesth Analg 2013; 116: 1057

### PAIN DURING LABOR

Why do some women choose not to have epidural analgesia when available? 509 women who had not requested or received analgesia were interviewed.

- 39% had misunderstandings unsupported by the literature and/or lack of trust in providers
- 23% desired natural childbirth
- 46% had concerns about the procedure and its possible complications.

Int J Obstet Anesth 2013; 22 : 119

### AORTO-CAVAL COMPRESSION

157 term parturients not in labor had non-invasive CO, upper and lower extremity BP measured supine and tilted.

- CO was 5% higher with  $\geq 15\%$  tilt
- 11/157 had a fall in CO > 20% when tilted < 15%, without changes in BP → "silent" vena caval compression
- 1/157 had aortic compression with systolic BP 25 mmHg higher in the arm than leg.

Br J Anaesth 2012; 109: 950

## TECHNOLOGY & EPIDURALS

Using ultrasound, which plane best to estimate depth in obese parturients?

- 60 obese (BMI 40) parturients at term
- Depth was measured in the TM transverse median and PSO paramedian sagittal oblique planes against actual depth at placement.
- No difference (6.5, 6.5, and 6.6 cm) but quality of image was better in PSO planes.

Anesth Analg 2013; 116: 829

## TECHNOLOGY & EPIDURALS

The Episure™ spring-loaded syringe has been used successfully, but what is the learning curve for experienced providers (N=14)?

- Similar rates for successful placement versus conventional glass syringe, but shorter time to catheter insertion.
- Greater success with Episure™ for attending versus fellow and if their preferred technique was saline with continuous pressure

Anesth Analg 2013; 116: 145

## TECHNOLOGY & EPIDURALS

An algorithmic approach to scoliosis:

- Mild (11-25°): good positioning
- Moderate (25-50°): paramedian approach on the convex side of the curve, or midline approach angling to the convex side, ± US
- Severe (>50°): CT, fluoro, US imaging or consider alternative pain management

Br J Anaesth 2013; 111: 807

## CSE versus CLE

800 women received CSE or CLE with PCEA in a busy private practice hospital by experienced anesthesiologists (new model).

- No difference during 2<sup>nd</sup> stage and at delivery
- CSE → better pain scores in 1<sup>st</sup> stage of labor
- And fewer CSE patients needed top-ups (16 vs 26%) - a boon to a busy practice.

Anesth Analg 2013; 116: 636

## CSE versus CLE

*Editorial: CSE or Traditional Epidural Technique: Who Wins?*

- Both techniques provide excellent analgesia.
- Epidural catheters function better for labor if placed by a CSE approach.
- Epidural catheters in both techniques can fail during labor; rates and timing unknown.

Anesth Analg 2013; 116: 515

## EPIDURAL MAINTENANCE

Meta-analysis to assess whether use of low concentration epidural infusions ( $\leq 0.1\%$  B or 0.17% R) in labor ↓ risk of assisted vaginal delivery (AVD) or other adverse outcomes:

- No difference in cesarean rates, pain scores, hypotension, NRFHT, 5-minute Apgar < 7
- Low conc had ↓ AVD, ↓ motor block, ↑ ambulation, ↓ urinary retention, shorter 2<sup>nd</sup> stage, fewer 1-minute Apgar < 7

Can J Anaesth 2014; 60: 840

## EPIDURAL MAINTENANCE

Patient satisfaction with epidural labor analgesia was assessed at a teaching hospital that used 0.0625% B + fentanyl 2 µg/ml infusions.

- Many experienced pain: 38% reported pain in the first stage of labor, 26% in the second
- 25% required top-ups but only 8% had the concentration of their infusion adjusted
- BMI 25-30 (OR 2.56), induced labor (OR 2.4), and those requiring top-ups (OR 5) were less satisfied.

Can J Anesth 2013; 60: 787

## EPIDURAL MAINTENANCE

A systematic review of 9 RCTs comparing continuous epidural infusions (CEI) with intermittent epidural bolus (IEB) found:

- No difference in cesarean rates, duration of labor, or need for anesthetic intervention.
- IEB had slightly lower bupivacaine usage (-1.2 mg/hr) and higher maternal satisfaction scores (7mm / 100mm scale).

Anesth Analg 2013; 116: 133

## INTRATHECAL CLONIDINE

Non-pregnant female volunteers received various doses of IT clonidine and bupivacaine and had heat tolerance assessed.

- Significant analgesia occurred > 25 µg clonidine and 3 mg bupivacaine
- Only bupivacaine ↓ heart rate, neither had sympatholytic effects at these doses

Br J Anaesth 2013; 111: 256

## INTRATHECAL FENTANYL

Do genomics (the A118G SNP) affect duration of analgesia and pruritus after intrathecal fentanyl for labor analgesia?

- A118G genome, ethnicity (Miami versus Jerusalem) and hospital were variables examined after 20 µg IT fentanyl in labor
- No effect of A118G SNP on duration, pruritus
- Ethnicity mattered: Hispanics and Black > Jew/Arab, Miami > Jerusalem

Br J Anaesth 2013; 111: 433

## REMIFENTANIL PCA

Method of using remifentanyl PCA in labor:

- Dosing started at 0.15 µg/kg lean weight
- Increases every 15 min at patient request
- VAS scores ↓ 76-46 mm after one hour
- Pain scores were 63 mm at end of 1<sup>st</sup> and 2<sup>nd</sup> stages of labor (significant reduction)
- Minimal side effects (27% received supplemental oxygen), 93% satisfaction

Int J Obstet Anesth 2013; 22:19

# ANESTHESIA FOR CESAREAN DELIVERY

## FAMILY-CENTERED C/S

Is a family-centered cesarean possible?

- Place ECG leads on the back; Put BP cuff and oximeter on the non-dominant arm.
- Allow the mother to breathe room air.
- Delay cord-clamping to ↑ iron stores.
- Drop the surgical drapes during delivery.
- Plan immediate skin-to-skin contact on the mother's chest ± intra-op breast-feeding.

OBG Management 2013; 25: 10



Clear drapes facilitate the mother's view of the birth during cesarean.

## EVIDENCE-BASED SURGERY

Results of a systematic review for evidence-based surgical decisions during cesarean delivery:

- Pre-skin incision prophylactic antibiotics
- Spontaneous placental removal
- Surgeon preference on uterine exteriorization
- Single-layer uterine closure if no more babies
- Suture closure of SQ tissue if > 2cm thick
- Avoid manual cervical dilation, SQ drains
- Supplemental oxygen does not ↓ infection

Am J Obstet Gynecol 2013; 209: 294

## ANTIBIOTIC PROPHYLAXIS

Current ACOG guidelines recommend antibiotics before skin incision in C/S.

- 1052 ASA members responded to a survey
- Only 66% reported pre-incision antibiotics as standard of care vs. endorsing giving after cord clamp or at the discretion of OB
- Teaching > community hospitals
- West > Southwest or southeast

Anesth Analg 2013; 116: 644

## SKIN CLOSURE

Women had half their CD skin closure with staples, half with sub-cuticular suture.

- More women preferred stapled side (OR 2.55) both overall and cosmetically at 6 months.
- No difference in pain scores at any time.
- Four cases of infection; all involved suture.
- 2 plastic surgeons evaluated at 6 months; 1 preferred stapled side; 1 had no preference.

Obstet Gynecol 2013; 122: 878

## VERSION FOR BREECH

Is neuraxial anesthesia to facilitate version for breech presentation cost effective?

- Computer cost model of possible outcomes
- Studies → successful version 60% with anesthesia versus 38% without
- ↑ success with anesthesia leading to ↓ cesarean rate offsets the cost of anesthesia for version

Anesth Analg 2013; 117: 155

## UNSCHEDULED CD

- Excellent review of anesthetic issues for urgent or emergent cesarean delivery:

Classification	Decision-to-delivery time
Preop Antibiotics	General anesthesia
Supra-glottic airways	Spinal anesthesia
Epidural anesthesia	CSE and CSA

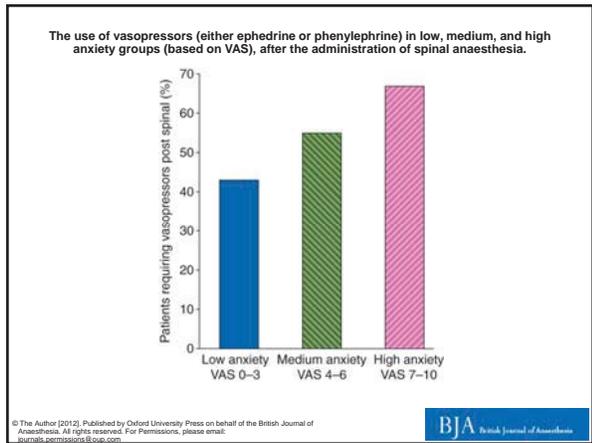
Trends in Anaesthesia and Critical Care  
2013; 3: 157

## PREDICTING HYPOTENSION

Does preoperative anxiety affect the incidence hypotension after spinal for cesarean?

- 100 parturients had psychological assessment of their preoperative anxiety and salivary amylase measured.
- High anxiety group had significantly more hypotension than the low anxiety group
- Salivary amylase did not correlate.

Br J Anaesth 2012; 109: 943



## PREDICTING HYPOTENSION

Perfusion index (PI) derived from a pulse oximeter can assess baseline peripheral vascular tone. Parturients had PI measured before spinal anesthesia for CD versus hypotension after.

- Baseline PI correlated with degree of hypotension ( $r=0.664$ ).
- $PI > 3.5$  identified parturients at risk with a sensitivity of 81%, specificity of 86%.

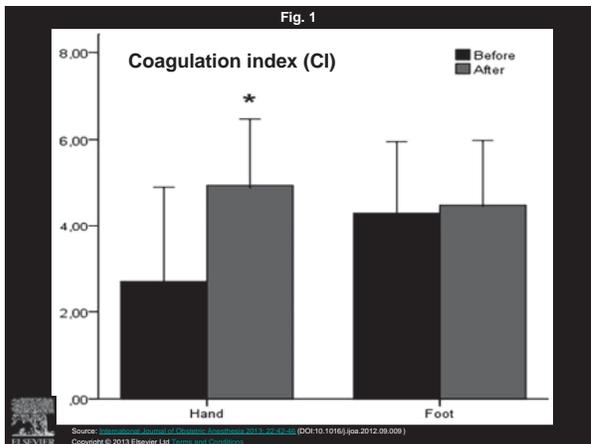
Br J Anaesth 2013; 111: 235

## SPINAL ANESTHESIA & TEG

Parturients are hypercoagulable. TEG was performed before and 1 hour after spinal for CD.

- No changes in blood collected from the foot.
- Blood from the hand:  $\downarrow$  R and K values and  $\uparrow$   $\alpha$  angle, MA and CI (enhanced coagulation).
- Spinal anesthesia may  $\downarrow$  coagulation by  $\downarrow$  vascular tone of the lower extremities.

Int J Obstet Anesth 2013; 22: 42



## SPINAL 2-CHLOROPROCAINE

Review of 14 studies, 7 volunteer and 7 clinical using 2-CP for spinal anesthesia.

- Reliable surgical block using 30-60 mg.
- Shorter time to ambulation and discharge compared with other LA.
- Fentanyl prolongs surgical block; not DC.
- Rare or no TNS; lower risk than lidocaine.

Acta Anaesthesiol Scand 2013; 57: 545

## SPINAL MAGNESIUM

How does addition of intrathecal magnesium influence spinal local anesthetic + opioid?

- 15 RCT with 980 patients (surgery, labor)
- ↑ duration in surgical but not obstetric patients
- No difference in onset, duration, hypotension, pruritus with LA alone or with opioids
- No advantage, unapproved for IT use

Br J Anaesth 2013; 110: 702

## SPINALS & PREECLAMPSIA

Review of spinal anesthesia in severe preeclampsia supports its use:

- Compared with healthy parturients, ↓ BP is less frequent and less severe.
- Compared with epidural anesthesia, ↓ BP is more frequent but easily treated and doesn't affect maternal or neonatal outcomes.
- Use clinical judgment if platelet count or coagulation profile is marginal.

Anesth Analg 2013; 117: 686

## GENERAL ANESTHESIA

- Risk of maternal death due to general anesthesia is now equivalent to regional.
- Anesthetic complications may be increasing with regional anesthesia; complacency?
- Emergent clinical situations may favor general anesthesia; do not cause delays attempting regional techniques.
- GETA should be neither widely used nor consistently avoided; use common sense!

SOAP Newsletter; Summer 2013: 12

## GENERAL ANESTHETICS

How do they work to prevent awareness?

- Non-OB patients were induced with ketamine, propofol or sevoflurane during EEG monitoring (complex analysis)
- All 3 selectively impaired frontal-to-parietal brain communications
- Disrupting this pathway may be a final common mechanism for inducing GA.

Anesthesiology 2013; 118: 1264

## GENERAL ANESTHETICS

Electronic survey of all UK consultants asking preferred choices for GA for CD.

- 93% use thiopental but 58% would support a change to propofol
- 15% use opioids during RSI
- 85% use nitrous oxide; 37% use TAP blocks
- 52% use sevoflurane, 2% use desflurane for maintenance but 80% *would* use desflurane if it were less expensive.

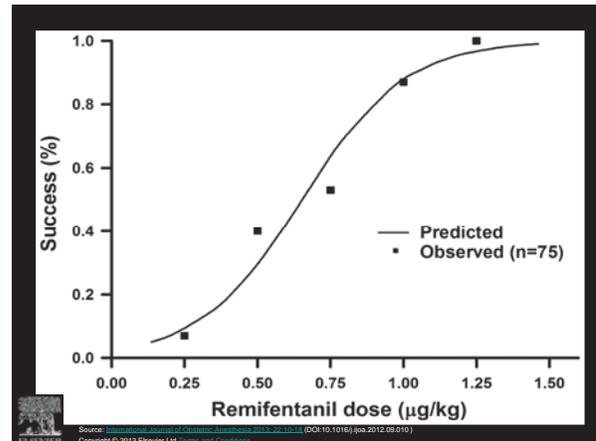
Int J Obstet Anesth 2013; 22:31

## REMIFENTANIL FOR RSI

Dose-ranging study using remifentanyl during RSI for CD with severe preeclampsia to attenuate CV responses.

- Doses of 0.25-1.25  $\mu\text{g}/\text{kg}$  + 5 mg/kg STP
- ED 95 was 1.34  $\mu\text{g}/\text{kg}$  (CI 1.04-2.19)
- Newborn SAP, HR, birth weight, and Apgar scores were comparable among groups.
- Need for neonatal resuscitation was common; preterm vs. remifentanyl effect?

Int J Obstet Anesth 2013; 22:10



## FAILED INTUBATION

UK survey of consultant-led units:

- Overall incidence = 1:224
- Risk factors: older, higher BMI, a recorded Mallampati score (not the score itself)
- Classic LMA most common rescue device
- No deaths or brain injuries, 8% incidence of aspiration (4 cases), 1 surgical airway

Br J Anaesth 2013; 110: 74

## FAILED INTUBATION

ASA Practice Guidelines were updated:  
Anesthesiology 2013; 118: 251  
Page 257 – Difficult Airway Algorithm  
Page 258 – Summary of Recommendations

## FAILED INTUBATION

An excellent review: *Use of Advanced Airway Techniques in the Pregnant Patient*

Anesthesiology Clin 2013; 31: 529

Page 535- difficult airway algorithm is adapted for the obstetric patient.

## AIRWAY ISSUE

Case report: 39-year old G1 with BMI 47 and goiter causing tracheal compression. She declined thyroid surgery until postpartum, but then required urgent cesarean for severe preeclampsia at 32 weeks. Awake fiberoptic intubation was performed → cesarean delivery → total thyroidectomy. Monitored postop for tracheomalacia in the ICU.

Int J Obstet Anesth 2013; 22 : 340

## INSPIRED OXYGEN

- Prospective RCT with women assigned to 30% or 80% oxygen during cesarean. An aerosol face mask was used to deliver oxygen after cord clamp and 1 hour postop.
- Outcome: endometritis or SSI
- No difference in infection rates: 8.2% in both groups

Obstet Gynecol 2013; 122: 79

## INSPIRED OXYGEN

Meta analysis of studies using high (> 60%) versus low (< 40%) inspired concentrations of oxygen during cesarean section.

- No evidence of benefit in reducing surgical site infection (RR 1.12, 95% CI 0.86-1.46)
- Moderate grade; studies often failed to adhere to the assigned intervention.

Int J Obstet Anesth 2013; 22: 104

## OXYTOCICS

RCT comparison of oxytocin 5U IV versus carbetocin 100 µg IV or placebo in elective CD.

- Drugs produced comparable hemodynamic changes: 25% drop in BP lasting 2-3 minutes
- HR, SV and CO increased after both drugs; only HR and CO ↑ after placebo, challenging the idea that uterine contractions will auto-transfuse and ↑ venous return.

Anesthesiology 2013; 119: 541

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## OXYTOCICS

Prolonged exposure to oxytocin (induction) desensitizes receptors in animals. Study used human myometrial strips obtained at CD.

- Strips were pretreated with oxytocin or saline, followed by dose-response to oxytocin
- Contractions were decreased based on duration and concentration of exposure
- Explains need for higher oxytocin doses after delivery if mother was exposed in labor.

Anesthesiology 2013; 119: 552

## PACU ISSUES

Updated ASA Guidelines published.

*Anesthesiology 2013; 118: 291*

Page 297: Summary of Recommendations:

- ECG monitor should be immediately available. BP and pulse ox are routine.

## TAP BLOCKS

Review of TAP block anatomy, spread, analgesic benefit, and comparison with other analgesic techniques. Key points:

- Effective as part of a multi-modal technique for abdominal surgeries incl. CD
- Reduces systemic morphine consumption, pain scores and opioid side effects after CD
- Effective for women who do not receive IT morphine as part of their anesthetic.

Curr Opin Anesthesiol 2013; 26: 268

## TAP BLOCKS

Do TAP blocks add benefit to intrathecal morphine for postop pain after CD?

- 51 women were randomized to TAP blocks with saline or 0.5% ropivacaine after spinal morphine in their CSE.
- At 2 hours the R group had less pain (2.8 vs. 4.9 with movement) and no requests for analgesics. At 24 hours → no difference.

J Clin Anesth 2013; 25: 475

## TAP BLOCKS

TAP blocks can be used for rescue analgesia after spinal morphine.

- 3 women with severe pain (9-10/10) after IT morphine and parenteral narcotics requested TAP blocks for rescue.
- US guided, 20 ml ropivacaine 0.375%
- Significant relief for 10-19 hours

Can J Anesth 2013; 60: 299

## LIPOSOMAL LA

Healthy volunteers received bilateral femoral nerve blocks with liposomal bupivacaine in different doses.

- Measured quadriceps strength and pain response to electrical current
- Duration > 24 hours but responses highly variable – needs larger study
- Is there a role in TAP blocks after CD?

Anesth Analg 2013; 117: 1248

## ACETAMINOPHEN

- Double-blind psychological studies show that in addition to analgesia, acetaminophen blocks the mechanisms in the brain that make us worried or uneasy when faced with uncertainty.
- Participants (120 college students) who received Tylenol® felt less upset after conversations about death, social snubs
- Both physical pain and feelings of rejection are caused by activation in the dorsal anterior cingulate cortex.

Psychological Science 2013; 24:966

## ASSESSING PAIN

Two methods asking women about their pain after cesarean were compared:

- Rate their pain: No pain → worst pain (0-10)
- Rate their comfort: No comfort → most comfortable (0-10)
- Patients rating pain scores had higher pain scores, were more bothered, perceived sensations as unpleasant and related to tissue damage rather than healing.

Br J Anaesth 2013; 110:780

## PREDICTING POSTOP PAIN

3 questions moderately predicted severity of individual's pain after CD:

1. Rate the intensity/loudness of audio tones.
2. Rate their level of anxiety.
3. Rate their anticipated postoperative pain and need for analgesics.

Anesthesiology 2013; 118: 1170

## NEURAXIAL MORPHINE

A comparison of 1.5 vs. 3 mg epidural morphine found equivalent analgesia, but fewer side effects (itching, N&V).

- Multi-modal regimens were not used during original dosing studies
- Combining NSAIDs, acetaminophen may allow for ↓ doses

Anesth Analg 2013; 117: 677

## NEURAXIAL MORPHINE

Retrospective chart review of post-CD patients who received either 100 or 200 µg spinal morphine:

- Higher dose had lower pain scores and lower use of opioids in the first 24 hours
- Higher dose also had more nausea and used more anti-emetics

Int J Obstet Anesth 2013; 22:36

## NEURAXIAL ADDITIVES

Meta-analysis of intrathecal clonidine in addition to morphine for postop pain:

- ↑ duration by 1.6 hours
- ↓ morphine requirements by 4.5 mg
- More hypotension with OR 1.78
- Balance small advantages against increased frequency of hypotension

Br J Anaesth 2013; 110:21

## MAGNESIUM

A meta analysis of RCT using perioperative systemic magnesium to minimize postop pain found positive results.

- All 18 studies showed reduction in postop opioid requirements
- Accompanying editorial points out effects were minor, but perhaps similar to ketorolac or acetaminophen

Anesthesiology 2013; 119: 13,178

## ORAL INTAKE

Does early oral intake affect GI outcomes during postop CD recovery?

- Meta-analysis of 17 studies
- Oral intake within 6-8 hours ↑ return of GI function with no ↑ in GI complications (ileus, vomiting, abdominal distention).
- Be flexible and consider early intake.

Obstet Gynecol 2013; 121: 1327

## DEXAMETHASONE

Meta-analysis to determine the optimal dose of dexamethasone to prevent postop N&V: 4-5 mg versus 8-10 mg:

- 4-5 mg reduces N&V: RR 0.31, NNT 3.7
- 8-10 mg reduces N&V: RR 0.26, NNT 3.8
- No difference when compared directly either as single drug or as combination therapy.

Anesth Analg 2013; 116: 58

## ANTI-EMETICS

3 groups: placebo, metoclopramide alone, metoclopramide + ondansetron with spinal anesthesia + phenylephrine infusion:

- Intraoperative N&V occurred in 49%, 31% and 23% respectively, but post-operative N&V was reduced only at 2 hours in the combination group.
- Surgical factors had a large effect – exteriorization of the uterus

Obstet Gynecol 2013; :615

## CHRONIC PAIN

Does chronic pain due to childbirth exist?

- Multicenter longitudinal cohort study
- Women were questioned about depression and pain within 36 hours after delivery and at 2, 6 and 12 months
- Low incidence of pain (0.3%) at 12 months; no association with tissue damage or history of chronic pain

Anesthesiology 2013; 118:

## CHRONIC PAIN

What is the mechanism by which chronic pain after childbirth is so rare?

- Pregnant rat peripheral nerve injury model
- Animals exposed to intrathecal oxytocin, atosiban after nerve injury
- Pregnancy → no effect; postpartum ↓ pain
- Oxytocin ↓ hypersensitivity; atosiban ↑ pain

Anesthesiology 2013; 118: 152

## CHRONIC PAIN

Childbirth causes physical injury during vaginal delivery and cesarean. Why is chronic pain so rare versus post-surgical patients?

1. There may be a protective mechanism peripartum that prevents chronic pain.
2. Pain ↓ more rapidly when CSF oxytocin levels were high postpartum, but not when atosiban was given. No effect of naloxone.

Anesthesiology (*editorial*) 2013; 118: 16

## FETAL SURGERY

Using a maternal-fetal sheep model, anesthesia with high-dose desflurane was compared to low-dose des + propofol / remifentanyl.

- High-dose des → more maternal hypotension, fetal acidosis, and ↓ uterine blood flow.
- Even with maternal normotension, UBF still declined and fetal acidosis persisted.
- No difference in fetal cardiac function.

Anesthesiology 2013; 118: 796

## FETAL SURGERY

Prenatal repair of myelomeningocele may be preferable. Issues for open fetal surgeries:

- Ethical considerations
- Inducing profound uterine relaxation
- Vigilance for maternal and fetal blood loss
- Fetal monitoring and possible resuscitation
- Postoperative tocolysis and analgesia

Anesthesiology 2013; 118: 1211

## ANESTHETIC COMPLICATIONS

### CARDIAC ARREST

During simulated maternal cardiac arrest, teams were randomized to perform CPS during transport or while stationary.

- % of correctly performed compression was 32% in the transport group vs. 93%.
- Interruptions in CPR were observed in 92% of transports vs. 7%.
- Tidal volume was 270 ml T vs. 390 ml S.

Anesth Analg 2013; 116: 162

### LA TOXICITY

A survey to obstetric anesthesia directors asked about lipid emulsion availability:

- 88% of units had it available
- 95% had it available in < 30 minutes
- Of 72 programs, 10 had a previous LAST
- 71% had an algorithm or guideline for LAST with lipid emulsion as a component

Anesth Analg 2013; 116: 406

### LA TOXICITY

Does intracellular partitioning of bupivacaine explain lipid resuscitation?

- Used whole-cell voltage-gated proton channel currents and the fact that LA are weak bases
- Real-time results → lipid emulsion rapidly extracted bupivacaine in the extracellular space and subsequently reduced the intracellular concentrations

Anesth Analg 2013; 117: 1293

### LA TOXICITY

How does lipid emulsion affect pharmacokinetics and tissue distribution of bupivacaine?

- Rat model of lipid for bupivacaine toxicity
- After lipid infusion, bupivacaine levels ↓ in brain, heart, lung, kidney but rose in liver
- Bupivacaine elimination half-life ↓
- Lipid sink effect is important

Anesth Analg 2013; 116: 804

### LA TOXICITY

30 parturients had bilateral TAP blocks after cesarean delivery:

- 2.5 mg/kg ropivacaine in 40 ml
- Peak venous concentration occurred at 30 minutes post-injection → mean 1.82 µg/ml (maximum 3.76 µg/ml)
- 3 patients reported symptoms at 2.70 µg/ml

Br J Anaesth 2013; 110: 996

## TEST DOSE

Since parturients are more sensitive to local anesthetic doses, would a 30 mg lidocaine test dose be as efficacious as 45 mg?

- 4 groups: 30 or 45 mg, spinal or epidural route; blinded observer assessed
- Both doses identified spinal placement; negative predictive value = 100%
- Poor specificity (74% and 59%) for leg warmth = spinal versus epidural

Anesth Analg 2013; 116: 125

## TEST DOSE

Use of color-flow Doppler to distinguish caudal epidural injection versus intrathecal:

- 20 intrathecal injections, 20 caudal epidural injections in ages < 6 years under GA
- Doppler images evaluated by blinded anesthesiologist for turbulence or not
- Sensitivity, specificity, + predictive value and negative predictive value all = 100%

Anesth Analg 2013; 116: 1376

## LOCAL TOXICITY

Sustained-release liposomal local anesthetics may have local myotoxicity when used for peripheral nerve blockade.

- Rat sciatic nerve block model using lidocaine or bupivacaine micro-particulate formulations + efficacy + myotoxicity scores
- ED 50 sensory duration for lidocaine = 255 minutes, for bupivacaine = 840 minutes
- All animals had similar degrees of myotoxicity

Anesth Analg 2013; 116: 794

## NEURAXIAL HEMATOMA

11 centers pooled their AIMS data to find patients who developed epidural hematoma requiring laminectomy after epidural catheters.

- 7 cases in perioperative group (N=62,450) for a 95% CI of 1 in 4,330 - 22,189 cases
- 0 cases in the obstetric group (N=79,837) for a 95% CI of 1 in 0 - 21,643 cases
- Much lower risk for obstetric patients

Anesth Analg 2013; 116: 1380

## NEURAXIAL HEMATOMA

Why are obstetric patients at less risk, even when bloody taps are more common?

- Pregnancy is a hyper-coagulable state
- The epidural space is more compliant; MRI after EBP shows blood leaking out
- All published cases have been in parturients with coagulopathy; no cases associated with anti-thrombotic or anti-platelet therapy

Anesth Analg 2013; 116: 1195 (*editorial*)

## NEURAXIAL HEMATOMA

FDA issued a new warning on Lovenox for patients with spinal or epidural catheters; ↑ risk of bleeding and paralysis.

- 170 cases from 7/1992 and 1/2013
- Recommendations similar to ASRA: wait 12 hours after prophylactic doses to place or remove a catheter; 24 hours if therapeutic
- Different: wait 4 hours after removal for next dose; ASRA states 2 hours after removal

Medscape 11/6/13

## VON VILLEBRAND DISEASE

ACOG Committee Opinion #580:

- Fetus can have up to 50% chance of being affected so avoid FSE and forceps/ vacuum, and postpone circumcision until evaluated
  - vWF levels often increase in pregnancy so measure in the third trimester to plan for delivery, option of neuraxial anesthesia
  - Risk of PPH, esp. delayed may be ↑ 50%
- Obstet Gynecol 2013; 122: 1368

## REPEAT SPINAL ANESTHESIA

Case Report: Patient suffered a crush injury to the thigh and had > 300 surgeries at a single institution, 191 of which were spinals. The patient denies pain, paresthesias or neurologic deficits. MRI showed no evidence of adhesions, neuroma formation, or intrathecal scar tissue, but there was scar tissue over the L2 and L3 spinous processes.

Anesth Analg 2013; 117: 1503

## RESPIRATORY DEPRESSION

In a single center series of post-cesarean analgesia with neuraxial morphine, there was no case of respiratory depression in 5036 patients.

- About 90% received either 3 mg epidural or 0.15 mg spinal morphine
- 63% were obese (BMI  $\geq$  30)
- No instances of naloxone being given

Anesth Analg 2013; 117: 1368

## ANAPHYLAXIS

Literature review of anaphylaxis in pregnancy:

- Incidence: 3 per 100,000 deliveries
- Most common triggers = PCN, cephalosporins, latex; less common ranitidine, colloid, succinylcholine. No local anesthetics.
- Treatment: epinephrine, LUD, cesarean to correct aorto-caval compression, fluids, bronchodilators, steroids.

Anesth Analg 2013; 117: 1357

## ANAPHYLAXIS

Review article on allergic reactions during labor and cesarean anesthesia:

- Predominant use of regional on L&D limits exposure to trigger agents.
- Commonly due to latex, antibiotics, colloids, oxytocics, local anesthetics, relaxants
- Delayed diagnosis common; confused with LA toxicity, AFE, hemorrhage

Int J Obstet Anesth 2013; 22: 231

## PDPH TREATMENT

Meta-analysis: assess efficacy of insertion of intrathecal catheter after wet tap in parturients:

- 9 trials→included CD and SVD, duration of catheterization was not analyzed
- Risk of PDPH was reduced but not significantly, RR 0.82 (95% CI 0.67-1.01)
- Need for EBP was reduced significantly, RR 0.64 (95% CI 0.49-0.84)

Int J Obstet Anesth 2013; 22:26

## ASPIRATION RISK

Pro – con of allowing food during labor:

- Though rare, aspiration still occurs in OB
- Minimal improvement in satisfaction scores (5 on a 100 point scale)
- No difference in delivery outcomes
- Even low-residue food ↑ gastric volume
- What to do with the patient undergoing induction of labor?

SOAP Newsletter 2014; Winter: 5

## ASPIRATION RISK

Women in labor were randomized to drink a chocolate or vanilla protein shake (325 ml) or have only ice chips:

- No difference in nausea or vomiting
- No difference in gastric emptying (26 vs. 20 minutes)
- Small ↑ in patient satisfaction scores

Aust NZ J Obstet Gynaecol 2013; 53: 369

## ASPIRATION RISK

Does adding milk to tea or coffee delay gastric emptying? Is prohibition necessary?

- Current NPO guidelines require 6 hours after milk until surgery and anesthesia
- RCT of healthy volunteers who received 300 ml black tea or 250 ml + 50 ml milk
- No difference in gastric emptying by paracetamol absorption or ultrasound.

Br J Anaesth 2014; 112: 66

## BREASTFEEDING

Review of current knowledge on neuraxial analgesia's impact on breastfeeding details many problems with published studies:

- lack of RCTs, varied scoring systems
- failure to control for confounding variables such as lactation consults, social support, BMI, oxytocin, neuraxial medications, temperature ↑, skin-to-skin contact and time to initiation of breast-feeding

Anesth Analg 2013; 116: 399

## NEUROTOXICITY

Do children age 12 who were exposed to GA for minor procedures during infancy show differences in academic achievement from those who were not exposed? Yes.

- No difference in standardized test scores
- Diagnosed learning disability was 15% vs 4% with an OR 4.5

Anesth Analg 2013; 117: 1419

## NEUROTOXICITY

1. Non-primate models indicate ↑ programmed cell death (apoptosis) after exposure to general anesthetics.
2. Primate models confirm + associated neurocognitive deficits.
3. Retrospective clinical data is inconclusive and prospective studies are ongoing → changes to pediatric anesthesia practice are premature.

Br J Anaesth 2013; 110: i53

## NEUROTOXICITY

Expert report and consensus statement:

1. Pre-clinical studies indicate general anesthetics are modulators of neuronal development and function.
2. Need clinical studies (vs. animal models)
3. Need strategies to avoid or limit brain injury in pediatric and geriatric patients; GA effects are not entirely reversible.

Br J Anaesth 2013; 111: 143

## MARFAN'S SYNDROME

Anesthetic management in 16 parturients:

- 4 emergency CD (3 fetal distress, 1 aortic dissection), 10 elective cesarean, 2 VD
- $\beta$ -blockers through pregnancy are key. Aortic root diameter > 40 mm in 10 initially; at term 12 patients had roots > 40 in 12 ( $\uparrow$  in 2 patients)
- Early epidural and no pushing for VD
- Consider lumbar MRI for dural ectasias
- 13 CD had GA with RSI, IV opioids and nicardipine as needed for  $\uparrow$  BP

Anesth Analg 2013; 116: 392

## INTRACRANIAL LESIONS

Can neuraxial techniques be used in parturients with intra-cranial pathology and potential  $\uparrow$  ICP?

- High risk of herniation: midline shift or downward shift with or without obstruction to the flow of CSF
- Alternative is ICP-controlled general anesthesia for cesarean delivery

Anesthesiology 2013; 119: 703

## OBSTETRIC COMPLICATIONS

## OBSTETRIC COMPLICATIONS

These areas will be discussed at the CRASH meeting. If you would like any of the references that I talk about, feel free to e-mail :  
Joy.Hawkins@ucdenver.edu

## THE FETUS AND NEONATE



## NEWBORN MORTALITY

Save the Children released its “Surviving the First Day” report show that 1 million babies die the day they are born each year.

- The 14 countries with the highest mortality rates are all in Africa.
- Lowest rates in Finland, Sweden, Norway.
- The U.S. is #30; the highest rate in the industrialized world; 50% higher than all other industrialized countries combined.

## SMOKING CESSATION

Association between smoking cessation, fetal weight gain, and neonatal birth weight:

- No difference among groups at 16 weeks
- Neonatal weight < 10%ile was 22% in smokers, 8% in quitters, 7.4% for non-smokers – OR 3.6
- Sustained quitters had 2.4 kg higher weight at 1-year postpartum.

Obstet Gynecol 2013; 122: 618

## ONDANSETRON

Large retrospective review of a Danish database for fetal outcomes after use of ondansetron during pregnancy:

- No relationship with stillborn, miscarriage, any birth defects, preterm delivery, or small size
- Usually used during first trimester for severe nausea & vomiting.

N Engl J Med 2013; 368: 814

## DRINKING ALCOHOL

5628 nulliparous women gave information about their alcohol use before pregnancy and up to 15 weeks gestation:

- 19% occasional use, 25% low, 11% moderate, 5% heavy consumption
- 34% binge drank just before pregnancy and 23% during first trimester
- No association with SGA, low birth weight, preeclampsia or preterm birth.

Obstet Gynecol 2013; 122: 830

## VALPROATE USE

Valproate(Depakote®) is teratogenic.

- Uses: epilepsy, migraines, bipolar disorder
- At age 6, IQ points were 8-11 points lower than children exposed to other anti-epileptics.

JAMA 2013; 309: 2542

- Significantly ↑ risk of autism spectrum disorder and childhood autism.

JAMA 2013; 309: 1696

## SSRI USE

Using a Danish registry, looked for a link between autism spectrum disorders and SSRI use before and during pregnancy.

- Compared to no use, use during pregnancy was not associated with ↑ risk.
- Use before pregnancy did ↑ risk (RR 1.46)
- It may be the indication for the SSRI that ↑ risk rather than the SSRI.

N Engl J Med 2013; 369: 2406

## ABRUPTION & ANOMALIES

From a national health registry in Finland:

- 4190 women with abruption matched with 3x women without abruption
- OR for anomalies overall was 1.92 if there was an abruption, especially if there was growth restriction and/or prematurity
- GI anomalies OR 3.81, respiratory OR 3.51, skin OR 3.29, genito-urinary OR 2.55, etc.

Obstet Gynecol 2013; 122: 268

## IODINE DEFICIENCY

Severe iodine deficiency is rare; mild deficiency is common in pregnancy.

- Women with intake < 150 µg daily during pregnancy had children with a lower verbal IQ at age 8 and reading ability at age 9
- Recommended intake is 220 µg daily

Lancet 2013; 382: 331

## INDUCTIONS & AUTISM

↑ risk of autism in children (boys and girls) born after induced labor:

- Induced or augmented labor: OR 1.23
- Induction and augmentation: OR 1.27
- Increases similar to those seen with fetal distress, meconium, birth ≤ 34 weeks and diabetes
- Reason for the induction matters too

JAMA Pediatr 8/12/2013

## AUTISM & IVF

Swedish national health registry, cohort of IVF pregnancies and controls:

- Overall no ↑ risk of autism
- Slight ↑ risk of mental retardation
- ICSI for paternal infertility had small ↑ risk for these disorders compared to IVF without ICSI

JAMA 2013; 310: 75

## GASTROSCHISIS

When should babies with gastroschisis be delivered?

- Induction at 37 weeks vs expectant mgt
- No difference in maternal age, parity, cesarean rate (20% both), Apgars, RDS
- Induction → ↓ rates of neonatal sepsis, bowel damage, and neonatal death

Obstet Gynecol 2013; 121: 990

## CESAREAN & OBESITY

Over the past several decades, childhood obesity has ↑ and cesarean rates have ↑. Is there an association?

- Lack of exposure to maternal gut microbiota may be related to obesity, IDDM, asthma
- Obesity status, BMI, waist circumference at 21 years were not associated with mode of delivery in 2625 offspring

Obstet Gynecol 2013; 122: 1176

## FETAL MONITORING

Terminal heart rate decelerations while pushing are common (17.7%). Which are associated with neonatal acidosis?

- 30 minutes of monitoring were reviewed by blinded observers
  - Deceleration > 10 minutes → acidosis OR 18.6 and NICU admit OR 5.4
  - Decelerations were longer in acidotic newborns 6.7 minutes vs. 3.2
- Obstet Gynecol 2013; 122: 1070

## FETAL MONITORING

Review of EFM for the anesthesiologist:  
 “Anesthesia provider understanding of fetal assessment modalities is essential in improving communication with obstetricians and improving the planning of cesarean deliveries for high-risk obstetric patients.”

Anesth Analg 2013; 116: 1278

## TREATING PTL

Review and meta-analysis of transdermal nitroglycerin for treatment of preterm labor:

- 13 studies, 1302 women comparing NTG to placebo,  $\beta$ -agonists, nifedipine, magnesium
- Reduced preterm birth, NICU admit, ventilation and maternal side effects compared to  $\beta$ -agonists
- No differences in efficacy over placebo or other agents although lower risk of major morbidity or death (RR0.29) than placebo

Am J Obstet Gynecol 2013; 209: 551

## BEDREST FOR PTL

Bedrest for PTL or short cervix recommended by most obstetricians, but has physical, psychological and financial harms:

- Cochrane reviews → not efficacious for PTL, preterm birth, HTN, or IUGR so not ethical to impose on the patient
  - Preterm birth < 37 weeks was more common in women with short cervix on activity restriction
- Obstet Gynecol 2013; 121: 1158/1305/1181

## PRETERM DELIVERY

Does mode of delivery affect outcome for preterm neonates at 24-34 weeks?

- Retrospective cohort study in NY
- 20,231 neonates → 69% vaginal deliveries, 31% cesarean
- Worse outcomes with cesarean: ↑ respiratory distress (OR 1.74) and Apgar < 7 (OR 2.04)

Obstet Gynecol 2013; 121: 1195

## CEREBRAL PALSY

Magnesium sulfate protects preterm neonates from CP – can a protocol be implemented in a large practice?

- 20% of eligible women (< 32 weeks) received M when guidelines implemented vs. 94% after 3 years
- 84% did deliver before 32 weeks
- No M-associated morbidities were noted.

Obstet Gynecol 2013; 121: 235

## CEREBRAL PALSY

Does delivery by cesarean protect from CP?

- Meta-analysis of 13 studies
- No overall association or with elective CD
- ↑ CP with emergency cesarean (OR 2.17) and term newborns (OR 1.6)
- Did not alter risk for breech presentation or preterm neonates

Obstet Gynecol 2013; 122: 1169

## CEREBRAL PALSY

What are the antecedents of CP and death in singletons > 35 weeks?

- Fetal growth restriction and birth defects found by age 6 were the strongest contributors
- Birth asphyxia and inflammation were modestly associated (OR 1.9 and 2.2)

Obstet Gynecol 2013; 122: 869

## CEREBRAL PALSY

What is the link between perinatal infection and subtypes of CP in children born at term?

- Infection is a strong predictor of spastic hemiplegia, including urinary tract, any infectious disease, severe infection, and/or antibiotic therapy during pregnancy
- Only neonatal infection was associated with spastic diplegia or tetraplegia – not maternal

Obstet Gynecol 2013; 122: 41

## STILLBIRTH

IUFD or stillbirth occurs in 1/160 pregnancies and is often unexplained.

- Post-mortem genetic testing was done on 91 unexplained IUFD at about 26 weeks.
- Mutations associated with Long QT Syndrome were found in 9% of cases.
- Possible pathogenesis of fetal demise?

JAMA 2013; 309: 1525

## STILLBIRTH

Do mono-chorionic twins have a higher risk of IUFD / stillbirth?

- Meta-analysis of 9 studies
- Rate by gestational age: 32-34 weeks = 5%, 34-35 = 7%, 36-37 = 6%
- Compared to di-chorionic twins, risk was increased: 32 weeks OR 4.2, 34 weeks OR 3.7, 36 weeks OR 8.5

Obstet Gynecol 2013; 121: 1318

## NICU MANAGEMENT

RCT comparing high arterial O<sub>2</sub> saturations (91-95%) to low (85-89%) at gestational ages 23-28 weeks:

- No effect on rate of death or disability at 18 months of age
- 52% died or survived with disability in the lower saturation group vs. 50% in the high
- 17% vs. 15% died in the low vs. high groups

JAMA 2013; 309: 2111

## NICU MANAGEMENT

Re-analysis of pooled data from 3 prior international RCTs that assessed targeting low vs. high oxygen saturations in infants < 28 weeks gestation. Report of hospital-discharge outcomes:

- ↑ risk of death targeting O<sub>2</sub> saturations < 90%
  - 23% died in 85-89% vs. 16% in 91-95% group
  - Low target group had ↑ necrotizing enterocolitis
  - But low target group had ↓ retinopathy
- N Engl J Med 2013; 368: 2094

## NICU MANAGEMENT

Necrotizing enterocolitis (NEC) occurs in preterm infants within 2-4 weeks of birth and has a mortality rate of 30%.

- Neonatal gut micro-biome is sterile.
- Ongoing study is collecting fecal samples of preterm babies to see how the micro-biome is established and how it is different in those with NEC.

JAMA 2013; 309: 1448

## NICU MANAGEMENT

A Swedish database of 500 preterm infants < 27 weeks gestation looked at survivors' degree of disability at 30 months of age.

- 75% had mild or no disability; 11% severe
- Outcomes improved with each additional week of gestational age
- Received "active care" and were breast-fed

JAMA 2013; 309: 1810

## POSTOP IN THE NICU

Double-blind RCT of neonates up to 1 year having major thoracic or abdominal surgery.

- Received either morphine infusion or intermittent IV paracetamol; both groups had bolus morphine as needed for rescue
- Cumulative morphine dose was 66% less in the P group over 48 hours: 121 vs. 357 μg/kg
- No difference in pain scores or side effects

JAMA 2013; 309: 149 + 183 (*editorial*)

## BREAST-FEEDING

Excellent review on NSAID safety peripartum:

- Avoid 3<sup>rd</sup> trimester use due to ductal closure and renal injury in the fetus.
- Postpartum: valuable to reduce opioid requirements after CD and perineal injury. Avoid with severe PEC (↑ HTN, ↓ renal).
- Lactation: safe, but avoid high-dose aspirin; low-dose may be warranted (risk vs. benefit)

Anesth Analg 2013; 116: 1063

## BREAST-FEEDING

- AAP states that most drugs and vaccines are safe to take while nursing.
- Consult the LactMed database on-line.
- Caution with preemies or if there are underlying medical conditions.
- FDA: "The benefits of breastfeeding outweigh the risk of exposure to most therapeutic agents via human milk."

Pediatrics 2013; 132: 796

## BREAST-FEEDING

Most women initiate breast-feeding; few continue. Only 13% breastfeed exclusively at 6 months. Why?

- Interviews with 532 expectant mothers, then followed them for 2 months.
- 92% reported concerns at 3 days: difficulty, pain, and milk quantity most common.
- OR 9 of antepartum concerns → postpartum stopping breastfeeding.

Pediatrics 2013; 132: e865

## BREAST-FEEDING

Could breast-feeding promotion (duration and exclusivity) affect child obesity and growth?

- 31 maternity hospitals and 17,046 couplets randomized to BF promotion or usual care; 81% follow-up at 11.5 years of age.
- BF promotion worked: 43 vs. 6% at 3 months and 8 vs. 0.6% at 6 months
- No difference in BMI, measures of adiposity

JAMA 2013; 309: 1005

## BREAST-FEEDING

Failure to BF optimally cost the U.S. \$14.2 billion annually in pediatric disease. What about the mother?

- BF association may ↓ risk of breast cancer, ovarian cancer, HTN, type 2 DM, MI
- Monte Carlo simulations based on 90% of mothers BF for 1 year → \$17.4 billion in cost to society for sub-optimal BF

Obstet Gynecol 2013; 122: 111

AND WE'LL SEE WHAT'S  
NEW IN 2014!

THE END

