

## WHAT'S NEW IN OBSTETRIC ANESTHESIA FROM 2017?

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(\* I have no conflicts to disclose. \*)

## GOALS & OBJECTIVES

Discuss how literature from the past year may:

1. Change clinical practice in obstetric anesthesia via new **guidelines and policies**.
2. Produce best practices for **analgesic and anesthetic techniques** during labor and delivery.
3. Optimize and expedite management of **obstetric and anesthetic complications**.
4. Alter practices affecting the **fetus and newborn**.

## NEW GUIDELINES AND POLICIES

## MATERNAL MORTALITY

The CDC published its 2011-13 update on U.S. **pregnancy-related** maternal mortality:

- Overall there were 17 deaths per 100K live births (stable).
- Hemorrhage, HTN and anesthesia causes *declined*, but...
- Cardiovascular deaths, stroke, other medical conditions ↑.
- 15% of births were to women > 35, but 30% of the deaths were in this age group.
- African-American death rates are 3.4 times higher.

Obstet Gynecol 2017; 130: 366

## TRAUMA MORTALITY

What is the impact of trauma on maternal mortality?

- Pregnant trauma patients had 1.6-fold higher rate of mortality than a non-pregnant cohort. More likely to be dead on arrival and to die during their hospital course.
- They were less likely to undergo surgery and more likely to be transferred to another facility.
- More likely to experience violent trauma (homicide or assault) compared to non-pregnant: 16% vs. 10%.

Am J Obstet Gynecol 2017; 217: 590

## MORTALITY DUE TO VIOLENCE

Illinois formed a second statewide maternal mortality review committee just to review deaths due to violence.

- Homicide, suicide and substance abuse accounted for one fourth of pregnancy-associated deaths 2002-13.
- The committee focused on opportunities to intervene and to identify appropriate resources, social services.
- This is a change in focus from only reviewing **pregnancy-related** deaths due to obstetric/medical causes.

Am J Obstet Gynecol 2017; 217: 556

## DIAGNOSTIC IMAGING

ACOG Committee Opinion: *Guidelines for diagnostic imaging during pregnancy and lactation.*

- Ultrasound and MRI do not have known risks and are the imaging techniques of choice in pregnancy.
- X-rays, CT or nuclear medicine imaging should not be withheld if needed. Their radiation dose is much lower than the exposure associated with fetal harm.
- Gadolinium should be avoided in pregnancy, but postpartum breast-feeding is safe and should not be interrupted.

Obstet Gynecol 2017; 130: e210

## ANALGESIA FOR LABOR

## INTRAVENOUS FLUIDS

Does IV glucose supplementation improve muscle performance in labor, analogous to prolonged exercise?

- 200 G1 were randomized to 250 ml/hr D5NS or NS.
- Duration of labor was shorter by 76 min in the D5 group.
- There was no difference in the rate of cesarean, instrumented delivery, Apgar scores or cord pH.
- Given this intervention's low cost and safety, should D5 be the default intravenous fluid in labor?

Am J Obstet Gynecol 2017; 216: 508

## NITROUS OXIDE

An institution introduced nitrous oxide for labor analgesia using an FDA-approved delivery system with scavenging. Because of staff concerns regarding environmental exposure, dosimeter badges were required to ensure levels were below NIOSH recommended 25 ppm.

- Despite numerous attempts to limit exposure, 48% of samples were still above the recommended thresholds, and the use of nitrous on L&D was suspended.

(continued)

## NITROUS OXIDE

The APSF Committee on Technology responded:

1. The patient must be educated to exhale into the mask for scavenging purposes.
2. There are requirements for labor room air turnover rates and the use of non-recirculated air. Each labor room should have a very high fresh gas turnover rate using non-recirculated, conditioned (heat and humidity) air. Older L&D units may not have this.

Anesthesia Patient Safety Foundation Newsletter 6/17

## NITROUS OXIDE SATISFACTION

What is the relationship between analgesic effectiveness and patient satisfaction when comparing N<sub>2</sub>O, epidural, or both?

- Used a standardized survey on postpartum day 1 over 3 years.
- Only half of women who used nitrous reported good analgesia, while > 90% using neuraxial analgesia had high analgesia scores.
- *But* women who had poor or just intermediate analgesia with nitrous were still very satisfied with their anesthesia care.
- Analgesia is clearly not the only contributor to maternal satisfaction with their obstetric anesthesia care.

Anesth Analg 2017; 124: 548

### NITROUS OXIDE SATISFACTION

Editorial: "Pain, pain relief, satisfaction and excellence in obstetric anesthesia: a surprisingly complex relationship."

- Women's satisfaction with their overall labor experience is not directly correlated with pain or pain relief.
- Meeting her personal expectations, involving her in decision-making, and her satisfaction with caregiver relationships are the most important elements.
- Letting her control the administration of her pain medication (e.g. nitrous or PCA) and avoiding neuraxial anesthesia if she wishes to avoid it will increase patient satisfaction.

Anesth Analg 2017; 124: 383

### REMIFENTANIL

What monitoring should be used as an early warning alert for apnea when women use a remifentanyl PCA in labor?

- 53% of the women had apneic episodes while using R.
- Pulse oximetry missed most episodes of apnea.
- ET CO<sub>2</sub>, respiratory rate, and integrated pulmonary index detected most apneas, but many false positives occurred.
- Continuous observation at bedside is best - like the OR! – but impractical on L&D.

Anesth Analg 2017; 124: 1211

### REMIFENTANIL

Results of a survey on the use of remifentanyl PCA during labor from 84 academic teaching centers in the U.S.:

- Only 36% had used remifentanyl in the last year, and most less than 5 times – this is not a frequently used modality.
- 9 cases of respiratory depression were reported, with 2 leading to cardiac arrest → a 4-13% morbidity rate!
- Between centers, there was no consistency in how it was used, i.e. adjuncts allowed (nitrous?), how pharmacy prepared the drug, or the PCA settings that were used.

Anesth Analg 2017; 124: 1208

### REMIFENTANIL

Editorial: *Is it [remifentanyl] really an option to consider?*

- Since 2012 at least 3 case reports (+ these 9) have described intrapartum maternal cardio-respiratory arrest in labor. Other cases in medico-legal review are not yet published.
- Many arrests occurred with no obvious risk factors.
- There is a 53% incidence of apnea, but the optimal form of monitoring is unknown.
- Neonatal effects are also mostly unknown.

Anesth Analg 2017; 124: 1029

### EPIDURAL PLACEMENT

Does loss of resistance to saline provide better labor analgesia at 30 minutes than loss of resistance to air? No.

- 400 parturients were randomized to LOR to air or saline.
- There was no difference between groups in onset time, pain score reduction, degree of motor block, or overall efficacy of the block after 30 minutes.

Anesth Analg 2018; 126: 532 (PAP 2017)

### DURAL PUNCTURE EPIDURAL

Comparison of DPE, CSE (combined spinal-epidural), and E (epidural) techniques for labor analgesia:

- Speed of analgesia onset → CSE > DPE = E
- Bilateral sacral (S2) analgesia → DPE > E
- Asymmetric block → DPE < E
- Need for top-ups → DPE < E
- Pruritus, hypotension, uterine hypertonus → CSE > DPE
- DPE → better block quality than E; fewer side effects than CSE.

Anesth Analg 2017; 124: 560

## MAINTENANCE: PIEB

Review article: *Epidural analgesia for labor; continuous infusion versus programmed intermittent bolus*

- PIEB benefits include lower local anesthetic requirements, less breakthrough pain, improved patient satisfaction, less motor block and ↓ instrumental delivery.
- But optimal combinations of bolus volume, rate, time interval, and drug concentrations are not known.

Anesthesiol Clin 2017; 35: 1-14

## MAINTENANCE: PIEB

What is the optimal time interval between boluses using programmed intermittent epidural bolus (PIEB) technique for maintenance during labor analgesia?

- Double-blind sequential allocation trial to determine ED90
- Bolus dose was fixed at 10 ml 0.0625% bupivacaine + fentanyl; first bolus given 1 hour after initial epidural bolus
- The optimal interval was about 40 minutes (versus 30, 50 or 60 minute intervals).

Anesth Analg 2017; 124: 537

## IT CATHETER MIGRATION

Case report: G3P1 being induced for gestational HTN. CSE was performed with attempts at 2 interspaces – negative aspiration from the epidural catheter. Pump set for PIEB of 9 ml every 45 minutes → 0.0625% bupivacaine with sufentanil. After receiving the 5<sup>th</sup> PIEB dose over 3 hours, she developed hypotension, N&V, dyspnea, motor block and T3 sensory level → CSF was aspirated at this time. Pump was stopped until labor pain returned, then run at 2 ml/hr until delivery.

A&A Case Reports 2017; 9: 357

## EPIDURAL & OUTCOMES

Should epidural infusions be maintained in the second stage of labor, or will this prolong pushing?

- Double-blind RCT of 400 nulliparous patients.
- All women had low-concentration epidural infusions for labor (0.08% ropivacaine + 0.4 µg/ml sufentanil).
- When completely dilated, the infusion was either maintained or changed to placebo (normal saline).
- No difference in duration of 2<sup>nd</sup> stage or rate of SVD.

Obstet Gynecol 2017; 130: 1097

## EPIDURAL & PP DEPRESSION

If women intend to have epidural analgesia for labor but do not receive it, are they at higher risk for postpartum depression (PPD) due to untreated pain and unmet expectations?

- No ↑ in PPD if she planned an epidural but did not receive it.
- Protective effect seen for those who intended and received E.
- ↑ **PPD** if she did *not plan* for an epidural but received one.
- Is this due to a physically difficult delivery requiring more pain management, a sense of personal failure, other issues?

Anesth Analg 2017; PAP (Orbach-Zinger)

## ANESTHESIA FOR CESAREAN DELIVERY

## PREVENTING INFECTION

An economic evaluation of adjunctive IV azithromycin prophylaxis (+ cefazolin) for unscheduled cesareans:

- Used data from a prior trial that showed a decrease in endometritis (NNT 43) and wound infection (NNT 24).
- In their analysis, use of azithro resulted in hospital savings of \$360 per unscheduled cesarean.
- This antibiotic regimen is likely to become routine for unscheduled cesarean deliveries.

Obstet Gynecol 2017; 130: 328

## AORTO-CAVAL COMPRESSION

Is left uterine displacement still necessary to prevent aortocaval compression in modern practice?

- 100 healthy women having elective cesarean were randomized to 15° LUD or supine position after spinal.
- All received 10 ml/kg fluid co-load and a phenylephrine infusion titrated to keep BP at 100% of baseline.
- There was no difference in neonatal acid-base status.

Anesthesiology 2017; 127: 241 & 212

## AORTO-CAVAL COMPRESSION

Review article: *Aortocaval compression syndrome: time to revisit certain dogmas*

- Caval obstruction is only relieved by > 30° left tilt.
- MRI reveals the aorta is not compressed when supine.
- Tilt may not be necessary in healthy pregnancies if BP is supported with fluids and pressors, *although* both BP and cardiac output were lower in the women placed supine and they did require significantly more phenylephrine.

Anesth Analg 2017; 125: 1975

## CHOICE OF ANESTHETIC

The National Anesthesiology Clinical Outcomes Registry (NACOR) was used to analyze anesthesia practice patterns for cesarean deliveries from 2010-5.

- 218,285 cases: 94% neuraxial and **6% general anesthesia**.
- 15,282 were emergent cesareans: 85% neuraxial, **15% general anesthesia**.
- The GA rate was highest at University hospitals (8.5%).

Anesth Analg 2017; 124: 1914

## SUGAMMADEX

Is sugammadex appropriate to use during cesarean? Yes.

- It facilitates use of high-dose rocuronium for intubation if that option is preferred over succinylcholine.
- There are at least 3 case reports in the literature of successful use during cesarean.
- Animal studies show no adverse effects on the fetus / neonate (although delivery would occur before administration).
- Animal studies show some excretion into breast milk but oral absorption is low and no effects are expected.

Core Evidence 2013; 8: 57

## RISK FACTORS FOR PPH

What factors increase the risk of postpartum hemorrhage after an elective vs. an intrapartum (i.e. during labor) cesarean?

- Single center; used EBL > 1500 ml or need for transfusion.
- Pre-labor or elective cesarean: highest odds ratios were **general anesthesia (OR 22.3)**, multiple gestations (OR 8.0), and placenta previa (OR 6.3).
- Intrapartum: **general anesthesia (OR 5.4)**, multiple gestations (OR 3.2), and predelivery Hgb < 10 g/dL (OR 3.0).

Anesth Analg 2017; 125: 523

## NEURAXIAL FOR ECV

Neuraxial anesthesia improves the success rate for external cephalic version (ECV) for breech presentation and thus lowers the cesarean delivery rate. Does increasing the spinal bupivacaine dose ↑ ECV success rate?

- 240 women were randomized to 2.5, 5, 7.5, or 10 mg spinal bupivacaine 0.5% + 15 µg fentanyl.
- No difference between groups → ~50% success in each.
- But, the time to discharge was prolonged by 60 minutes using 7.5 and 10 mg as compared to 2.5 mg.

Anesthesiology 2017; 127: 625

## NEURAXIAL FOR ECV

Editorial: *Not too little, not too much: finding the Goldilocks zone for spinal anesthesia to facilitate ECV.*

- No difference in ECV success rates between groups, but:
- Pain was greater with 2.5 mg vs. 5-10 mg (12/100 vs. 4-5/100).
- Time to discharge was longer with 7.5 or 10 mg vs. 2.5 mg.
- If the plan is to discharge regardless of success, use a lower dose.
- If the plan is delivery regardless of outcome, use a higher dose to ↑ comfort. Consider a CSE (versus single-shot) to allow re-dosing for cesarean or for analgesia during induction of labor.

Anesthesiology 2017; 127: 596

## POSTOPERATIVE PAIN

If a patient is given a choice of low or high dose intrathecal morphine dose (100 vs. 200 µg), does it reflect her awareness of what her analgesic needs will be? Yes.

- Deception: all were still randomized but without their consent.
- Patients choosing the larger dose *did* have higher pain scores and needed more rescue analgesics, but they had less N&V.
- Women choosing the lower dose had more N&V.
- Expectation of pain or of side effects appropriately influenced their choice of dose for postoperative pain medication.

Br J Anaesth 2017; 118: 762

## INTRATHECAL MORPHINE

What is the incidence of hypercapnic events (using TeCO<sub>2</sub> monitoring) after IT morphine for cesarean?

- 108 healthy women had 150 µg morphine in their spinal.
- 32% had a sustained hypercapnic event (> 50 for > 2 min).
- Median time to the event was 5 hours; no adverse events.
- A higher baseline TeCO<sub>2</sub> was associated with more hypercapnic events → 5% incidence if baseline was < 31 mmHg, 23% if 32-38, and 77% if baseline was > 38.

Anesth Analg 2017; 124: 872

## LOCAL ANESTHETICS

RCT of intrathecal morphine +/- continuous ropivacaine sub-fascial wound infusion for postop cesarean analgesia:

- After elective cesarean, 192 women were randomized to wound infusion with ropivacaine, 100 µg IT morphine, or neither (control). All had multi-modal adjuncts.
- Both IT morphine and wound infusion increased the quality and duration (until IV morphine request) of post-cesarean analgesia. No ↑ in incidence of side effects.

Anesth Analg 2017; 125: 907

## LOCAL ANESTHETICS

RCT comparing bilateral, ultrasound-guided TAP blocks versus local anesthetic wound infiltration (both using 0.25% bupivacaine).

- No difference in postop opioid consumption, pain scores, or patient satisfaction.
- Incidence of side effects was low and no different.

Anesth Analg 2017; 124: 1291

### OPIOID PRESCRIPTIONS

How are opioids used after discharge by women who had a cesarean delivery?

- 83% used opioids and used them for a median of 8 days.
- BUT: 75% had unused tablets at home and most (63%) stored them in an unlocked location.
- Women who used the most pills were more likely to be smokers and they consumed more morphine equivalents during their inpatient stay.

Obstet Gynecol 2017; 130: 36

### OPIOID PRESCRIPTIONS

A study to define the amount of opioid prescribed and consumed after discharge from cesarean delivery:

- 6 academic medical centers participated; all patients had a phone interview 2 weeks after discharge.
- 85% filled an opioid prescription.
- The median number of tablets dispensed was 40 but number consumed was 20 and 95% had not disposed of the excess.
- The amount prescribed did not correlate with satisfaction, pain control or the need to refill the prescription.

Obstet Gynecol 2017; 130: 29

### ANESTHETIC COMPLICATIONS

### ASA CLOSED CLAIMS DATA

Update of OB anesthesia claims from 2000-2011 (vs. 1990s):

- 68% cesarean, 32% vaginal delivery; ↑ proportion C/S.
- Proportion associated with GA ↑ from 19% to 25%.
- Respiratory events ↓, but CV events ↑ related to *hemorrhage* rather than maternal cardiac disease.
- Maternal death ↑ from 13-24% → the most common injury.
- More claims paid, ↑ payments, and more substandard care.

Clin Obstet Gynecol 2017; 60: 431

### ASA CLOSED CLAIMS DATA

CHARACTERISTICS	INCIDENCE PRE-2000	INCIDENCE 2000-11
Mother's age > 35 years ↑	14%	25%
Mother was obese ↓	55%	39%
Emergency case ↓	73%	49%
Patient condition / surgery ↑	12%	27%
Maternal death ↑	13%	24%
Maternal minor injuries ↓	32%	20%
Substandard care ↑	24%	35%
Claim was paid ↑	43%	55%
Median payment made ↑	\$352,600	\$570,000

### ASA CLOSED CLAIMS DATA

Other take-home points from the Closed Claims database:

- Hemorrhage: substandard anesthesia care in 68% → slow to recognize, inadequate resuscitation.
- Substandard care in all cases of high block / total spinal → lack of CV support with pressors and delayed intubation.
- Nerve damage: inadvertently high placement with cord damage, paresthesias or pain during injection, abscess, arachnoiditis due to magnesium infusion in the epidural space.
- Pain / emotional distress: inadequate block for cesarean and delay in inducing GA, incision before GA, cesarean started with local.

## RETAINED EPIDURAL CATHETER

Case report of difficult removal; after multiple attempts by the anesthetist it was recovered minus the distal 6 cm. What now?

- Perform prompt disclosure to your patient, group leaders and hospital risk manager.
- No RCTs available, but expert opinion is to leave the tip in place. Risks of removal are thought to outweigh any benefits.
- Resolution: CT showed the remaining catheter clearly; patient requested removal so taken to OR → GA → neurosurgery easily removed fragment under fluoro with a small incision.

ASA Monitor 2017; 81: 30

## ANTI-COAGULATION

Systematic review of spinal-epidural hematomas to identify cases associated with neuraxial block + thrombo-prophylaxis.

- None of the hematoma cases involved OB patients.
- There were 28 parturients who had neuraxial done before the recommended ASRA time limit without complications.
- There were 52 parturients who had neuraxial *while* receiving LMWH without complications.
- This is reassuring, but we need better registries and details.

Anesth Analg 2017; 125: 223

## THROMBOCYTOPENIA

What is the risk of epidural hematoma requiring decompression in thrombocytopenic (defined as < 100K) parturients?

- Combined data from MPOG + a systematic review found 573 cases of thrombocytopenic parturients who received neuraxial block in MPOG + 1524 from the review.
- No cases of epidural hematoma were found.
- Upper limits of 95% CI: platelets 0-49K = **11%** (highest estimated risk), 50-79K = **3%** and 70-100K = **0.2%**, although results < 70K remain poorly defined due to small numbers.

Anesthesiology 2017; 126: 1053

## LIPID EMULSION

Meta analysis of 26 animal studies using lipid emulsion as a treatment for local anesthetic toxicity (LAST).

- Lipid emulsion significantly reduced the odds of death in animal models of resuscitation (OR 0.24).
- Analysis of outliers when lipid was not successful reinforced the need for good life support measures (airway management, chest compressions) + prompt lipid treatment.
- RCTs to assess efficacy in humans are not practical.

Clin Tox 2017; 55: 617

## PREGNANCY TESTING

ASA statement from the Committee on Quality Management and Departmental Administration (QMDA):

1. Indications for preoperative pregnancy screening
2. Accuracy of early pregnancy testing
3. **Medicolegal concerns** → “routine pregnancy testing may pose greater medicolegal risk to anesthesiologists due to failure to check the result or failure to document informed consent of risk of miscarriage prior to elective surgery.”
4. Ethical considerations
5. Recommendations (www.asahq.org)

## EPIDURAL & BREASTFEEDING

Controversial topic: does epidural analgesia for labor that includes fentanyl impair breast-feeding?

- RCT of term, multiparous women who had breastfed successfully before and who received epidural analgesia.
- Randomized to epidural bupivacaine alone, B + fentanyl 1 µg/ml, or B + fentanyl 2 µg/ml
- Frequency of breastfeeding at 6 weeks was > 94% and no different between groups.

Anesthesiology 2017; 127: 614

## OBSTETRIC & MEDICAL COMPLICATIONS

### COSTS OF PREECLAMPSIA

What is the annual health and cost burden of preeclampsia to mothers and infants in the U.S.?

- Epidemiologic analysis of multiple databases.
- Preeclampsia ↑ adverse events from 4.6% to 10% in mothers; from 8% to 15% in infants.
- The cost burden for infants ↑ as gestation age ↓.
- Cost burden during the first year was \$1.03 billion for mothers and \$1.15 billion for infants = \$2.18 billion.

Am J Obstet Gynecol 2017; Sept: 235-7

### PREECLAMPSIA PREVENTION

What has the effect been from the USPSTF 2014 recommendations to give aspirin for PEC prevention?

- Retrospective cohort study of 2 academic institutions before/after aspirin was used to prevent *recurrent* PEC.
- Confounders were accounted for in multivariate analysis.
- Rates of recurrent preeclampsia were decreased by 30%.

Am J Obstet Gynecol 2017; 217: 365

### National Partnership for Maternal Safety: Consensus Bundle on Severe Hypertension During Pregnancy and the Postpartum Period

*Editorial: Key considerations for the anesthesiologist.*

- BP > 160/110 is a hypertensive emergency that requires treatment within 30 minutes to prevent hemorrhagic stroke.
- We have an important role in management of eclamptic seizure.
- Promote neuraxial if possible, but manage GETA safely.
- Continue magnesium during cesarean delivery to avoid sub-therapeutic levels that ↑ the risk for eclampsia.
- Be involved in safe disposition post-delivery (BP control).

Anesth Analg 2017; 125: 383 & 540

### AMNIOTIC FLUID EMBOLISM

Four recent research publications on AFE and the implications:

- Insulin-like growth factor binding protein-1 has been validated as the only lab test that can confirm a diagnosis of AFE.
- A registry from Australia-New Zealand reported “only” a 15% mortality rate in 33 AFE cases – survival is improving.
- Report of 3 cases where AFE presented as an isolated coagulopathy without cardiac or respiratory collapse.
- 90% of parturients survived when transfused with FFP:PRBC  $\geq 1$  compared with only 40% survival if transfusion ratio < 1.

Obstet Gynecol 2017; 129: 941

### LIPID THERAPY FOR AFE

*Case report:* G1 at 41 weeks was induced and had a low-dose epidural for analgesia. Fetal decelerations and bleeding from the epidural site occurred intermittently for several hours before vacuum-assisted delivery, which was followed by postpartum hemorrhage. INR 2.0, PT 23 (nl 11-14). Dyspnea and confusion were followed by cardiac arrest → presumed diagnosis of amniotic fluid embolism. No PE on TEE. No response to ACLS so intralipid administered as a last resort. Within 1 minute → ROSC → decompensated several minutes later → lipid → ROSC → transported to ICU → full recovery.

A&A Case Reports 2017; 8: 64

## THE WOMAN TRIAL

Early administration of TXA reduces death in bleeding trauma patients. What are the effects in postpartum hemorrhage?

- 20K women, 193 hospitals in 21 countries were randomized to receive 1 gram TXA or placebo + usual care during PPH after vaginal delivery or CS.
- Death due to bleeding ↓ **19%** overall (1.5% vs. 1.9%), RR 0.81.
- Death ↓ **31%** if given within 3 hours (1.2% vs. 1.7%), RR 0.69.
- No difference in hysterectomy rate or in other causes of death.
- No difference in venous or arterial thromboembolic events.

Lancet 2017; 389: 2105

## TXA IN OBSTETRICS

- Byproducts of fibrinolysis (D-dimer and plasmin-antiplasmin complexes) are ↑ in bleeding parturients. These increases are attenuated by TXA → good rationale for use.
- The WOMAN Trial demonstrated both efficacy and safety.
- However, most subjects were from Central Africa and South Asia. 7% were not even transfused before death. Interventions such as Bakri balloon or B-Lynch sutures were uncommon.
- So...are the results generalizable to high resource countries?
- Adverse effects can occur with TXA → seizures, thrombosis, death after accidental neuraxial injection.

APSF Newsletter 2017; October: 34

## MANAGEMENT OF PPH

ACOG Practice Bulletin: Postpartum Hemorrhage

- Have guidelines for routine use of uterotonics.
- Escalate quickly to other interventions if uterotonics fail.
- Consider TXA when initial medical therapy fails.
- Have a multi-disciplinary response team, an escalating PPH protocol, and a functioning massive transfusion protocol.
- Transfuse fixed ratios of PRBC, FFP and platelets.
- Adopt and implement a hemorrhage bundle for your L&D.

Obstet Gynecol 2017; 130: e168

## BUPRENORPHINE DOSING

Pharmacokinetic study on buprenorphine dosing during pregnancy:

- 14 pregnant and postpartum women + 62 followed in the clinic.
- Plasma concentrations were sub-therapeutic for 50-80% of the 12-hour dosing interval when BID dosing was used.
- When the dosing interval was determined by patient preference, 68% chose TID or QID dosing.
- More frequent dosing may be required during pregnancy to prevent withdrawal symptoms and to ↑ maternal adherence.

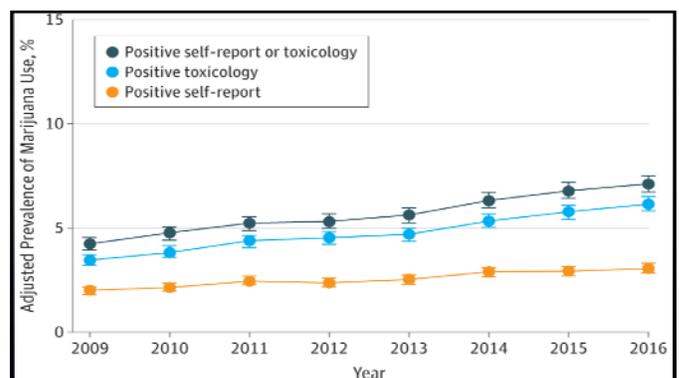
Am J Obstet Gynecol 2017; 217: 459

## MARIJUANA USE

Trends in prenatal marijuana use 2009-16:

- Kaiser Permanente Northern California does universal marijuana screening via self-report and by urine toxicology.
- Prevalence of marijuana use increased significantly over time from 4% to 7% of pregnant women, especially ≤ age 24.
- 22% of pregnant patients < age 18 and 19% ages 18-24 tested positive by toxicology.
- 79% perceived little to no harm in prenatal use of marijuana.

JAMA 2017; 318: 2490



## MARIJUANA RISKS

- Data suggest that pregnant women use marijuana as an anti-emetic, especially first trimester when fetal risks are greatest.
- Marijuana available today is more concentrated and used in ways that expose the user to higher THC concentrations → different than when earlier teratogenicity studies were done.
- The potential for marijuana to interfere with neuro-development is theoretical but justified → the endocannabinoid system is present from 16 days gestation.

JAMA 2017; 317: 129 (editorial)

## THE FETUS AND NEONATE



## TERATOGENICITY

Is maternal use of anti-epileptic drugs during pregnancy associated with major congenital malformations in children?

- 50 studies published between 1974 and 2014.
- Offspring of women without epilepsy were used as baseline → 2.5% incidence of congenital anomalies.
- Lamotrigine (Lamictal®) at 2.3% and levetiracetam (Keppra®) at 1.8% had lowest risk while valproate (Depakote®) at 11% had the highest risk.

JAMA 2017; 318: 1700

## DELAYED CORD CLAMPING

*ACOG Opinion: Delayed umbilical cord clamping after birth*

- ACOG recommends delay of cord clamping for at least 30-60 seconds after birth for all vigorous infants.
- Term infants: ↑ Hgb levels, improves iron stores, and may have developmental benefits. May ↑ jaundice, so must monitor.
- Preterm infants → improved transitional circulation, better red blood cell volume, ↓ need for transfusion, ↓ risk of NEC, IVH.
- No ↑ risk of postpartum hemorrhage for the mother.

Obstet Gynecol 2017; 129: e5

## MECONIUM STAINING

*ACOG Opinion: Delivery of a newborn with meconium-stained amniotic fluid*

- Do not routinely provide suctioning at delivery whether vigorous or not.
- A full Pediatrics team should be present in case intubation is needed.
- Resuscitation should follow the same principles whether meconium-stained or not.

Obstet Gynecol 2017; 129: e33

## ASA CLOSED CLAIMS DATA

What is the anesthesiologist's liability in newborn death and brain damage cases, and when participating in newborn resuscitation?

- 29% of OB anesthesia malpractice claims are for newborn death and brain damage (vs. 71% related to maternal care).
- Anesthesia care was felt to have contributed in 33% of cases due to delay of delivery, poor communication (level of urgency), or sub-standard care (mismanagement of difficult intubation or high block).
- Cases involving anesthesia delay → didn't respond when not in hospital; inappropriate choice of regional anesthesia versus general.
- Most resuscitation claims are dropped → "Good Samaritan".

ASA Monitor 2017; 81: 16 (February)

## EXTREME PREMATURETY

What is the expected survival and neuro-developmental outcome for infants born at 22-24 weeks gestation?

- 4274 infants at 11 centers comparing 2000-3 to 2008-11.
- Survival ↑ from 30% to 36%.
- Survival *without* impairment ↑ 16% to 20%.
- Survival with disability did not change: 15% to 16%.

N Engl J Med 2017; 376: 617

## NEWBORN INFECTION

Case report (Oregon): Infant with respiratory distress was diagnosed as having GBS infection at birth. Treated and discharged. Recurrence 5 days later – same sensitivities as initial infection. The mother had asked to keep her placenta, and registered with a company that turns it into “pills” to be taken like vitamins for mood and energy boosts. She was taking 2-3/day, and cultures showed the same GBS cultured from the baby → “high maternal colonization from consumption of GBS-infected placental tissue”.

JAMA 2017; 318: 511

## NEONATAL ABSTINENCE SYNDROME

Is buprenorphine a better treatment than morphine for NAS due to maternal opioid use? Yes.

- Double-blind RCT of 63 infants with signs of NAS
- Duration of treatment was shorter with B: 15 vs. 28 days.
- Median length of stay was shorter with B: 21 vs. 33 days.
- Only 15% needed adjunct phenobarbital in the B group vs. 23% in the morphine group.

N Engl J Med 2017; 376: 2341

## NEUROTOXICITY - CLINICAL

What is the association between anesthesia and surgery before age 4 and academic performance at 16 + IQ testing at military conscription (Sweden)?

- 2 million children born from 1973-1993; compared those with 1 surgical exposure before age 4 to unexposed children.
- Mean difference of 0.41% lower school grades and 0.97% lower IQ scores in the exposed group.
- The surgery vs. no surgery differences were markedly *less* than the differences associated with sex, maternal educational level, or month of birth during the same year.

JAMA Pediatr 2017; 171: e163470

## NEUROTOXICITY - ANIMAL

Does dexmedetomidine provide protection in the developing brain against anesthesia with sevoflurane?

- Infant rats received 2.5% sevoflurane + dexmedetomidine in varying doses.
- Co-administration of dex 1 µg/kg with sevoflurane significantly reduced apoptosis in all brain areas.
- Dex 5 µg/kg or higher *plus* S increased mortality.

Br J Anaesth 2017; 119: 506

AND WE'LL SEE  
WHAT'S NEW IN 2018!

THE END

