The Expanding Role of the Obstetrical Anesthesiologist

- It's not just epidurals

Ob Anesthesia Update

- Expanding Role of OB Anesthesiologist
- Safety (Simulation and Team-training)
- Ultrasound
- Oxytocin for PPH prophylaxis
- Anesthetics and the developing brain

Expanding Role of OB Anesthesiologist

- Rising complexity of maternal patient
  - aging, obese, resource challenged, chronic disease
- Rising frequency of Cesarean Delivery
- Medical sophistication of Ob Providers
  - “Where is the M in MFM?”
- Leadership in reproductive public health
  - non-uniform, under-funded, audits
  - few evidence based practice guidelines
  - systems oriented improvements in quality and safety
Maternal Mortality USA

- Rising not falling!
- Statistical glitch?
- 30% of increase
- Tip of the iceberg
- Severe morbidity 5x
- Underreporting
- 25 to 50% avoidable
- Shifting causality

Rising By Comparison


Cause of Death: 1987 - 2005

### "Where is the M in Maternal Fetal Medicine?"

- "practices [increasingly] limited to ultrasound and obstetric consultation"
- "increasing reliance on medical experts from other specialties….cardiologists, anesthesiaologists, and intensivists to manage pregnant women with chronic disease or serious medical complications"

D’Alton, ME., Obstet Gynecol 2010; 116:1401-4

### Who are the Maternologists?

- 1960’s “high risk”, 70’s MIM, 90’s MFM
- Late 90’s to present mFM………..FM?
- Internist maternal-medicine specialists
- Remaining hardcore MFM’s
- MFM trained intensivists (9 total in USA)

**Obstetrical Anesthesiologists**
- 24/7 L&D
- anesthetist, consultant, safety manager, etc…..

### “The Peripartum Obstetrical Home”™

*defragmentation of Ob care*

- Antepartum anesthesia/medical consultation
  - Medically/surgically complex patients
- Patient education
  - Labor analgesia/anesthesia (anticipatory consent)
  - Role of anesthesiologist in Ob care
- Establish/reinforce evidence based guidelines
  - Antibiotic and VTE surgical prophylaxis
  - PPH and transfusion management
- Post-op pain/nausea/pruritis management
Hospital Safety

- 44,000 to 98,000 medical error deaths/yr in U.S. Hospitals*
- 1,000,000 avoidable disabling injuries*
- Eighth leading cause of death in USA
  - MVA’s 43,000 death/yr
  - Breast cancer 42,000 death/yr
- Systematic review
- 8 studies, 75,000 patients (US, UK, Aus)
- Incidence in-hospital AE’s: 9.2%  
  - Lethal AE’s: 7.4%  
  - Significant disability: 44%

* Institute of Medicine: “To Err is Human”, 1999

Failures in “Communication”

- 2/3 involve failure of communication
- “Training reality gap”  
  - Train in silos  
  - Fragmentation of care  
  - Function in groups
- Recommendations:  
  - “Team Building” (CRM)  
  - Simulation training

JCAHO Sentinel Event Statistics, 2007

Team Training:
“Crew Resource Management”

- Unit-wide didactic: Team concepts  
- Creation of multidisciplinary teams  
- Teach “teamly” behavior as clinical skill  
- Structured implementation process

Example: TeamSTEPPS (developed by DoD and AHRQ)
Simulation Training in L&D

Methods:
• High fidelity
• Lower fidelity
• Off site (sim lab)
• In situ (on L&D)

Simulated Events
• Gravid CV arrest
• Emergency C/S
• Airway emergency
• Shoulder dystocia
• PPH
• Eclampsia

Maintaining Skills for Rare but Consequential Events
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Example: Gravid Cardiac Arrest

• North American Survey: specialist obstetricians
  – 42% had read pregnancy specific guidelines
  – 32% knowledgeable about initial management
• Israeli Study: obstetricians, anesthetists, midwives
  – less than 50% had knowledge to treat gravid arrest by established
guidelines
• Studies of ACLS in general:
  – similarly demonstrate poor retention of knowledge/skills even
    among trained anesthesiologists

Ultrasound in OB Anesthesia: Why?

1) Clinical assessment of ICL # L4 by Ultrasound
   - Brinbach, 2011 (n=50)
     - Anatomically 1 or more higher than clinical estimate in 40%
   - Carvalho, 2011 (n=48)
     - Clinical assessment above L4-5 in all patients
     - 1 to 3 above L2-3 in 23%

2) Vascular access, of course!

Longitudinal paramedian approach

Transverse approach

http://pie.med.utoronto.ca/OBAnesthesia/index.htm
Identify Midline and Level

Approximate Depth

Learning Ultrasound for Neuraxial Blocks: course, website, scan, scan, scan

http://pie.med.utoronto.ca/VSpine/index.htm
Oxytocin for PPH Prophylaxis and Rx: How Much?

- **Oxytocin physiology**
  - **Cardiovascular:**
    - Large vessel dilation (↓SVR, MAP, ↑CO, HR)
    - Coronaries: can cause constriction (ST ∆’s)
  - **Myometrium:**
    - Estrogen (and GA) dependant up-regulation (sensitization)
    - Dose and time dependant down-regulation (tachyphylaxis)
- **Bolus:** > 3 units, dose dependant ↓BP, etc
- **Infusion:** less CV instability

Dyer, et al., Curr Opin Anesthesiol 2011

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Oxytocin Recommendations:

- **Refrain from bolus**
  - ED50 elective C/S: slow 0.3 units tone at 2 min
  - ED90 labor arrest: slow 3 units (20 to 60 seconds)
- **Consider:** 0.29 u/min infusion
  - about 15 units in 1000 mL, infuse over 60 min
- **Failure of low dose oxytocin predicts tachyphylaxis**
  - higher doses: side effects > hemostasis
  - Choose prostaglandins and ergots
- **Beware:** cardiac, severe preeclampsia, hypovolemic

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Neuro/behavioral Teratology:

- **Animal data** (mice, rats, guinea pigs, primates)
  - GA’s age-dependant neuronal deletion vulnerable brain regions
  - attendant neurocognitive impairments
- **Human epidemiologic data**
  - equivocal association between early GA exposure and long-term impairment of cognitive/behavioral development
- “These findings should concern, but not alarm, Ob-anesthesia community” *

* Flood P, Anesthesiology, 2011
Conclusion

- Having a baby is natural, but its dangerous
  - Anesthesiologists can impact maternal outcomes
- Safety can be improved
- Ultrasound is coming to Ob anesthesia
- Oxytocin for PPH: We give too much
- Anesthetics may not be good for fetal brain