

WHAT'S NEW IN OBSTETRIC ANESTHESIA FROM 2014?

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(* I have no conflicts to disclose. *)

GOALS & OBJECTIVES

Upon completion of this lecture, participants should be able to:

- Discuss how recent research is changing clinical practice in obstetric anesthesia via new guidelines and policies
- Cite maternal and fetal effects of analgesic and anesthetic best-practice techniques.
- Optimize and expedite management of obstetric and anesthetic complications.

GUIDELINES AND POLICIES

PREVENTING C/S

Joint ACOG/SMFM Consensus Statement:

“...the rapid increase in the rate of cesarean births without evidence of concomitant decreases in maternal or neonatal morbidity or mortality raises significant concern that cesarean delivery is overused. Therefore, it is important for health care providers to understand...the safe and appropriate opportunities to prevent overuse of cesarean delivery, particularly primary cesarean delivery.”

- Includes 19 recommendations to ↓ cesarean
Obstet Gynecol 2014; 123: 693

PREVENTING C/S

Does an obstetrician's delivery volume affect a patient's risk for cesarean delivery?

- Nulliparous patients with term singleton vertex-presenting fetus at a single hospital
- Median = 60 deliveries per year
- Lowest volume → 18% cesarean rate versus 9% for the highest
- Is there a role for volume in credentialing?

Obstet Gynecol 2014; 124: 697

PREVENTING C/S

Meta analysis of whether the risk of cesarean is higher following induction of labor → 157 RCT

- Risk of C/S was 12% lower with induction of term and post-term gestations (not preterm)
- Risk of fetal death (RR 0.5) or admission to ICU (RR 0.86) was lower with induction
- No impact on maternal death

CMAJ 2014; DOI:10.1503/cmaj.130925

ANTIBIOTIC PROPHYLAXIS

A database review of over 1 million women who had a cesarean delivery examined rates of perioperative antibiotic use.

- Only 59.5% received abx on the day of surgery.
- 66% who did not labor vs. 44% who labored
- Large variation by geographic region; no influence of age, race or insurance status.

Obstet Gynecol 2014; 124: 338

DELAYED CORD CLAMPING

There is safety and benefit to delayed cord clamping at delivery; it should be routine:

- Preterm neonates: stabilizes transitional circulation, ↓ need for inotropes, ↓ blood transfusions, less NEC, less IVH
- Term neonates: less iron-deficient anemia, ↑ iron stores, ? improved neuro-development

Obstet Gynecol 2014; 123: 549

SKIN-TO-SKIN

Do newborns develop hypothermia during intraop skin-to-skin bonding?

- 40 cesareans, randomized to forced-air warming or passive insulation with blankets
- 81% of blanketed infants became hypothermic
- 5% of forced-air infants had temp < 36.5° C
- Also improved maternal comfort, ↓ shivering

Anesth Analg 2014; 118: 997



Figure 2. Bonding a neonate on the chest of the mother in the active warming group by using a forced-air cover (Level 1: Stuggle Warm® Upper Body Blanket, Summit Medicals, Rockland, MA).

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WATER BIRTHS

ACOG Committee Opinion: Immersion in Water During Labor and Delivery:

“...the safety and efficacy of immersion in water during the second stage of labor have not been established... case reports of rare but serious adverse effects in the newborn... underwater delivery should be considered an experimental procedure that only should be performed within the context of an appropriately designed clinical trial with informed consent.”

Obstet Gynecol 2014; 123: 912

PATIENT SAFETY

Yale implemented a comprehensive patient safety program in 2003. They look at liability before and after, compared to the state market.

- Median annual claims dropped: 1.31 → 0.64
- Median payments per 1000 deliveries decreased: \$1,141,638 → \$63,470
- Amount per case: \$632,262 → \$216,815
- CT market had stable claims and ↑ cost/claim.

Am J Obstet Gynecol October, 2014

ANALGESIA FOR LABOR

WOMEN'S PREFERENCES

40 healthy women scheduled for induction were asked their preference for ↓ pain intensity or ↓ pain duration before and after labor and delivery.

- Scores showed a preference for ↓ pain intensity, even at the cost of longer pain duration.
- This preference was even greater post-delivery.
- So even if epidurals increase length of labor....

Br J Anaesth 2014; 113: 468

WOMEN'S PREFERENCES

“Listening to Women” survey → review of responses specific to labor epidural use (n=914)

- Positive: effective pain relief is appreciated
- Negatives: waiting in pain to receive their epidural, receiving it too late in labor, feeling it wore off before delivery, having numb legs
- Unplanned epidurals perceived as negative; but 60% who plan un-medicated birth receive an epidural
- Better childbirth education by anesthesia providers would help with expectations and good information

Anesth Analg 2014; PAP

CONSENT ISSUES

When a woman's birth plan says to ignore her wishes for an epidural in labor, can she consent?

- No advance directive can ethically or legally override the contemporaneous expressed wishes of an informed and competent patient.
- A woman is not giving truly informed consent until she is actually experiencing labor.
- Competent patients have the right to change their mind about any treatment decision at any time.

ASA Newsletter 2014; 78: 40

REDUCED PP DEPRESSION

Does epidural analgesia for labor decrease the risk of postpartum depression?

- 214 parturients were given the Edinburgh Depression Scale at 3 days and 6 weeks PP
- Depression occurred in 14% of women who received an epidural, vs. in 35% who did not.
- Childbirth classes and breast-feeding were also associated with ↓ depression.

Anesth Analg 2014; 119: 383

REMIFENTANIL

Favorable characteristics for labor analgesia:

- Rapid onset, short duration, and inactivated by plasma esterases → unaffected by renal or hepatic impairment
- Inferior analgesia to an epidural, but pain control is satisfactory → VAS 3.7 ± 2.8 after 30 minutes, PP satisfaction scores 8.6 ± 1.4
- Monitor for desaturation, sedation and apnea

Anesth Analg 2014; 118: 589

INHALED N₂O

Systematic review of its use for labor analgesia:

- Currently used by at least 50% of women in the UK, Australia, Finland and Canada.
- Little effect on pain scores, but most women find benefit; use as a bridge?
- No adverse effects on uterine contractility or the neonate; nausea and dizziness can occur.
- Neurotoxicity? Environmental pollution?

Anesth Analg 2014; 118: 153

INHALED N₂O

In 2012, the FDA approved equipment to deliver 50% N₂O with 50% oxygen.

- Often replaces fentanyl in early labor.
- Can be used while pushing rather than IV medications to avoid newborn effects
- After an unmedicated birth, can be used for perineal repair or removal of the placenta.
- Must collaborate on a protocol and training

OBG Management 2014; 26: 10

INHALED N₂O

	UCSF	UColorado
% using N ₂ O	14%	19%
N ₂ O→epidural	42%	54%
Epidural only	76%	75%
Adverse events	0	0

UCSF found N₂O use did not affect admission to NICU, 5-minute Apgars, maternal bleeding.

EARLY EPIDURAL

Cochrane Review: Effectiveness and safety of early versus late initiation of epidural analgesia for labor using 9 RCT and > 15K women:

- Low risk of bias and high quality evidence
- No difference in cesarean: RR 1.02
- No difference in instrumental birth: RR 0.93
- No difference in length of second stage
- No difference in Apgar scores or umbilical pH

CD 007238, 2014

EPIDURAL MAINTENANCE

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

- No difference in cesarean rates, pain scores, hypotension, NRFHT, or 5-minute Apgar < 7 .
- Low concentration had \downarrow AVD, \downarrow motor block, \uparrow ambulation, \downarrow urinary retention, shorter 2nd stage, and fewer 1-minute Apgar scores < 7

Can J Anaesth 2014; 60: 840

ANESTHESIA FOR CESAREAN DELIVERY

GENERAL ANESTHESIA

Findings of the 5th National Audit Program (NAP5) on accidental awareness:

- Overall incidence = 1:19,000
- Risk factors: female sex, younger adults, obesity, previous awareness, emergencies, and use of NMB agents.
- Obstetrics 10-fold over-represented, more than any other specialty; many risk factors

Br J Anaesth 2014; 113: 549

GENERAL ANESTHESIA

A review of options to prevent HTN and risk of CVA on induction in preeclampsia:

- Consider using: propofol, esmolol (1.5 mg/kg) and labetalol, NTG (2 μ g/kg), nicardipine, fentanyl and remifentanyl
- Avoid: lidocaine (ineffective, seizures), magnesium (hypotonia), hydralazine (long onset) and nifedipine (PO only, tocolytic)

Anesth Analg 2014; 119: 1350

GENERAL ANESTHESIA

Does progesterone concentration affect anesthetic and analgesic requirement during and after cesarean?

- 90 women for elective cesarean had serum progesterone measured preop.
- Those with higher than median levels required less sevoflurane / hour and less 48-hour IV-PCA consumption postoperatively.

Anesth Analg 2014; 119: 901

NEURAXIAL ANESTHESIA

Is spinal anesthetic requirement different in preterm pregnancies? Database review of 5000 women having cesarean using spinal or CSE.

- 3.2% of spinal failed overall; 4.5% if preterm (OR 1.6) versus 2.2% if term
- Highest failure if < 30 weeks gestation (OR 3)
- Gestational age was the only significant predictor

ASA Annual Meeting 2014; A1059

DELIVERY OF PRESSOR

Is a phenylephrine infusion better than bolus dosing to maintain maternal BP during CD?

- Double-blind comparison of P infusion starting at 0.75 μ g/min versus boluses to keep BP within 20% of baseline.
- Use of infusion \downarrow physician interventions, \downarrow hypotensive episodes, \downarrow maternal N/V, and kept BP closer to baseline.

Anesth Analg 2014; 118: 611

OBESITY AND C/S

Which takes less time to initiate anesthesia in morbidly obese parturients: spinal or CSE?

- Elective C/S, 41 patients, mean BMI 49
- Compared times from inserting introducer or epidural needle to intrathecal injection
- Spinal = 210 seconds, CSE = 180 seconds (NS)
- Completed in < 10 minutes in 75% of spinals, 95% of CSE (NS)

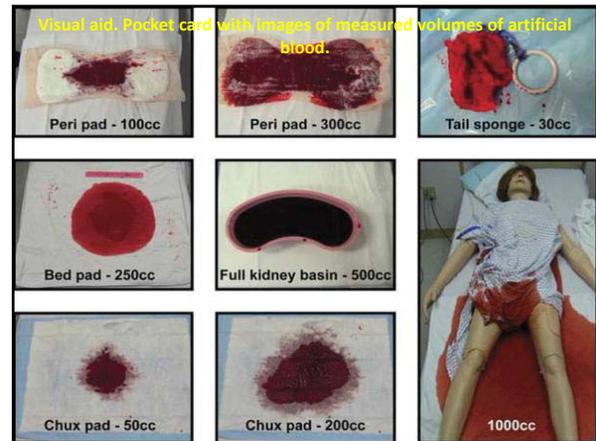
Anesth Analg 2014; 118: 168

MEASURING BLOOD LOSS

Can a visual aid improve accuracy of EBL after delivery? Given a pocket card with pictures of blood on common obstetric materials; then visited 6 stations with known volumes of blood.

- The visual aid improved both objective and subjective estimation of blood loss.
- Provider type and years of experience did not correlate with accuracy before or after.

Obstet Gynecol 2014; 123: 982



TAP BLOCKS

Do TAP blocks with ropivacaine improve early or late (2, 24, 48 hours) analgesia when combined with neuraxial morphine?

- US-guided, bilateral, 20 ml TAP blocks
- No difference in pain at any interval, quality of recovery scores, opioid consumption, nausea, vomiting, pruritus, urinary retention.

Can J Anaesth 2014; 61: 631

ANESTHETIC COMPLICATIONS

THE SOAP-SCORE PROJECT

30 institutions submitted data on 257,000 obstetric anesthetics from 2004-9 to establish the incidence of serious cx in modern practice.

- 1:3000 patients had an anesthesia-related cx
- The most common complication was high block ("total" spinal) in 1:4336 anesthetics.
- 1:533 general anesthetics resulted in failed intubation, but no hypoxic arrests or deaths.
- No cases of aspiration were reported (0/5000).

SOAP-SCORE RESULTS

- There were 2 cardiac arrests: 1 from LAST during TAP blocks and 1 after high neuraxial block in a morbidly obese patient. No deaths.
- There were 5 cases of anaphylaxis from drugs administered by anesthesia personnel (not anesthetic drugs): ampicillin, cefazolin, latex, metoclopramide and 1 unknown medication.
- The most common causes of death were hemorrhage, cardiac disease, HTN, embolism.

Anesthesiology 2014; 120: 1505

PERIPARTUM CARDIAC ARREST

Using data from the National Inpatient Sample, 1998-2011, the incidence of peripartum maternal cardiac arrest was **1:12,000**.

- Incidence is stable, outcome is improving.
- Most common etiologies: hemorrhage, heart failure, amniotic fluid embolism, and sepsis.
- 59% of women survived to hospital discharge, although neurologic status unknown.

Anesthesiology 2014; 120: 810

CPR IN PREGNANCY

The Society for Obstetric Anesthesia and Perinatology Consensus Statement on the Management of Cardiac Arrest in Pregnancy

- Goal: to improve maternal resuscitation
- Includes POC checklists, operational strategies
- Expands on maternal and L&D aspects of the 2010 ACLS / AHA guidelines such as system errors, communication unique to L&D setting.

Anesth Analg 2014; 118: 1003

ASPIRATION RISK

Using bedside US, what is gastric volume and emptying during labor?

- Antral cross-sectional area = volume
- Measured 60 parturients at the time they requested an epidural, and when fully dilated
- 50% had ↑ gastric volume (> 300 ml) in early labor versus only 13% at full dilation → gastric motility is maintained during labor.

Br J Anaesth 2014; 112: 703

PREVENTING PDPH

After 128 witnessed accidental dural punctures with an 18-gauge needle, 89 had intrathecal catheter placement and 39 had an epidural at another level.

- IT catheter for 24 hours → 42% PDPH
- Epidural replacement → 62% PDPH
- Odds ratio = 2.3 (CI 1.04-4.86)

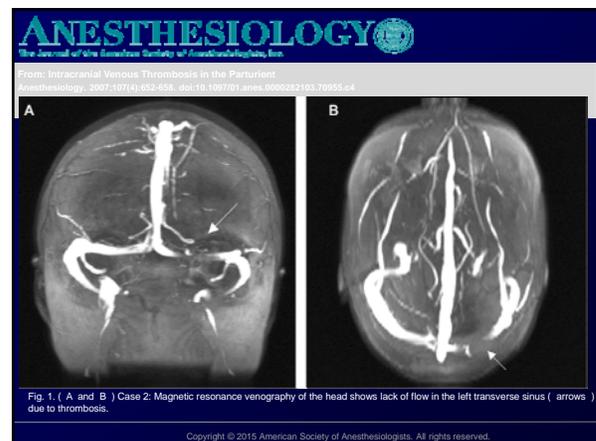
Acta Anaesth Scand 2014; 58: 1233

PDPH AND DDX

Case series of 3 patients with persistent headache after epidural blood patch for presumed PDPH, who were then diagnosed with cerebral venous sinus thrombosis.

- EBP resolved the postural component
- All had other neurologic symptoms
- All recovered with anti-coagulation

Can J Anesth 2014; 61: 1134



LAST: LIPID RESCUE

Does lipid rescue work by other methods than just “lipid sink”?

- Rat model of bupivacaine toxicity
- 20% & 30% lipid, saline or control Rx
- Best model of recovery included a dose dependent lipid effect on both sequestration and inotropy

Anesthesiology 2014; 120: 915

LAST: LIPID RESCUE

An editorial reviews current understanding of the role of intralipid ± epinephrine in resuscitation:

- If coronary perfusion is maintained, lipid alone has equal resuscitation outcome as epinephrine, plus there are ↓ arrhythmias, and better post-arrest metabolic parameters.
- But with ↓ CP in LAST, survival depends on epinephrine, so we should use epi + lipid.

Br J Anaesth 2014; 112: 622

EPIDURALS AND FEVERS

An RCT of 400 nulliparous women having epidural analgesia randomized them to receive 2 gm cefoxitin or placebo prior to placement.

- 38% developed fever in both groups.
- About half in both groups had placental neutrophilic inflammation; abx had no effect.
- There was no difference in neonatal outcomes, no sepsis in either group, no deaths.

Anesth Analg 2014; 118: 604

EPIDURALS AND FEVERS

Where do we stand in our understanding of epidural-associated fevers:

- Affects 10-30% of nulliparous mothers
- Not prevented by acetaminophen, antibiotics
- Placentas show non-infectious inflammation
- Not infectious but fever may ↑ work-ups
- Fever itself may ↑ neonatal encephalopathy
- Can't prevent epidural-related fever when we don't understand the mechanism.

Anesth Analg 2014; 118: 494

OPIOID PRESCRIBING

In the general population about 2% regularly use prescription opioids. Is that true during pregnancy?

- Using a national insurance plan, 14% of pregnant women were prescribed an opioid sometime during pregnancy.
- 1 in 20 were prescribed in 1st trimester.
- Lowest in northeast, highest in south.

Anesthesiology 2014; 120; 1216

OPIOID PRESCRIBING

- Most prescriptions were for back and joint pain, migraine, abdominal ligament pain, fibromyalgia – none are very responsive to opioids – why not NSAIDs which are safe?
- The risk of prescribed, short-term opioid use causing congenital malformations is minimal.
- Their use in 3rd trimester is a risk factor for neonatal abstinence syndrome.

Anesthesiology 2014; 120: 1063 (editorial)

OPIOID vs. NERVE BLOCKS

Case series of 27 nerve blocks performed in 13 pregnant women for migraine therapy.

- Used for status migrainosus (52%) or frequent headaches (48%) after failed oral and IV medications.
- Blocked greater occipital, auriculo-temporal, supraorbital, and supra-trochlear nerves.
- Average pain ↓ was 3-4, no adverse events.

Obstet Gynecol 2014; 124: 1169

CHRONIC PAIN POSTPARTUM

In a rat model of nerve injury, the recovery time course was no different between males and females, but was enhanced in postpartum group.

Anesthesiology 2014; 121: 1056

Is it oxytocin-related? Spinal receptors for oxytocin exist. Animal studies do not show neurotoxicity → clinical studies possible on preventing chronic pain after nerve injury.

Anesthesiology 2014; 120: 951

OBSTETRIC COMPLICATIONS

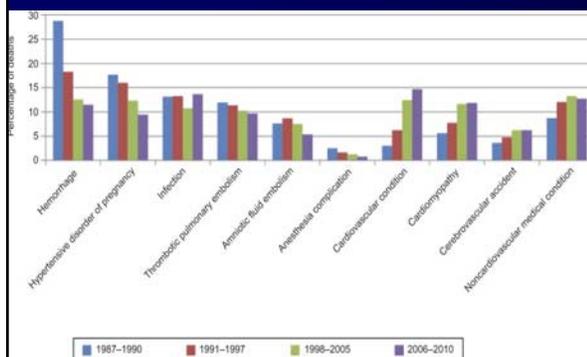
U.S. NATIONAL DATA - CDC

Top 10 causes of maternal mortality after live birth:

1. Cardiomyopathy 15%
2. Cardiovascular conditions 14%
3. Infection 13%
4. Preeclampsia / Eclampsia 11%
5. Non-cardiovascular medical 10%
6. Hemorrhage 9%
7. Thrombotic pulm. embolism 9%
8. Amniotic fluid embolism 7%
9. Cerebrovascular accident 6%
10. **Anesthesia complications 0.7%**

Obstet Gynecol 2015; 125: 5

U.S. NATIONAL DATA - CDC



HOSPITAL NETWORK QI

Review of maternal deaths in Hospital Corporation of American (HCA) hospitals between 2000-6:

- Leading causes of death were **preeclampsia, thromboembolism**, AFE, hemorrhage, cardiac.
- Recommendation: the best chance of reducing maternal mortality is for all women having cesarean delivery to receive thromboembolism prophylaxis.

Am J Obstet Gynecol 2008;199:36

HOSPITAL NETWORK QI

Same group (HCA), 6 years later.....

- The authors instituted a policy of universal use of pneumatic stockings after CD → postop pulmonary embolism deaths dropped 7-fold.
- Another policy for automatic, rapid anti-HTN therapy for defined BPs ↓ deaths 5-fold
- Disease-specific protocols can decrease maternal mortality significantly.

Am J Obstet Gynecol 2014; 211: 32

MATERNAL MORBIDITY

- Maternal deaths are the tip of the iceberg.
- We need to identify who experienced severe maternal morbidity – the “near miss”, review their care, and recommend methods of quality improvement in obstetrics.
- Indicators: transfusion of ≥ 4 units of blood and/or admission to an intensive care unit.

Obstet Gynecol 2014; 123: 978

SEVERE MORBIDITY

National cohort of 115,502 women and their neonates born in 25 U.S. hospitals examined severe morbidity (MFMU Network project):

- Incidence = 2.9 / 1000 deliveries
- Most often due to postpartum hemorrhage
- Morbidity is highly associated with placenta accreta, gestational age < 37 weeks, antepartum anti-coagulant use, and any HTN

Obstet Gynecol 2014; 123: 804

QUALITY INDICATORS

Do OB quality measures correlate with maternal or neonatal morbidity?

- All hospitals review elective deliveries < 39 weeks and cesareans in low-risk mothers.
- Rates vary widely among hospitals, as do rates of maternal and neonatal complications
- But there is no correlation between quality rates being measured and morbidity.

JAMA 2014; 312: 1531

HEMORRHAGE

The ASA Closed Claims Project reviewed 141 claims related to hemorrhage (4% of all claims):

- OB accounted for 30% of hemorrhage claims vs. 13% of all non-hemorrhage (NH) claims.
- Mortality was high; 77% vs 27% of all claims
- Substandard care in 55% vs. 38% of all claims
- Payments were higher; \$607K vs. \$276K
- Themes: lack of timely diagnosis & transfusion

Anesthesiology 2014; 121: 450

HEMORRHAGE

A review of medical advances in treating PPH:

- Develop an emergency hemorrhage panel with your lab that includes fibrinogen, PT, INR, platelets and Hgb for STAT turnaround. Consider TEG or ROTEM on L&D.
- Implement an obstetric hemorrhage protocol including high plasma to red cell ratios.
- Use tranexamic acid and fibrinogen (cryo).

Anesth Analg 2014; 119: 1140

PREECLAMPSIA

What are *contemporary* risk factors for PEC?

- 2537 women enrolled < 15 weeks gestation
- 9% developed preeclampsia → risk factors:
- Chronic HTN (OR 2.7), pre-gestation DM (OR 3.9), multiple gestation (OR 3), AA race (OR 1.9), prior preeclampsia (OR 3.6), nulliparity (OR 1.7), infertility techniques (OR 1.7), dose-response risk with ↑ BMI (> 40, OR 6)

Obstet Gynecol 2014; 124: 763

PREECLAMPSIA

Is maternal morbidity different in early-onset versus late-onset preeclampsia?

- Rates of early (0.3%) and late (2.7%) differed
- Maternal death rates per 100K deliveries → 42 with early, 11 with late, and 4 with no PEC
- Severe morbidity per 100 deliveries → 12.2 early, 5.5 late, and ~ 3 with no PEC
- Early onset disease has ↑↑ risk for ex

Obstet Gynecol 2014; 124: 771

PREECLAMPSIA

New guidelines from the US Preventive Services Task Force (USPSTF) state that women at increased risk of preeclampsia (e.g. PEC in a previous pregnancy) derive benefit > than harm from taking low-dose aspirin.

- 50-160 mg/day from 12-28 weeks gestation
- No ↑ abruption, PPH, IVH, perinatal mortality.
- Based on 21 RCT and 2 observational studies.

JAMA 2014; 311: 2055

PREECLAMPSIA

What is the frequency of lab abnormalities in preeclampsia? Are they related to bad outcomes?

- Abnormal labs occurred in 7.3% of women with HTN: 5% with mild, 9% with severe, and 12% with severe HTN + clinical signs of end-organ dysfunction.
- In women with mild HTN and no signs of severity, routine labs may not be beneficial or cost-effective since 95% will be normal.

Obstet Gynecol 2014; 124: 933

THROMBOEMBOLISM

How long does the risk of a postpartum thrombotic event persist?

- Includes ischemic stroke, acute MI or venous thromboembolism
- Compared to frequency of events 1 year later, highest risk in first 6 weeks: OR 11
- Still elevated 7-12 weeks postpartum: OR 2

N Engl J Med 2014; 370: 1307

AMNIOTIC FLUID EMBOLISM

Clinical Expert Series Review:

1. Syndrome is not amniotic fluid or embolism.
2. Timing of AFE suggests a breach between normal physiologic barrier of mother/fetus.
3. Coagulopathy likely related to trophoblastic-derived antigens – like abruption, accreta.
4. Clinical picture similar to SIRS, anaphylaxis

AFE REVIEW (cont)

5. Syndrome is final common pathway of a unique maternal immunologic response to foreign antigens originating in the fetal compartment.
6. Not linked to induced or augmented labor.
7. Diagnosis is purely clinical – no markers.
8. The only treatment is supportive.
9. Emergent delivery indicated for cardiac arrest.

AFE REVIEW (cont)

10. Mis-diagnosis hinders research – many cases labeled AFE are not. Must include triad of hypotension, hypoxia and coagulopathy.
11. Research is now clearly directed toward the role of antigenic response and endogenous or inflammatory mediators – not amniotic fluid per se and not embolism.

Obstet Gynecol 2014; 123: 337

BREECH DELIVERY

Since the Term Breech Trial in 2000, ACOG and others have “banned” vaginal breech delivery.

- Unintended ↑ maternal complications, mortality
- Obstetricians worldwide have lost the skills to practice vaginal breech deliveries
- Medico-legal concerns now prevent its practice
- Version should be done for all suitable women + more use of neuraxial anesthesia to ↑ success rates.

Lancet 2014; 384: 1183

BREECH DELIVERY

What happens after successful external cephalic version (ECV)?

- As compared with women presenting with cephalic presentation, successful ECV is still associated with higher C/S rate.
- OR 2.2 for cesarean for dystocia
- OR 2.2 for cesarean for fetal distress
- OR 1.4 for instrumental vaginal delivery

Obstet Gynecol 2014; 123: 1327

BARIATRIC SURGERY

Case series of 3 patients who conceived > 2 years after bariatric surgery and presented with abdominal pain that was mis-diagnosed.

- #1: Perforated gastric remnant: fetus died, mother had prolonged unstable ICU stay
- #2: Internal hernias and globally ischemic small bowel: preterm fetus with IVH, 21-day maternal hospital stay
- #3: Internal hernia reduced by laparoscopy

Obstet Gynecol 2014; 124: 464

THE FETUS AND NEONATE



OXYTOCIN & AUTISM

- Oxytocin deficiency may be associated with autism. Does synthetic oxytocin administered for induction or augmentation alter fetal oxytocin receptors, predisposing to autism?
- Prior studies have limitations in identifying confounders, knowing the drugs used for induction, diagnosing autism (DSM criteria).
- Reducing oxytocin use would ↑ cesarean rate.
Obstet Gynecol 2014; 123: 1140

CORD GASES

Is umbilical cord lactate a better predictor than pH of neonatal morbidity?

- Consecutive births, immediate cord gases and lactate before knowing neonatal outcomes.
- 1.1% morbidity rate → lactate 6.5 versus 3.3 in healthy newborns, significantly more predictive than pH using a cut-off of 3.9.
- Sensitivity / specificity higher for lactate
Obstet Gynecol 2014; 124: 756

NEWBORN RESUSCITATION

- Maternal oxygen supplementation has not been shown to be beneficial to the fetus.
- By increasing free radical activity it may be harmful to the fetus.
- Until studied in an RCT, maternal oxygen should be reserved for maternal hypoxia and not considered an indicated intervention for non-reassuring fetal status.
Am J Obstet Gynecol 2014; 211: 124

COOLING FOR ASPHYXIA

After head cooling at birth, what is their neurologic outcome later in childhood?

- 325 newborns with asphyxial encephalopathy were randomized to cooling or usual care
- At 6-7 years of age → 52% of treated children survived with an IQ > 85 vs. 39% of controls
- 45% survived without neurologic abnormalities vs. 28% of controls, 21% cerebral palsy vs. 36%
N Engl J Med 2014; 371: 140

COOLING FOR ASPHYXIA

What obstetric events preceded the need for cooling for neonatal encephalopathy?

- 1.1 per 1000 live births received cooling
- Catastrophic events: cord prolapse OR 14, abruption OR 17, uterine rupture OR 130
- Associations: age < 15, BMI > 40, diabetes, preeclampsia, chorioamnionitis, length of labor, mode of delivery, epidural analgesia
Am J Obstet Gynecol 2014; 211: 155

COOLING FOR ASPHYXIA

How much and how long should cooling be done after neonatal hypoxic ischemic encephalopathy? Usual = 33.5° for 72 hours.

- Comparisons: 32° versus 33.5° and 72 hours or 120 hours (4 groups)
- No advantage to longer cooling or deeper cooling or both → did not reduce ICU deaths.
JAMA 2014; 312: 2629

