An Introduction to Obstetrical Emergencies

Charles D Giordano CRNA, MSN (Major USAFR)
My Background

- One of the first few cadre’s of CRNA’s trained at University of Pittsburgh Nurse Anesthesia Program to be “allowed” to perform anesthetics on parturient patients beginning in 2006
- 2+ years of independent practice as a CRNA
  - The Birthplace at Faxton St. Lukes Hospital in Utica NY
    - 2000+ deliveries a year 24 hr in house call 2011-current
- 2 years as the only full time OB/CRNA at Magee Womens Hospital of UPMC
  - 10,000+ deliveries a year
- Involved in hands on and didactic instruction for the UOPNAP and clinical reorientation to OB for seasoned CRNA’s in the system
My Background

- 2nd Generation OB/CRNA
  - Following in the footsteps of Charles A Giordano
    - 40+ years of experience
    - Overall good guy

- Management of Emergencies
  - 14 combined years of Active Duty and Reserve Military experience
  - STICU, C4, TNCC, SAMMC
  - Deployed FST Philippines 2010 sole anesthesia provider for area
    - Philippine casualties
    - Austere environment

- UPMC
  - Call team, OB
  - Cultivation of “6th Sense” follow your gut!
Giulianna S. Giordano 8/9/2010

31 weeks
Partial Abruption
Missed her birth by 1.5hrs
Objectives

- Understanding of Common OB emergencies and Anesthetic Implications for each
  - Ante-partum (before)
  - Intra-partum (during)
  - Post-partum (after)
Physiologic Changes of Pregnancy

- **CNS** - ↓ MAC and ↓ LA requirements, lumbar lordosis, ↑ spread
- **Resp** – Compensated Respiratory Alkalosis
  - ↑ (MV, alveolar ventilation, TV, O$_2$ consumption, RR, IC), ↓ (TLC, FRC)
- **CVS** - ↑ (HR, CO, SV, uterine blood flow) ↓ (SVR, PVR, MAP), ↑ volumes, ↓ pressures
- **GI** - ↑ gastric reflux and acidity, ↓ gastric motility and emptying
- **Renal** - ↑ (GFR, renal blood flow, Cr clearance, aldosterone, bicarb excretion) ↓ (BUN, Cr)
Common Anesthetic Techniques

- Spinal Anesthesia (% block)
  - Itrathecal placement of local anesthetics for C/S
    - 1.4-2 cc 0.75% bupivacaine with dextrose with narcotics
    - Dextrose baricity and confirmation
    - Lidocaine is still used at some facilities
    - Surgical Level achieved below T4 is the goal
  - Late stage I and stage II labor
    - Fentanyl 20-25mcs with 0.2-.5cc 0.75% Bupivicane
    - Or 1cc 0.25% Bupivicane
    - Pain relief for approximately 1-2 hours
    - Controversial decrease in FHT, High Spinal
Spinal

- Spinal Con’t
  - Saddle block for Circlage
    - 1 CC 0.75% Bupivicaine +/- fentanyl
    - Keep seated for 2-5 minutes
  - Post partum repair of vaginal tear/episiotomy
    - 1st degree - vaginal mucosa and perineal skin
    - 2nd degree – subcutaneous tissue
    - 3rd – through rectum
    - 4th – into rectal mucosa
    - All can be cause of blood loss
Spinal

- Complications:
  - Surgical Level not achieved = GA
  - High Spinal
    - Intubation
    - Support vs C/S
  - PDPH 1.5-11% incidence 14% closed claims
    - More than 1 attempt
    - Size/shape of needle
Common Anesthetic Techniques

- Epidural Analgesia with placement of epidural catheter (volume block)
- Placement of local anesthetic in the epidural space
Epidural

Common sites of placement L2-3 to L4-5

- Common dosing
  - Bupivicane 0.0625-0.125% infusion with 2mcs/cc fentanyl (cardiotoxic low concentrations safe)
  - Ropivicane 0.08-0.2% infusion with fentanyl (expensive)

- Bolusing for BT pain
  - Lidocaine 1-2% w/-w/o epinephrine 5-8cc
    - Shorter acting, stronger block, quicker onset
  - Bupivicane 0.625-0.25% 5-8cc
    - Longer acting, more diffuse block, longer onset
  - Fentanyl 50-100 mcs q 4-6 hours
    - High doses associated with maternal side effects, fetal depression, pruritus
Epidural

For C/S
- Establish that the epidural is working
  - Has it been turned down
  - Last bolus
  - Mom’s mental state
- Dosing for C/S
  - 2% Lidocaine with 1:200,000 epinephrine
    - 10-20cc +/- 100mcs of fentanyl
    - Moderate onset
    - 1.5-3 hours duration
  - 3% Chloropricane 10-20cc
    - Quicker onset
    - 45min to 1hr duration
  - Duramorph (PF Morphine) for post op pain
    - 2.5-5mg in last 1/3rd of C/S
    - Onset 30-60 min duration 16-24hrs
    - Delayed Respiratory Depression 6-12 hours later
    - Crosses into CSF acts centrally
Epidural

- For Post-partum period:
  - Laceration
  - Manual extraction of Placenta
  - Surgical extraction of Placenta
  - Tubal Ligation
  - Early fetal demise
  - Retained products of conception
    - May need adjuncts
Epidural

Complications
- Failed regional
  - Spinal vs GA
- Vascular insertion
- SA insertion
- High Block
- Epidural PDPH – 52% after “Wet Tap” 1-2% W/O
- Epidural Hematoma
S & S of Local Toxicity

- Circumoral numbness
- Ringing in the ears
- Seizures
- Cardiac arrythmias
- Hypotention

www.lipidrescue.com
Lipid Rescue for Local Toxicity

Get Help!

- **Initial Focus**
- Airway management: ventilate with 100% oxygen (BLS/ACLS and ABC’s)
- Seizure suppression: benzodiazepines are preferred
- Basic and Advanced Cardiac Life Support (BLS/ACLS) may require prolonged effort

- **Infuse** 20% Lipid Emulsion (values in parenthesis are for a 70 kg patient)
  - Bolus 1.5 mL/kg (lean body mass) intravenously over 1 min (~100 mL)
  - Continuous infusion at 0.25 mL/kg/min (~18 mL/min; adjust by roller clamp)

- Repeat bolus once or twice for persistent cardiovascular collapse
- Double the infusion rate to 0.5 mL/kg per minute if blood pressure remains low
- Continue infusion for at least 10 mins after attaining circulatory stability
- Recommended upper limit: approximately 10-12 mL/kg lipid emulsion over the first 30 mins
Lipid Rescue Cont.

- **Avoid** vasopressin, calcium channel blockers, β-blockers, or local anesthetic
- **Avoid** high dose epinephrine; preferably use doses < 1 mcg/kg
- **Alert** the nearest facility having cardiopulmonary bypass capability (esp for local anesthetic toxicity)
- **Avoid** propofol in patients with cardiovascular instability
**Epidural Blood Patch**

- 10-20 cc autologous blood inserted into the epidural space to decrease PDPH
- Epidural space found
- Blood drawn in a sterile fashion
- Inject in epidural space until patient is uncomfortable or 20cc
- May be done up to three times
  - Consider neurology consult with second attempt
- Conservative measures until 48-72 hours post-puncture
  - Caffeine
  - Hydration
  - Immobility
  - Smokers
  - NSAIDS and tylenol
Back Pain

- A 9lb fetus having been forcibly expelled into the world through a 8lb pelvis has been known to cause back pain and transient neuropathy.

That being said:

- S/S of infection?
- Persistent pain and neuropathy?
- Any question of epidural hematoma?
- Co-morbidities = bleeding

- Check it out!
Anesthetic Techniques

- General Anesthesia – the last resort
  - Airway

- Body Habitus –
  - large tongue
  - redundant oropharyngeal tissue
  - Friability of tissue
  - Inability to align airway axis
  - Decrease in FRC
  - Full stomach
  - Fetal Depression
  - Maternal Bonding
Yikes!

If your facility does not have a Glidescope than you need to get one!

- Difficult Airway Cart/FOB
Ante-Partum

- PIH/Chronis HTN
- Pre-Eclampsia/Eclampsia
- HELLP Syndrome
- Partial Abruption
- The Acreta’s
- GDM/DM
- LGA/IUGR/Pelvic Incompatability
PIH vs Chronic HTN

- **Chronic**
  - Prior to 20 wks
  - Multiparity, DM, Obesity, Race, Age
  - More likely to have Pre-E
  - Most do well can have exacerbations

- **PIH**
  - After 20 wks
  - Can be precursor of Pre-E/Eclampsia
    - Initiate lab work to rule out
    - Proteinuria, Platelets LFT’s
Pre-eclampsia

- Criteria: HTN, edema, proteinuria, onset > 20 wks gestation
- 6-8% incidence, types: mild + severe
- Eclampsia = preeclampsia with Sz +/- coma, Sz on Mg<sup>2+</sup> ⇒↑ incidence of structural neurologic disease
- Associations: 1<sup>st</sup> pregnancy (primes) and multiparity, obesity, extremes of age, chronic HTN +/- chronic renal disease, abruption 6x more common
Pre-eclampsia

- **Pathogenesis:**
  - vasoconstriction (thromboxane production) > vasodilation (prostacyclin, nitric oxide production)

- **Pathophysiology - multisystem d/o**

- **Neuro** - Sz, coma, visual disturbances, HA, hyperexcitability, hyperreflexia, ↑ ICP

- **Resp** - ↓ colloid oncotic pressure ⇒ pulm edema, pharyngolaryngeal edema

- **GI:** ↑ LFT’s, TA > 1000 IU/L, hepatic edema (expansion of Glisson’s capsule)

- **Renal:**
  - glomerular enlargement ⇒ proteinuria, ↓ sensitivity to RAAS ⇒ ↓ AII sensitivity

- **Heme:**
  - hypo-coaguability, thrombocytopenia (15-30%, 10%< 100 K, DIC)

- **Placenta:**
  - ↓ perfusion ⇒ IUGR, abruptio placentae (2%), fetal distress

- **Maternal Mortality:**
  - Sz, cerebral hemorrhage (most common), renal and hepatic failure, DIC, pulmonary edema, placental abruption
Anesthetic Considerations

- Stabilize and deliver - MgSO₄, judicious use of fluid, anti HTN agents, expectant management with timely delivery, *no defasciculating dose*
- C/S for OB indications only
- Observation for 24 hours postpartum
- Labor epidural and spinal *not* contraindicated
- Labs - CBC, platelets, PT/PTT, fibrinogen q 4-6 hrs, electrolytes, Mg levels, LFT’s

- MgSO₄ - initial bolus of 4-6 gm, 1-2 gm/hr drip, therapeutic range of 4-8 mEq/l: 10 mEq/l = loss of patellar reflexes, 12-16 = resp arrest, 20 = asystole
- Tx of Mg toxicity - Calcium Gluconate, CaCl₂, dialysis
- Mg mechanisms of action:
  - Central anticonvulsant
  - Inhibits Ca²⁺ pre and postsynaptically
  - Peripheral vasodilatation
  - Potentiates all muscle relaxants
Pre-eclampsia Treatment

- **Hydralazine** - $\alpha_1$ blocker: arteriole > venule dilatation, $\downarrow$ SVR with $\uparrow$ HR and $\uparrow$ CO

- **Labetolol** - $1\alpha : 3\beta$ blocker: $\downarrow$ SVR with Mod Dec. HR and $\uparrow$ CO

- **NTG** - converted to nitric oxide $\Rightarrow$ *venous* dilation + $\downarrow$ preload, use non-absorbent tubing

- **NTP** - converted to nitric oxide $\Rightarrow$ both *arterial* + *venous* dilatation: $\downarrow$ SVR + $\downarrow$ preload, initial dose of 0.5 mcg/kg/min, may cause maternal and fetal cyanide toxicity

- **Nifedipine** - slow channel Ca$^{2+}$ blocker, works on *arterial* + *arteriolar* smooth muscle, vasodilatation > cardiac effects, SE: facial flushing, HA, tachycardia
HELLP Syndrome

- **H** - hemolysis, hemolytic anemia, bilirubin $> 1.2$ mg/dl
- **EL** - ↑ liver enzymes: SGOT $> 70$ U/l, LDH $> 600$ U/l
- **LP** - low platelets $< 100$ K
- **S/S** - malaise, RUQ or epigastric pain, N/V, viral like syndrome
- **HTN** + Proteinuria may be absent
- Peak intensity **24-48 hrs** postpartum
- Usually compensated DIC with normal coagulation
Regional with Low Platelets

- The $100 question
- Textbooks say 100k
- Studies inconclusive
- TEG if you have one
  - Not gold standard not studied
  - Anecdotal evidence good
  - Pt/ptt/INR not indicators
- No TEG no regional
Partial Abruption

- Incomplete separation of placenta from uterine wall.
- May cause bleeding
  - May be occult
- Fetal Distress
  - Fetal Hypovolemia
- C/S possible
  - Volume resuscitate mom and baby
Placenta
Accreta/Increta/Percreta

- Penetration of the placenta into the uterine myometrium and beyond
- Can be caught on US but not always and severity questionable
- Can cause
  - Bleeding
  - Uterine inversion
- C/Hysterectomy
  - Be prepared for GA
  - Big IV’s
  - Blood in the room
  - Cell Saver/Salvage

- True Life threatening emergency if not recognized early
Gestational DM/DM

- Most common pregnant medical condition
- 3-5% incidence
- 90% of all DM in pregnancy
- ↑ with advanced maternal age
- prone to type II-DM in later years
- ↑ insulin requirement in pregnancy

- 2nd half of pregnancy
- 10-15% require insulin
- fasting blood glucose > 95-105mg/dl
- ↑ in insulin dose (50-100%) above pre-pregnancy
- Late pregnancy: ↓ insulin due to ↑ fetal glucose utilization
- ↑ maternal + fetal Cx
  - Check BS, Macrosomia
  - Infant will need BS/early feeds
LGA/UGR/Pelvic Incompatibility

- **LGA** = Large for gestational age = Big Baby
  - Failure to progress
  - Long labor
  - Fetal distress, placental deterioration
    - C/S – usually not acute
      - US’s lie – not our call

- **Pelvic Incompatibility**
  - Small pelvis + Big baby = C/S
  - Choose your mate wisely

- **Intrauterine Growth Retardation**
  - Variety of reasons, placental, nutritional, drugs/alcohol/smoking, genetic anomalies
    - Back of your head – this may not go well am I prepared for the worst

- Not normal causes of Stat C/S but can turn out that way
Intra-Partum or what goes wrong in the middle of the night and I have to go do stat/hurry up C/S

- Fetal distress
  - Prolapsed cord
  - Failure to decend
  - Breech in labor
  - Abruption
  - Ruptured uterus
  - C/Hysterectomy
  - Chorio
  - Placenta Previa
  - Fetal Intolerance to Labor
  - Its 1500 and I have a T-time/1700 I want to go home
Stat C/S

- Prolapsed cord
  - Umbilical cord is between the baby’s head and across the cervical os
  - Limited BF to fetus – downward dog to OR with triage nurse attached

- Abruption
  - Placenta actively tearing away from uterus
  - Time is of the essence
  - Mom can Bleed
  - Baby can bleed = pale neonate

- Low FHT
  - Normal FHT 110-150 bpm
  - Deceleration < 110 for >30sec
  - Sign of Fetal Distress
  - Can Happen for all of these reasons
  - If OB calls a STAT be prepared for GA
    - May be called for a pattern = NRFHT
    - Ask if there is time for regional
    - Can resolve on their own
      - LUD
      - Oxygen
      - Turn Pitocin off
      - Terbutaline
      - Hands and Knees

- Fetal Intolerance to Labor
  - NRFHT
  - Many reasons
  - BF not getting to fetus
C/S continued

- **Breech in Labor**
  - Breech birth considered very dangerous and can cause fetal distress – birth trauma
- **Footling breech** – a foot or two leading the way out = stat/hurry up C/S
  - May have time for regional
  - Prepare for GA
- **Placenta Previa**
  - Placenta has formed over the cervical os
    - More common early in pregnancy and usually resolves
  - As the cervix dilates it tears the placenta apart
    - Blood loss for both mom and baby
    - Ranges in severity
      - Known vs unexpected (no prenatal care)
      - Prepare for GA
      - Fluid resuscitation
      - Blood available
C/S

- Abruption
  - Placenta has fully prematurely separated from Uterus
  - True emergency
  - Time from decision to incision very short = GA
  - Blood loss mom and baby

- Chorioamnionitis
  - Infection of the uterus and placenta
    - Occurs in long labor
    - Premature rupture of membranes
    - Causes fever and malaise in mom
      - Can cause septicemia
    - Can cause septicemia in fetus
    - Placenta can become less effective
  - C/S if mom or baby are symptomatic
    - Resolves with antibiotics for both
C/S

- Ruptured Uterus
  - Multiparity
  - Multiples
  - Increased risk with each C/S
    - Classical Incision prior
    - TOLAC/VBAC
  - Low severe unrelenting abdominal pain that does not correlate with contractions
    - History of any of the above
- True emergency = GA
  - Possible Hysterectomy
  - All hands on deck
C/S

- Failure to Descend
  - Cervix is dilated but Jr just wont “come on down”
  - Could be related to position of fetus
    - OP (Occiput Posterior) or “Sunny side up”
    - Fetus facing anterior
- Fetal intolerance to Labor
  - NRFHT but there is time for regional
- Arrest of Dilation
  - Cervix will not dilate despite induction efforts
- Maternal exhaustion
  - Hard long labor
    - Pushing for several hours, or refusal to push anymore
- Maternal Desire for C/S
  - Britany Spears syndrome
    - Chic way to have a baby
    - Patients think C/S just as safe as vaginal
    - Policies to thwart early (39 wks)
    - C/S in otherwise healthy babies
    - under way
- Most of the time these can be done under regional
  - Spinal or existing working epidural
  - Take care to interrogate your epidural
    - It may have been turned down to aid pushing efforts
    - Mom in a very fragile state may cloud the issue
C/S – at a Glance

- Regional vs GA
  - Time, ability/difficulty, failed regional

- Intubation Ready
  - ETT airway adjuncts at the ready
  - Intubation drugs easily accessed
  - Emergency drugs at the ready

- Good IV access
  - 18g or better x1, x2 if there are ANY chances you will need one

- Stat Labs
  - H/H, Plts, T&S, T&C low threshold to order blood products
    - Uncross matched Blood if needed
    - Rhogam = Mom+/-, Baby +/- prevents (-) mom from (+) baby

- Is there a neonatologist available/on call
  - NRP – certified staff
  - Infant airways/blades/ supplies

- Will my spinal wear off?
  - Approx 2hrs should be enough time but
    - Complications
    - Residents/inexperienced staff
      - 0400 is no time to let the Med Student learn how to close
      - Gentle encouragement can be used
Ok so now we are doing a C/S so we can stop worrying right?

- Maternal Hemorrhage
  - Uterine Atony – Uterus will not contract and continues to bleed
    - Long labor
    - Multiparity/Multigravid
    - Magnesium/Pitocin
    - Anesthetic Agents
    - Retained placental tissues
  - Inability to stop the bleeding
    - Unknown source/Occult source
    - Coagulopathies
    - Emergent surgery can cloud judgment
- Bladder and Bowel perforation
  - Grab a snickers and prep for GA
C/S issues continued

- Uterine Inversion – Uterus turns inside out as placenta is removed
  - This causes a massive amount of blood loss
  - May result in a hysterectomy if not resolved quickly
- Uterine relaxants
  - AA’s
  - Nitroglycerine 200 mcs at a time
    - Great my patient is exsanguinating and I’m giving NTG
- GA – 2 IV’s - Transfuse
Common C/S Rescue drugs

- Uterotonics
  - Methergine (methylergonovine) - 200 mcs IM q 2-4hrs not to exceed 5 doses
    - Contraindicated for HTN
  - Hemabate (carboprost) – 250 mcs IM q 15 to 90 mins not to exceed 2000 mcs
    - Contraindicated for asthmatics – smooth muscle contraction
    - Nausea/Vomiting
  - Pitocin (oxytocin) – 10u IV with concomitant gtt of 20-40 units per 500/1000cc NS
    - 10u IU
    - Hypotension and increased MHR
    - Controversial dosing some studies suggest less is more
- Misoprostal - PR
Other Help

- PRBC’s
- Cell Saver/Salvage
- FFP
- Plts
- Cryo
- Factor VII
- New drugs on the horizon used in Europe
- Uterine Artery Coiling
- Hysterectomy
C/S

- Hemorrhage
  - Uterine atony
  - Retained Placenta
  - Anticoagulation
  - Surgical inability to stop bleeding
  - Bladder/Bowel perforations
  - Uterine inversion
Post Partum

- Post Partum Hemorrhage
  - Retained placenta
  - Premies
  - May need to go to the OR for D&C
    - Use Epidural if still working
    - 24-72 hrs assume all the risks of active parturient patient
  - Anesthesia choices based on other risk factors
    - Full stomach
    - airway
    - No kiddo to worry about
    - How much blood has she actually lost
    - Look at pads

- Uterine atony
  - Same as discussed
  - Uterine artery coiling
  - Hysterctomy

- DIC
  - Post fetal demise
  - Amniotic Fluid Embolism
Post Partum

- Uterine Artery Rupture/Aneurysm
  - Coiling vs open surgery
  - Possible Hysterectomy

- Renal Artery Rupture/Aneurysm
  - Low incidence 0.015-1%
  - Occult blood loss with no evidence of PPH
  - Often missed on the DD
  - S/S or retroperitoneal bleed
  - Coiling vs Surgery
Post Partum

- Amniotic Fluid Embolism – during birth/immediatley post
  - Amniotic Fluid/Debris enters maternal blood flow
    - Mimics anaphylactic reaction
    - Shock
    - Pulmonary edema/PE/ARDS
    - Cardiac events
    - Sepsis
    - DIC

- Up to 50% death rate
  - Supportive measures
  - TX DIC
  - Echmo
Drug abuse

- Epidemic use of IVD
  - Heroin
  - Meth
  - Cocaine
    - Hep C, HIV, methadone, subutex
- Prescription Meds
  - Narcotics
- THC
  - Unpredictable pain control
  - Fetal issues – underweight, no prenatal care
    - Small placenta, abruptions, spont early birth
  - Long term issues with abuse
IN A NUTSHELL

Regional first

Labs

Blood products

Prep for GA

airway

Follow your gut
Questions?????