

Massachusetts General Hospital

(Compiled by R. Minehart, MD, MSHPEd; September 2020)

Obstetric Anesthesiology Guidelines

Obstetric anesthesia is an art as well as a science; please consider each case's uniqueness when making decisions.

Analgesia for Labor

Patient Preparation

Patient must have working IV. Check platelets and coags if indicated by history. Consider hydration with 500-1000cc crystalloid prior to placement. Have labor nurse present for procedure. Monitor BP, FHR during procedure as per protocol. ALWAYS place patient in left (or right) uterine displacement when supine. Record baseline and pre-induction vitals on anesthetic record. (Remember: desire T10-L1 coverage for first stage of labor, S2-S4 for second stage of labor.) **Attending should be present for placements. Family members should NOT be present unless there is a compelling reason why it is necessary for optimal care. (NB: Epidural carts must remain locked at all times. No drugs may be left on top of carts or in pt rooms. Combination: XXXXX)**

Technique: Epidural

Patient sitting or lateral, LOR to saline or air, avg. depth of epidural space is 3.3cm-6.5cm. Catheter threaded and kept at 3-5cm in the space. Number at skin = Depth to space + 3-5cm. Aspirate catheter. 3cc test dose of 1.5% lidocaine & 1:200,000 epinephrine, **confirm no intravascular placement** (incr. in SBP & HR 20%) **and no intrathecal placement** (leg numbness or motor block at ~5 min). Consider giving rest of 2cc 1.5% lido w/ epi to speed onset of block. +/-Mastisol. Tegaderm catheter, tape. Reposition patient—LUD. Solution: 0.0625% bupivacaine with 2mcg/cc fentanyl in 100cc bag. Consider giving 8cc solution as "clinician bolus" through PCEA pump (code: XXX), then start PIEB at "Epidural OB" settings). Complete labor anesthesia record in Epic, including OB Epidural orders. Check back with your patient for satisfactory analgesia.

—**IF WET TAP:** Don't panic! Consider threading catheter into spinal space, leave at 2-3cm in space, remove Weiss needle. Confirm backflow of CSF through catheter. Loop catheter, +/- mastisol, secure catheter. ALERT TEAM caring for patient that catheter is CONTINUOUS SPINAL CATHETER, and CLEARLY mark catheter, tubing, patient record, and epidural pump with "CAUTION" stickers. **Bolus catheter with labor spinal dose (bupivacaine 1.25-2.5mg +/- fentanyl 10-25mcg) or 1cc increments of the epidural mix.** Set pump at 1-3cc/hr continuous infusion (no PCEA option). Once patient is comfortable, inform her of spinal catheter placement and potential PDPH. Check patient often and assess level. **Place a spinal catheter sign on the door, above pump. Alert all team members caring for patient.**

If catheter d/n thread and pt has epidural, consider prophylactic EBP (5 hrs after d/c epidural mix, inject 20cc sterile blood through catheter after confirming catheter position).

Desired Labor Analgesia

Intense pain relief (patient may continue to feel pressure and be aware of contractions), usually within 20min. If onset >20min, evaluate other etiologies (e.g., advancing labor, poorly functioning catheter, full bladder, need for another bolus). Desired sensory level: T10 bilaterally.

Technique: CSE

In addition to the epidural kit, open a 25g-11.9cm Whitacre spinal needle onto the field AND slip-tip (non-luer lock) 3cc syringe. For low-dose labor spinal, use **bupivacaine 1.25-2.0mg +/- 10-25mcg fentanyl** (you can bolus epidural as usual, including test dose of only 3cc). For higher-dose labor spinal, can use 2.5mg bupivacaine +/- fentanyl, but do not use test dose.

Technique: CSE (continued):

Locate epidural space with 17g Weiss needle, pass spinal needle through Weiss needle (spinal needle passes dura usually before the needle hubs meet). Feel the "pop" as needle passes through dura. Firmly grasp both Weiss and hub of spinal needle before removing stylet to prevent movement of the spinal needle. Confirm backflow of CSF. Inject CSE mixture, remove spinal needle, thread epidural catheter through Weiss needle (3-5cm past skin insertion), +/- Benzoin, secure catheter. May use 3cc 1.5% lido test dose if lower doses of spinal. Use caution if bolusing the epidural if you have given >2.5mg bupivacaine—patient may get a sympathectomy and have hypotension. Analgesia should be within minutes, and spinal should last 45-90min. Make patient aware of change in sensation as spinal wears off and epidural analgesia sets in (epidural generally less dense). Set PIEB pump to standard settings (*see above*). **WATCH FOR FHR ABNORMALITIES** which should resolve (occur in up to 5% of CSEs!)

Technique: Labor Spinal

Usually reserved for multiparous women in whom delivery is imminent or in patients with previously instrumented backs (e.g. cervix fully dilated, anticipated delivery in <60min, Harrington rods in place in lumbar spine). Open spinal kit, use isobaric bupivacaine 1.25mg +/- 10-25mcg fentanyl. Dense analgesia, lasts approx. 45-90min. (In the case of serial labor spinal, the patient may seem to need them closer together as labor advances because of increasing pain relief requirements with progressive cervical dilation and delivery.)

Analgesia for Assisted Vaginal Delivery

1. Epidural in place

(NB: Forceps delivery requires more dense analgesia at a slightly higher level than does vacuum-assisted delivery—you need more relaxed perineum with outlet forceps delivery. Goal is to preserve the feeling of pressure and ability to push.)

Desire dense S2-S4 level. Bolus 5cc increments of 1.5-2% lidocaine with epinephrine (with 1cc bicarb per 10cc lidocaine). Onset of block: 5-8min. If quick onset needed or fetal distress present: 10-12cc of 3% 2-chloroprocaine (+/- 1cc bicarb per 10cc 3% 2-chloroprocaine). If lac repair, may use 5-10cc 2% lidocaine with epinephrine.

2. No analgesia in place

Obstetricians could do pudendal, or you could perform spinal in the **OR only** with 12mg hyperbaric bupivacaine + 10-25mcg fentanyl and 0.1-0.15mg Duramorph (if Cesarean delivery probable—keep in mind that if vac/forceps attempts take long & are unsuccessful, Cesarean delivery that follows may need to be done quickly!).

Troubleshooting Epidurals

****If the patient complains of pain, first assume there is a problem with epidural delivery of medication (not a problem with the patient).**** Potential factors include: areas of sparing "windows," lack of sacral block (sometimes because catheter is placed high lumbar/low thoracic), catheter displacement, pump failure, etc.

Inadequate Analgesia

1. Talk to patient, get more details
2. Test level bilaterally (specifically checking for "windows"), both ceiling AND floor (to test lowest sacral areas, ask patient how internal cervical checks have felt to her or how the Foley catheter feels, or test the posterior thigh); ice may be easier for patients to detect level differences. **The patient can have an adequate sensory level but still have ineffective visceral coverage, rendering her overall neuraxial labor analgesia inadequate.**
3. Check epidural catheter and tubing connections; check epidural insertion site for depth at the skin and compare to original record; make sure epidural pump is on and running

Troubleshooting Epidurals (continued):

4. Consider stage and progression of labor (pain relief requirements increase as labor progresses), whether bladder may be full or recently emptied, where the station of the baby is and the fetal head position (Occiput Posterior, Transverse, etc., all may have different pain sensation in labor than Occiput Anterior)

****If epidural does not appear to be functioning, CONSIDER EARLY REPLACEMENT in lieu of multiple boluses! Remember: labor pain only progresses, and you need to confirm early whether your epidural will be reliable for a Cesarean delivery if need be!****

Common agents used in bolusing (vol: 5-10cc, avg. 8cc):

- Bupivacaine 0.125% (made by diluting 0.25% with PF NS): This is slightly stronger than our mix; onset is ~10-20min, lasts 60-120min
- Bupivacaine 0.25%: Strongest bupiv used on labor floor, onset/duration same as 0.125%. Usually use smaller boluses (4-6cc instead of 7-10cc)
- Lidocaine 0.8-1% +/- epi, +/- bicarb (made by diluting 2% with PF NS): Slightly stronger than our mix; onset is between 5-10min, lasts 45-90min
- Lidocaine 2% +/- epi, +/- bicarb: What we use for surgery! Usually limited to forceps delivery. Onset 5-10min, lasts 45-90min.
- Lidocaine 1.5% + epi, +/- bicarb, +/- PF NS (~0.75% lidocaine)
- Fentanyl 50-100 mcg (can be diluted in 4-6 cc PF NS or in one of the other local anesthetics): **SHOULD ONLY BE GIVEN THROUGH PROPERLY PLACED AND WORKING EPIDURAL!** Helps with pressure sensation in perineum/rectum during pushing efforts. Remember this goes systemically, so repeat doses should be LIMITED. **DO NOT GIVE IF FETAL DISTRESS IS PRESENT** (will go to baby!).

Common scenarios:

1. Bilateral sensory level below T10 during first stage: consider that you need more volume, +/- stronger solution
2. Inadequate analgesia despite bilateral T10 levels: consider that the patient needs a higher concentration of local anesthetic
3. "Window" of inadequate analgesia: consider placing patient with "window" side down and giving a bolus; higher concentrations often help to "patch up" windows. Also **consider replacing epidural**
4. Unilateral block: many practitioners will pull catheter back 1-2cm (after checking depth of insertion; leave at least 3cm in space but no more than 5cm in space) prior to giving a bolus (though this is not clearly supported in the literature). These catheters especially need to be followed up; **consider early replacement** if no improvement
5. Persistent discomfort despite boluses/moving catheter: consider confounders (full bladder, advanced stage of labor), consider possibility of sacral sparing, **consider early replacement**
6. Inadequate sacral coverage: consider sitting patient up and giving bolus of stronger solution, **consider replacing epidural** if time; for "rectal pressure" sensation only, consider giving fentanyl as above (remember, some fentanyl goes systemically when given in the epidural space, so do not give if fetal distress is present or likely)

Hypotension

Definition: systolic BP less than 100 mmHg or less than 20% of patient's baseline BP.

- A. If maternal symptoms present: place in LUD, give IV boluses of phenylephrine 80mcg or ephedrine 10-15mg (notify nurse if giving pressors). Consider if vasovagal episode (consider atropine/glycopyrrholate or ephedrine if HR low)
- B. If fetal tracing is nonreassuring, but maternal BP is normal: give IV boluses of ephedrine 5mg (notify nurse if giving pressors) or phenylephrine 80-160mcg anyway since relative hypotension could still occur/uterine blood flow not autoregulated, aggressive LUD placement, check maternal sensory level, increase IV fluids
- C. **If persistent problems or unstable situation—call attending and get help!**

(NB: Epidural carts must remain locked at all times. No drugs may be left on top of carts or in pt rooms. Combination: XXXXX)

Cesarean Delivery (aka C/S)

Preop: 30cc Bicitra PO (usually given by nurse), Antibiotics given by us (Cefazolin 2gm IV; if PCN-allergic, Clindamycin 900mg + Gentamicin 5mg/kg.)

Intraop: T4 sensory level desired. Inform pt that feeling shortness of breath, touch/pulling/pressure, and N/V may be expected.

--Phenylephrine infusion: Common practice to begin this with neuraxial administration. Starting dose ranges according to hemodynamic goals.

--Oxytocin infusion: 30 units in 500cc NS. Start after cord clamp. Run until uterine tone improves (usually 500cc), then decrease rate (may cause hypotension, N/V). **This counts towards total IV fluid volumes.**

Postop: Postop pain options: (pick ONE route for neuraxial morphine)

a. Epidural PF morphine: **2mg** (range 2.5-5mg) given as discussed with attending, either given at beginning of case or after umbilical cord is clamped. Takes ~40min to begin to work.

b. Intrathecal PF morphine—given in spinal: **0.1-0.15mg** (solution drawn up separately in TB syringe, range 0.1-0.2mg)

—both above need post-op orders (Neuraxial Opioids PP) in Epic

c. IV PCA (usually reserved for GA cases; OB service to write the orders. We write orders if Epid/IT morphine has been already given)

d. Consider Ketorolac 30mg IV near/at end of case, discuss with attending and OB team (synergistic with Epid/IT opioids)

—Average total IV fluids given: 2 liters crystalloid

—Average C/S EBL: 800-1000cc (average vaginal delivery EBL: 200-500cc)

A. Elective Cesarean Delivery

1. If epidural: Dose with 2% lidocaine with epinephrine (1:200,000) + bicarb +/- 50-100mcg fentanyl (depending on fetal status—hold if nonreassuring)—dose in 5cc increments to 10-15cc. Check level. **If level not rising after 10cc—stop dosing, discuss with attending—may need to replace epidural.** If level rising, continue to total dose = 20-30cc; redose 1/4-1/3 of initial dose each 45 mins-1hr or sooner, if needed (do not need T4 level after uterus is back in abdomen). Give epidural PF morphine as above.

2. If spinal: 0.75% hyperbaric bupivacaine 1.6-1.8cc (adjust dose for height extremes, obesity, or multiple gestations after discussion with attending—this is controversial) + 10-25mcg fentanyl (+ 0.1-0.15mg PF morphine if not contraindicated)

3. If CSE: Spinal portion as above. **Quickly** thread epidural catheter to 4-5cm in epidural space, Tegaderm over site and **rapidly position patient in LUD** (to avoid hypotension). Test dose for epidural must be modified or delayed due to risk of causing a high spinal with epidural volume extension. May also incrementally dose (smaller-dose spinal, with slowly dosing epidural 2% lido w/ bicarb + epi).

B. Urgent Cesarean Delivery

1. If epidural: Dose with 2% lidocaine with epinephrine (1:200,000) + bicarb (1cc bicarb per 10cc lidocaine) +/- 50-100mcg fentanyl (one-time dose, diluted at least into a volume of 5cc)—dose lidocaine in 5cc increments (10-15cc total)—**if level not rising after 10cc given, DISCUSS WITH ATTENDING—may need to replace catheter;** total dose of 20-30cc; redose 1/4-1/3 of initial lidocaine dose every 45 mins-1hr or sooner prn (do not need T4 level after uterus is back in abdomen). Give epidural PF morphine as above.

-OR use 3% 2-chloroprocaine + bicarb (1cc bicarb per 10cc 2-chloroprocaine) +/- 50-100mcg fentanyl (one-time dose, diluted at least into a volume of 5cc)—dose in 5cc increments, up to 20cc; redose at 15-20min with 10-15cc 2% lidocaine + bicarb (1cc per 10cc lidocaine), then repeat the lidocaine dose every hr thereafter or prn. Watch for high level when giving large volumes of lidocaine on top of chloroprocaine (weakened hand grasp, patient unable to speak loudly, low tidal volumes using circuit to quantify). Give epidural PF morphine as above.

2. If spinal or CSE: Same as spinal or CSE for elective Cesarean delivery

C. Emergent Cesarean Delivery

1. GA

a. **CALL FOR HELP—requires multiple anesthesia and other providers (including NICU staff for fetal resuscitation)** Check airway, ask about problems with anesthesia, major medical conditions, medications, allergies, bleeding disorders, **CHECK FOR WORKING IV ACCESS**, Bicitra 30cc PO, Antibiotics if possible

b. Patient in LUD, monitors on, position patient properly (no fluffy pillows!) and **start to preoxygenate** while soothing patient, check FHR (unless not able to do so). **Communicate with OBs to coordinate timing of induction with prep/drape**

c. RSI with cricoid: 2-3mg/kg propofol (Unstable pts: use ketamine 1-1.5mg/kg or etomidate 0.3mg/kg), 1mg/kg succinylcholine IV. Intubate, check breath sounds, EtCO₂, **tell OB to “cut” once ETT is confirmed**—baby will be delivered within minutes!

d. Before delivery of baby: 100% O₂ **-or-** 50% O₂/50% N₂O, 1 MAC sevo, antibiotics if enough time. (Higher N₂O=lower Apgar scores)

e. After delivery: 30% O₂/70% N₂O, turn sevo down to 0.5 MAC or switch to propofol infusion with processed EEG monitoring and d/c sevo (higher doses of volatile agents interfere with uterine tone)

f. Consider midazolam 2mg IV, fentanyl 100-250mcg IV, start titrating in morphine (0.1mg/kg IV, or can give epidural PF morphine if epidural is present). Rarely need nondepolarizing NMB (and magnesium will potentiate!).

g. OG to empty stomach, give antiemetics (Ondansetron 4mg IV, Haloperidol 1mg, Dexamethasone 4mg); **always extubate awake**. Don't forget PCA, +/- TAP blocks if no neuraxial morphine given

2. Epidural in place and WORKING

3% 2-chloroprocaine + bicarb (1cc bicarb per 10cc 2-chloroprocaine), total dose of 20cc (give in two 10cc boluses), no need to check level between doses—redose at 15-20 min with 5-10ml 2% lidocaine + bicarb (1cc per 10cc lidocaine), then repeat the lidocaine dose every 45 mins-1 hr thereafter or prn (do not need T4 level after uterus is back in abdomen). Give epid PF morphine on schedule as discussed with attending.

Anesthesia for PPTL (aka PPS, aka BTL)

This is an urgent procedure, and can be done at the time of Cesarean delivery. If pts choose PPTL after vaginal birth, must be NPO as per ASA guidelines (e.g. light meal 6hr, fatty meal 8hr) and have waited 2 hours PP to ensure PPH is unlikely.

Existing epidural: Goal for total dosing and level is the same as for C/S. After inspecting epidural site, test epidural with 3cc of 1.5% lidocaine with epi. Then give additional 5-8ccs of 2% lidocaine with epi to confirm that block is not unilateral. Will likely need a total of 15-25cc 2% lidocaine with epi and bicarb or 3% 2-chloroprocaine + bicarb (1cc bicarb per 10cc 2-chloroprocaine) to T4 level. +/- Ketorolac 30mg IV. Consider epid PF morphine if pt admitted ~24hrs.

Spinal: Hyperbaric 0.75% bupivacaine 2cc (15mg) + 10mcg fentanyl. Desire T4 level. +/- Ketorolac 30mg IV. Consider IT PF morphine if pt admitted ~24 hrs.

Anesthesia for Cerclage Placement or Removal

Spinal: Cervix and perineum must be anesthetized (saddle block to T10 level). 1.2-2cc of 0.75% hyperbaric bupivacaine (more in early pregnancy, less in later) + 10-25mcg fentanyl vs. 45-60mg of 3% chloroprocaine. +/- ketorolac 30mg (ask atg/OBs, they may give indomethacin).

GA (rarely done): RSI with cricoid pressure if pregnancy >18wks EGA; propofol 1.5-2mg/kg IV, succinylcholine 1mg/kg IV. 1-2% sevoflurane in N₂O/O₂ or air/O₂. LMA if early pregnancy. Usually quick procedure. +/- Ketorolac 30mg (OBs may give indomethacin instead), +/- Ondansetron 4mg.

Pharmacologic Approach to Postpartum Hemorrhage

PPH definition: Clinically defined as excessive bleeding making the pt symptomatic.

Consider calling for Hemorrhage Huddle and calling Blood Bank (24346)

1. Oxytocin 30 units in 500cc NS IV (be very careful if using bolus doses of this); deaths have been reported with IV bolus doses of 10 units)

2. Methergine (Methylergonovine): 0.2mg **IM (not IV!)**—**relatively contraindicated in hypertension, repeat q2-4hrs, max 5 doses**

3. Hemabate (Carboprost, Prostaglandin F_{2α}): 0.25mg **IM (not IV!)**—**contraindicated in asthmatics, may cause some hypo- or hypertension, repeat q15-90min, max dose 2mg (8 doses)**

4. Cytotec (Misoprostol, Prostaglandin E₁): 1000mcg given PR by nurse — **can be given to pts with both HTN and asthma but not very effective** (recent evidence against its use)

[CALL FOR 4u Emergency-Release O negative PRBCs, also 6u PRBCs/6u FFP/1 dose platelets, consider early cryo, BELMONT, consider TXA 1gm over 10 min]

Uterine Relaxation

(during C/S, delivery of 2nd twin, uterine inversion, retained placenta)

IV nitroglycerin, titrate to effect & maternal BP in **80-160mcg** increments (usual dose 50-250mcg)—needs to be diluted from original vial (400mcg/cc), **give 80-160mcg phenylephrine to combat hypotension**

[Infrequently used: Sublingual nitroglycerin tablets, 1-2 tabs (300-400 mcg per tablet) or inhalational gases (requires **2-3 MAC and ETT** intubation)]

D&C, D&E for Retained Products

If unstable hemodynamics, or after delivery: large bore IV access, T&S, consider T&C (minimum 2 units PRBCs), Bicitra 30cc PO, volume resuscitate. **If molar pregnancy, need CBC/T&C ≥2 units PRBCs, large-bore IV access.**

1) MAC/paracervical block: Most commonly used in 1st trimester. Obstetricians place paracervical blocks. Consider fentanyl, midazolam +/- propofol infusion +/- ketorolac 30mg if pt NPO. Remifentanyl infusion 0.05-0.1mcg/kg/min may be used instead of fentanyl.

2) Existing epidural (only if HD stable): 10-15cc 2% lidocaine with epi and bicarb in 5cc boluses. Or 10-15cc 3% 2-chloroprocaine + bicarb (1cc bicarb per 10cc 2-chloroprocaine) to T10 level. Consider ketorolac 30mg

3) Spinal (only if HD stable): 7.5-10mg of hyperbaric bupivacaine + fentanyl 10-25mcg. Consider ketorolac 30mg

4) GA (especially if HD unstable): RSI with cricoid pressure; propofol 2-3mg/kg IV (or etomidate 0.3mg/kg or ketamine 1-1.5mg/kg if patient hypovolemic), succinylcholine 1mg/kg IV. Maintenance of 100% FiO₂ with roughly 2-3 MAC of inhalational agent until uterus evacuated, then decrease inhalational agent to 0.25 MAC in 50% O₂/50% N₂O. Consider antiemetics and ketorolac 30mg

Blood Patch for PDPH

Usually best performed with 2 people; pt needs IV, nursing afterwards to monitor, +/- fentanyl/midazolam sedation, monitor BP and pulse oximetry. One provider accesses epidural space, second sterilely draws 20-30cc pt's own blood, which is injected sterilely and slowly through epidural needle. Pt feeling pressure sensation is normal, but **paresthesias** and/or **severe back pain ARE NOT** (and require injection to STOP!) Have pt lie down 1hr, d/c if stable with instructions to call Blake 14 if worsening pain/fevers/etc. It is not uncommon for pt to have mild residual headache or back discomfort. *Consider prophylactic EBP through catheter, 5 hrs after last dose of local anesthetic.*

Phone Numbers (Patients should call Blake 14 Labor Desk)

OB Anes Office: phone XX
OB Anes Attending call room: phone XX
OB Anes Backup Resident pager: pager XX
Labor Floor (Blake 14) Desk: phone XX
Post- and Antepartum Floors: Blake 13 phone XX or
Ellison 13 phone XX

**Emergency paging operator: XX for:
RICU, Emergency Surgical Airway, OB Code Pager**