An Introduction to Obstetrical Emergencies

Charles D Giordano CRNA, MSN (Major USAFR)

My Background

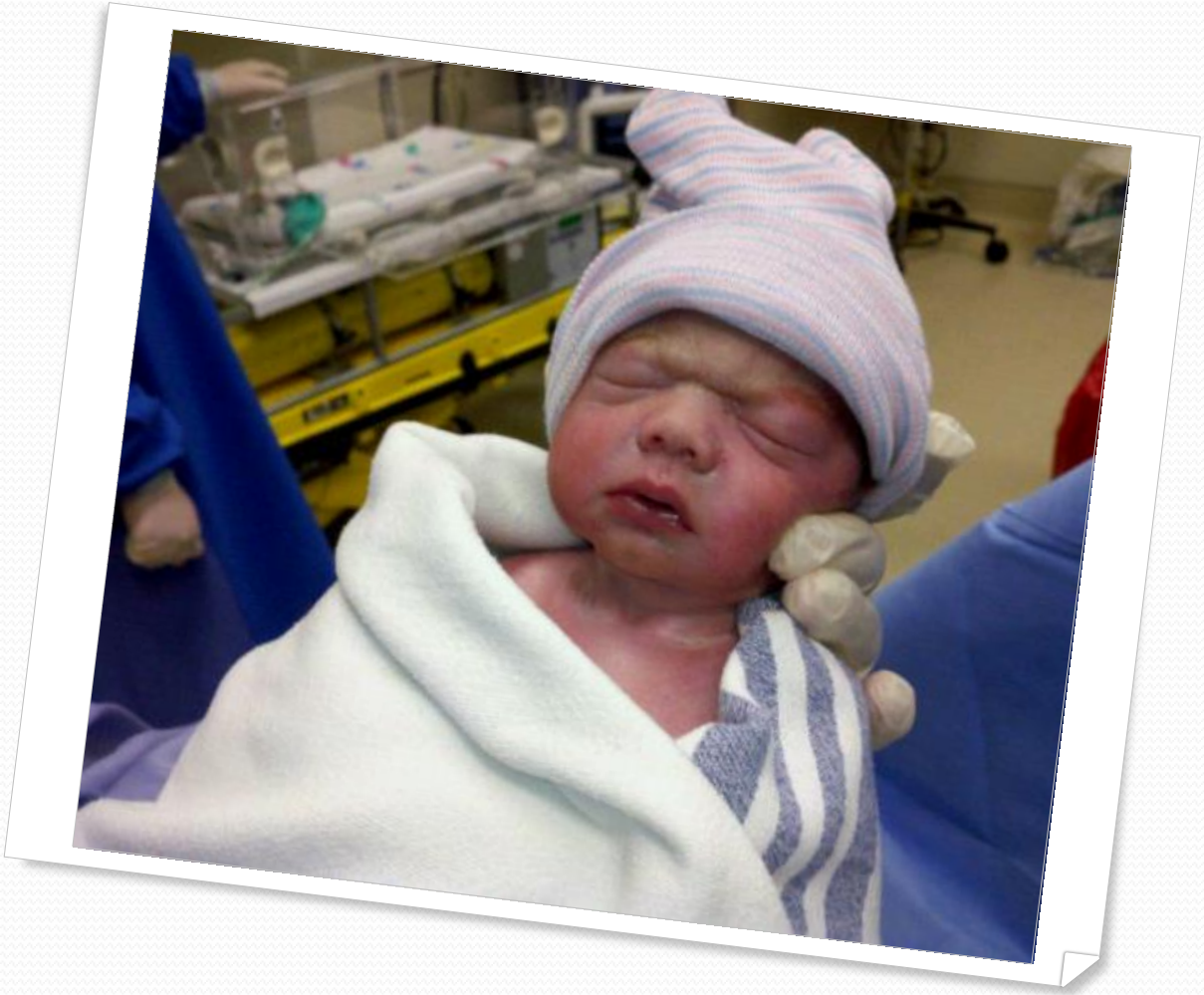
- One of the first few cadre's of CRNA's trained at University of Pittsburgh Nurse Anesthesia Program to be "allowed" to perform anesthetics on parturient patients beginning in 2006
- 2+ years of independent practice as a CRNA
- -***The Birthplace*** at Faxton St. Lukes Hospital in Utica NY
- -2000+ 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% bupivicane 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

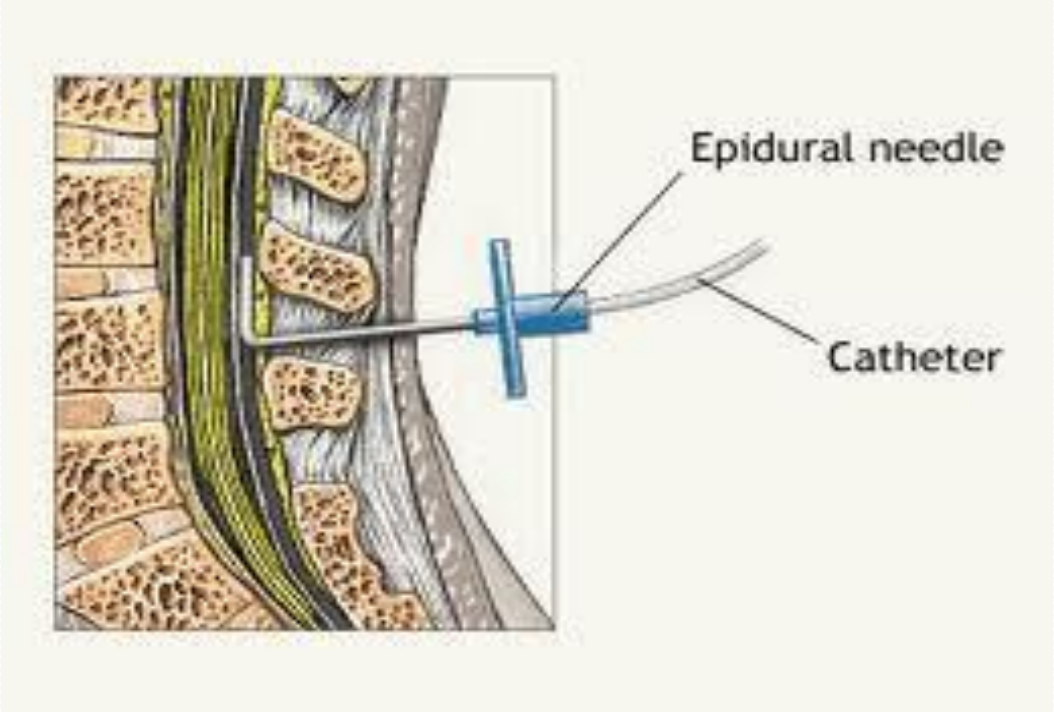
- Spinal Con't
  - Saddle block for Circlage
    - 1 CC 0.75% Bupivicaine +/- fentanyl
    - Keep seated for 2-5 minuets
  - Post partum repair of vaginal tear/episiotomy
    - 1st degree - vaginal mucosa and perineal skin
    - 2nd degree – subcutaneous tissue
    - 3rd – through rectum
    - 4th – 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

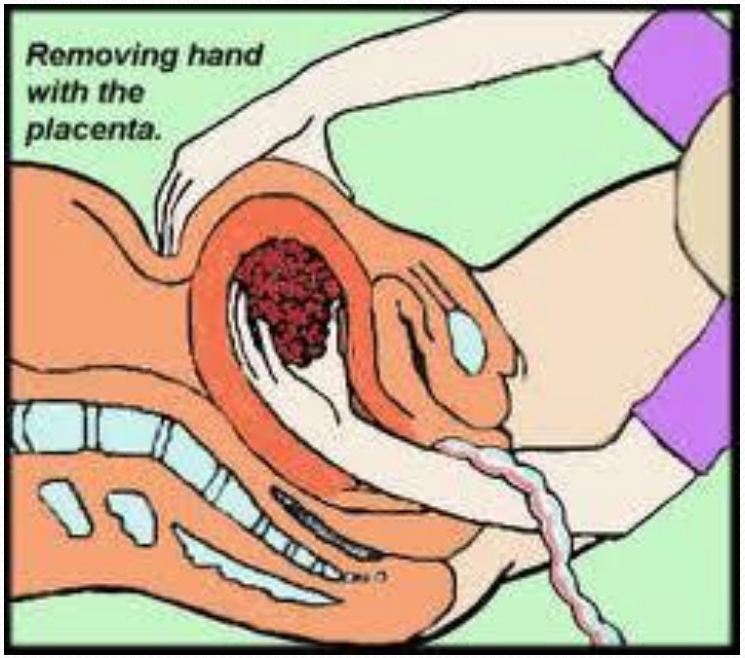
- Common dosing
  - Bupivicane 0.0625-0.125% infusion with 2mcs/cc fentanyl (cardiotoxic low concentrations safe)
  - Ropivicane 0.08-0.2% infusion with fentanyl (expensive)
- Bolusing for BT pain
  - Lidocaine 1-2% w/-w/o epinephrine 5-8cc
    - Shorter acting, stronger block, quicker onset
  - Bupivicane 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; preferrably 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

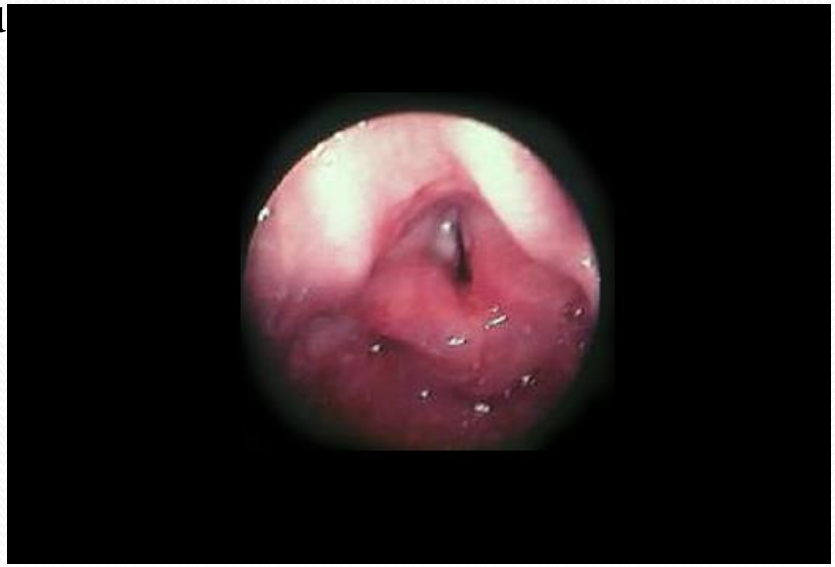
- 10-20 cc autologous blood inserted into the epidural space to decrease PDPH
- Epidural space found
- Blood drawn in a sterile fashion
- Inject in epidural space until patient is uncomfortable or 20cc
- May be done up to three times
  - Consider neurology consult with second attempt
- Conservative measures 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

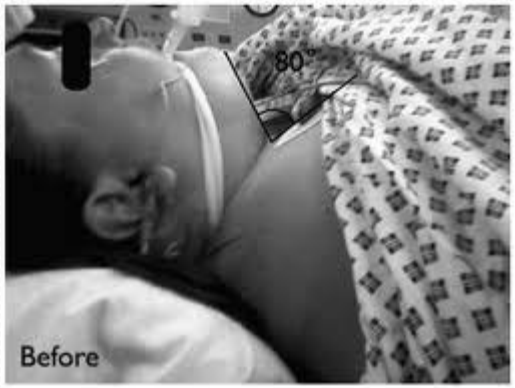
- General Anesthesia – the last resort
  - Airway Airway Airway
    - Body Habitus –
      - large tongue
      - redundant oropharyngeal tissu
      - Friability of tissue
      - Inability to align airway axis
      - Decrease in FRC
      - Full stomach
    - Fetal Depression
    - Maternal Bonding



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 $Mg^{2+} \Rightarrow \uparrow$ incidence of structural neurologic disease
- Associations: 1st pregnancy (primes) and multiparity, obesity, **extremes** of age, chronic HTN +/- chronic renal disease, abruption 6x more common

Pre-eclampsia

- Pathogenesis: vasoconstriction (thromboxane production) > vasodilation (prostocyclin, nitric oxide production)
- Pathophysiology - multisystem d/o
- **Neuro** - Sz, coma, visual disturbances, HA, hyper-excitability, 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 - $MgSO_4$, judicious use of fluid, anti HTN agents, expectant management with timely delivery, ***no* defasiculating 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
- $MgSO_4$ - 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, CaCl, dialysis
- Mg mechanisms of action:
  - Central anticonvulsant
  - Inhibits Ca^{2+} pre and postsynaptically
  - Peripheral vasodilatation
  - Potentiates all muscle relaxants

Pre-eclampsia Treatment

- **Hydralazine** - α1 blocker: arteriole > venule dilatation, ↓ SVR with ↑ HR and ↑ CO
- **Labetolol** - 1α:3β blocker:↓ SVR with Mod Dec. HR and ↑ CO
- **NTG** - converted to nitric oxide ⇒ **venous** dilation + ↓ preload, use non-absorbent tubing
- **NTP** - converted to nitric oxide ⇒ both **arterial + venous** dilatation: ↓ SVR + ↓ 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

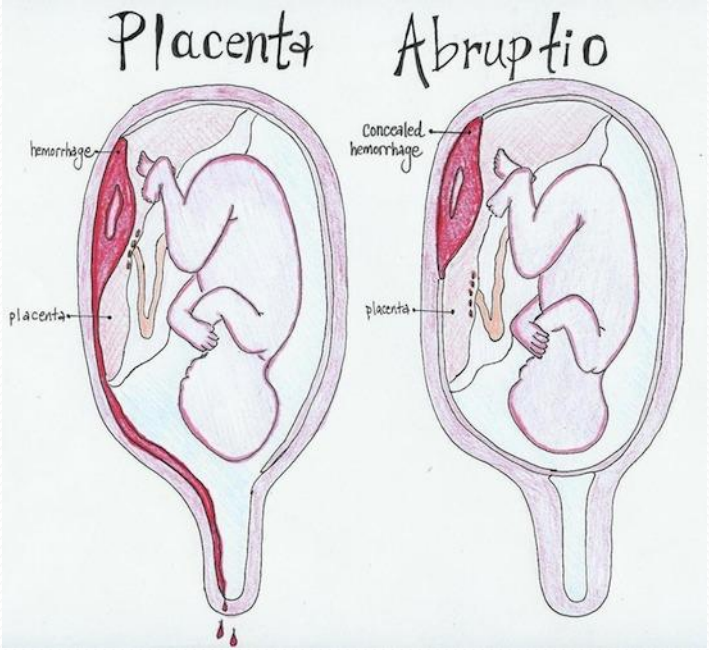
- **H** - hemolysis, hemolytic anemia, bilirubin > 1.2 mg/dl
- **EL** - ↑ liver enzymes: SGOT > 70 U/l, LDH > 600 U/l
- **LP** - low platelets < 100 K
- S/S - malaise, RUQ or epigastric pain, N/V, viral like syndrome
- HTN + Proteinuria may be absent
- Peak intensity **24-48 hrs** postpartum
- Usually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

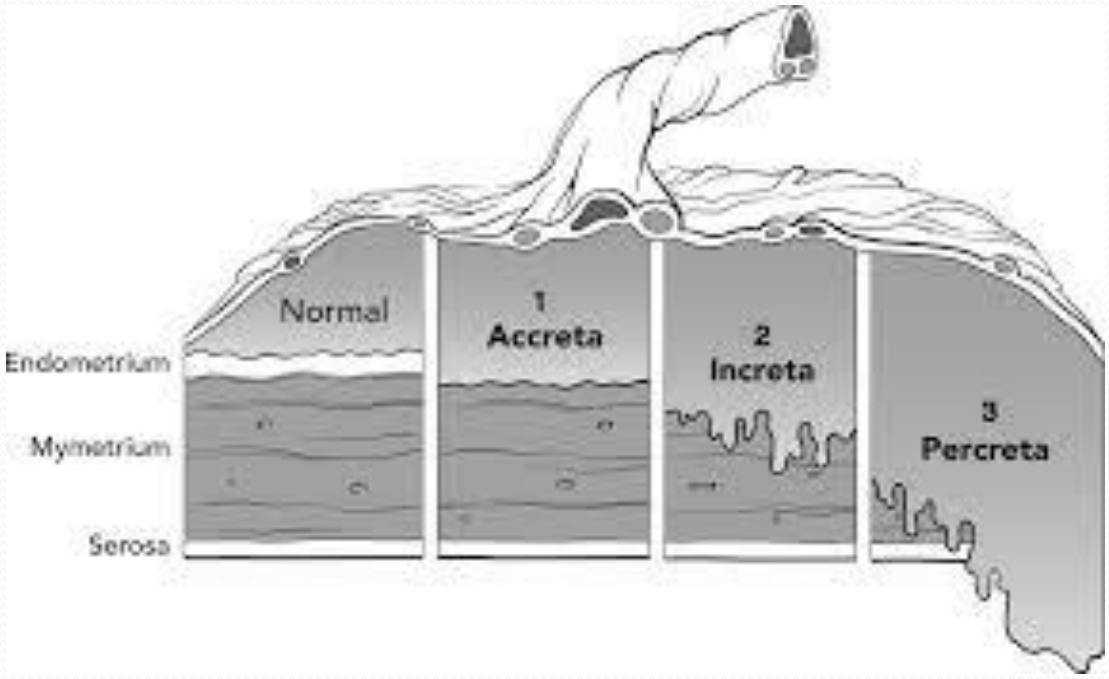
Partial Abruption

- 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

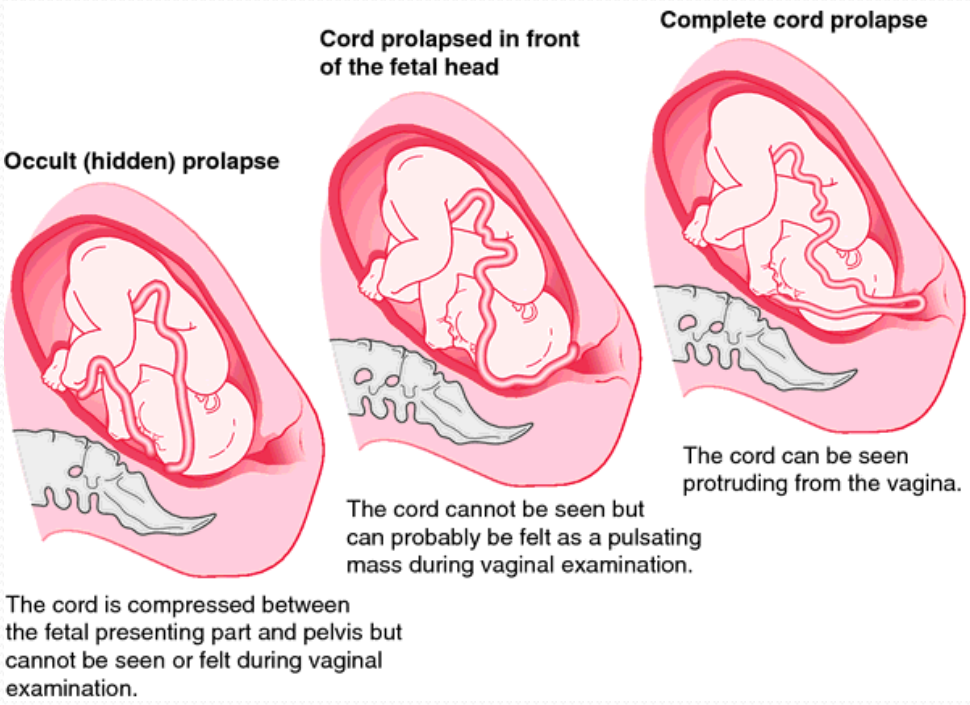
- LGA = Large for gestational age = Big Baby
  - Failure to progress
  - Long labor
  - Fetal distress, placental deterioration
    - C/S – usually not acute
      - US's lie – not our call
- Pelvic Incompatibility
  - Small pelvis + Big baby = C/S
    - Choose your mate wisely
- Intrauterine Growth 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

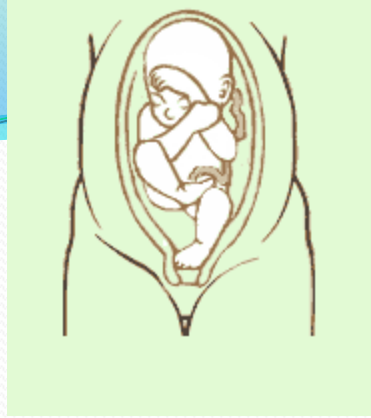
Intra-Partum or what goes wrong in the middle of the night and I have to go do stat/hurry up C/S

- 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

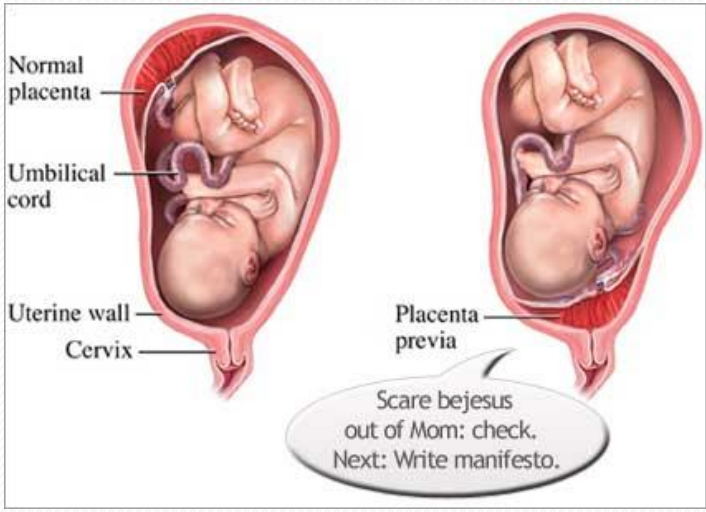
- Prolapsed cord
  - Umbilical cord is between the baby's head and across the cervical os
    - Limited BF to fetus – downward dog to OR with triage nurse attatched
- Abruption
  - Placenta actively tearing away from uterus
    - Time is of the essence
    - Mom can Bleed
    - Baby can bleed = pale 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

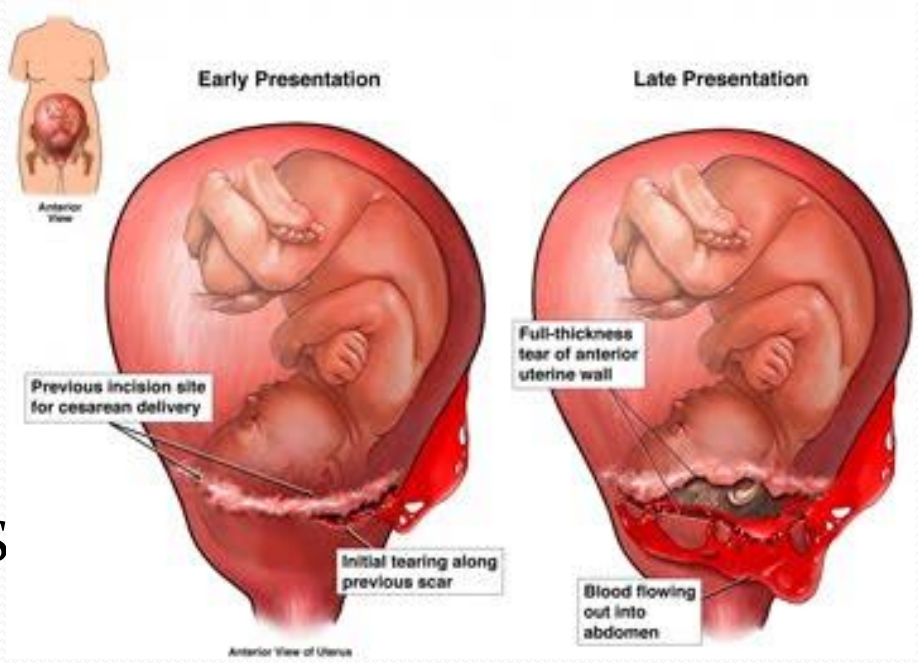


C/S

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

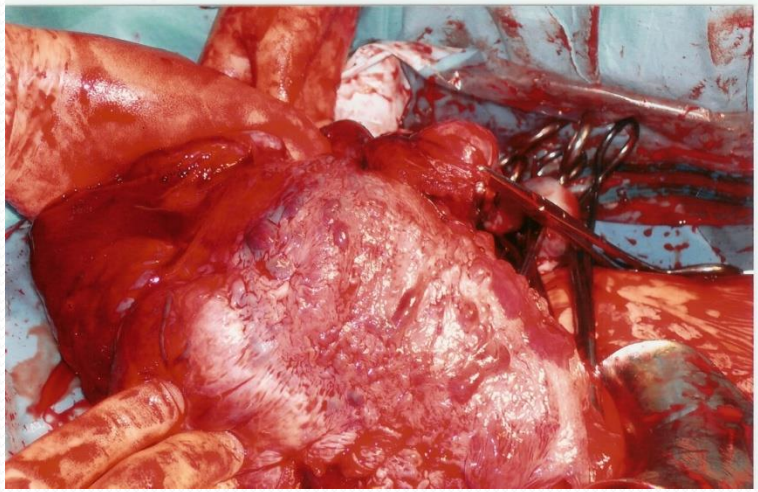
C/S – at a Glance

- 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

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

Post Partum

- Post Partum Hemmorrhage
  - 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 Hysterctomy
- 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?????