Episode 53: Analgesia for C-section with Mike Hofkamp

On this episode: Dr. Jed Wolpaw With Dr. Mike Hofkamp

In this episode, episode 53, I welcome back Dr. Mike Hofkamp to discuss analgesia for cesarean delivery. We discuss indications for C-section, urgent and emergent sections, anesthetic techniques and associated complications, how to approach the difficult airway in a pregnant patient, and aspiration prophylaxis.

References to the articles discussed are here: References

Questions & Notes

Hyperlinks to section of notes.

WHAT ARE THE INDICATIONS FOR URGENT CESAREAN SECTION?

Maternal factors

Fetal factors

WHAT MAKES C-SECTION URGENT VS EMERGENT?

GOALS OF LABOR ANALGESIA?

Options?

WHY SPINALS FAIL?

HOW TO DOSE SPINALS?

ADDITIVES TO SPINALS?

PEARL FOR SINGLE SHOT SPINAL AND LOTS OF SUBCUTANEOUS TISSUE

ALGORITHM IF EPIDURAL BOLUS NOT ADEQUATE

HOW TO USE EPIDURAL FOR C-SECTION?

WHEN EPIDURAL PREFERRED OVER SPINAL?

WHAT PREDICTS SUCCESS OF EPIDURAL FOR C-SECTION?

WHAT ARE RISKS OF GA?

TECHNIQUE FOR GA?

HOW TO MANAGE DIFFICULT AIRWAY?

WHAT TO DO TO TREAT HYPOTENSION WITH HIGH SPINAL?

ASPIRATION PROPHYLAXIS?

What are the indications for urgent cesarean section?

Maternal factors

1:52

- Failure to progress (FTP) ~34%
- Diameter of maternal pelvis
- Force of contractions (we can control w/ oxytocin)
- Mitigated by delivery of fetus
  - Preeclampsia
  - HELLP
- Repeat c-section
  - TOLAC or VBAC risks dehiscence of scar → uterine rupture
  - Twins+

Fetal factors

7:35

- Size of fetal occiput
  - Macrosomia
- Breech
- Atul Gawande – Better:
  - Craft vs industry.
  - Deliver baby w forceps = craft.
    - Skillset of individual provider.
  - Anyone can do c-section, constantly = industry.
  - Moving towards standardizing medicine, focus on common denominator, which is the c-section.
  - Seeing higher rates of c-section because guaranteeing higher quality than with a craft
- Non-reassuring fetal heart rate. Subjective, but 23% of indication
- Persistent fetal brady down to 60s– not specific cutoff for time

What makes c-section urgent vs emergent?

11:59

- Urgent = within hour.
- Eye of beholder.
- Non-reassuring FHR, FTP. Gives time for spinal or additional epidural

17:10

- Technique: time to prep, likely use regional.
- Emergent = ASAP. National standard of care.
  - Decision to cut time = <=30 min. really to give leeway to be standardized nationally. Vs local standards can be much shorter

Goals of labor analgesia?

18:19

- In labor:

    - take away sensory pain while retaining as much motor as possible to push out baby.
- In OR:
    - major intrabdominal operation. Also want to take motor away to relax musculature

Options?

19:52

- "Worst" = local, theoretical, not preferred

21:32

- Single-shot spinal: eye of needle into intrathecal space.
- Failure rate 1-3%, some studies quote 10%

Why spinals fail?

22:59

- False return of CSF from local injection

How to dose spinals?

24:49

- Dose: One study shows spinal dosing based on height and weight
- Research showing no diff between 1.6cc or 1.8cc in conversion rate to GA.
- Pushback about lower dose because trainees operate → sections lasting longer
- Academic settings may benefit from higher dose, but in private setting may benefit from ht/wt scale

Additives to spinals?

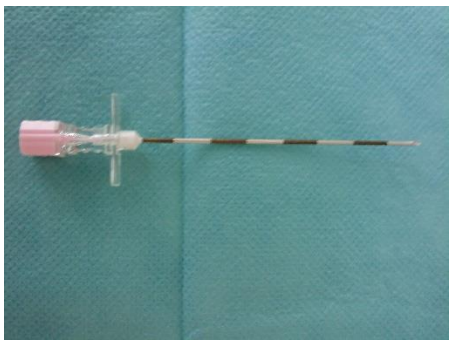
27:50

- Fentanyl and morphine work on substantia gelatinosa. Adds synergy to block
- Fentanyl effects during section
- Morphine for postop pain
- Epinephrine = mixed evidence. No harm..
- "Urban legend pearl" from study that washed syringe with epi. That showed.
- Some studies show 200mcg epi

Pearl for single shot spinal and lots of subcutaneous tissue

30:25

- If lots of subcutaneous tissue, continuous spinal epidural technique
- Touhy as introducer unlike skinnier pts who have adequate depth to use shorter introducer.

- 
- Spinal needles are flimsy. Don't walk off bone.
- If you have trouble, use Touhy needle until CSF, then use spinal needle

Algorithm if epidural bolus not adequate

32:42

- If epidural bolus not adequate, don't do spinal after because higher risk of high spinal
- Basic algorithm: epidural → c-section.
- First question: is epidural working?
  - Yes: 2% lido.
    - If loading not adequate, then unsafe to place spinal.
  - If epidural not working, and not fully loaded
    - if reasonable airway
      - Reasonable to do SSS because risking high spinal with this technique
    - If difficult airway
      - Try epidural but prepared for difficult airway.

How to use epidural for c-section?

35:48

- First check level of epidural.
- Think of epidural as glass of cola. Epidural is half-cup of diet coke. If going to c-s, want empty space as concentrated as possible. Fill rest with coke. Result is a blend in between. Not quite coke or diet coke. All this to say, difficult to achieve adequate labor analgesic .
- How successful? If working epidural and concentrated lido, > 90% success

When epidural preferred over spinal?

37:50

- Epidural primarily instead of spinal? Rarely.
- Epidural relies on normal anatomy for spread
- Spinal avoids arising issues by going directly to intrathecal space
- When better for epidural?
  - Slow steady ramp up for GA, eg subaortic stenosis, where you want to prevent SVR dropping quickly, thus preventing extremes. Can also re-dose epidural if prolonged procedure.
- But you can also do this with CSE

What predicts success of epidural for c-section?

40:01

- 3 things determine whether epidural for c-section succeed
    - 1: number of boluses predict failure
    - 2: urgency of c-s. more urgency predicts failure
    - 3: non-obstetric anesthesiologists providing care
        - Are generalists worse at neuraxial than specialists?
        - Generalists covering OB may have less situational awareness than specialists
        - Younger anesthesiologists more hesitant to do GA

What are risks of GA?

46:10

- Less complications from regional if done well.
- Hopkins study in 70s or 80s showed GA mortality rate to regional = 16.7.
- Brigham and Women's rate was 7.2% in 70s → 3.6% in 95 → <1% in 2005

49:17

- Video laryngoscopy decreased airway complication rates

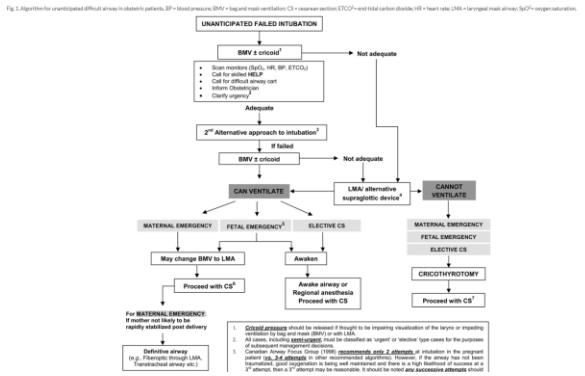
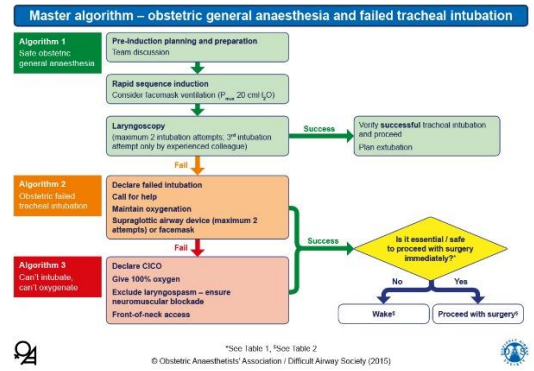
Technique for GA?

50:07

- Optimize O2 to fetus. Preoxygenate. Minimize fetal exposure.
- Induce w/ propofol and succinylcholine. Avoid opioids
- Want OB to hold off cutting until after securing airway.
- Prior to delivery:
    - 0.5MAC nitrous + 0.5MAC volatile to ↓ fetal exposure to volatile
- After delivery:
    - same but for different reasons: Want to minimize volatile effect on uterus (which relaxes) – desire uterus to clamp down

How to manage difficult airway?

52:28

American Society of Anesthesiologists	Difficult Airway Society
	

- ASA: Nasal oxygenation w hi-flow nasal prong.
- Limit intubation to 2 attempts
- DAS: early use of intubating LMA

What to do to treat hypotension with high spinal?

54:45

- Traditionally:
  - Preloading fluids but only ¼ stays in intravascular space
- Now:
  - Co-loading where you infuse wide open simultaneously
- Evidence?
  - Not statistically significant, and instead should use vasopressors
- Early studies showed phenylephrine in sheep caused uteroplacental insufficiency. Ephedrine was preferentially used.
- Later found to cause fetal tachycardia and acidosis. Humans, phenylephrine NOT shown to cause uteroplacental insufficiency, used for FHR>60. Ephedrine for <60
- Newer evidence: low dose norepinephrine because ↑ cardiac output with perfusion pressure

Aspiration prophylaxis?

58:08

- Per ASA guidelines
- Elective:
  - tubal ligation or repeat CS.
  - 2hrs clears. 6-8 solids.
- Non-elective case and not appropriately NPO?
  - Negotiation
- Guidelines:
  - H2-blocker to ↑ pH
  - Metoclopramide for gastric prokinetic
  - Non-particulate antacid (Bicitra) to directly raise pH of gastric contents

How do you do anesthesia for urgent/emergent cesarean sections? Differences from this episode?