Episode 54: Term Pregnancy Part 1

On this episode: Dr. Jed Wolpaw With Dr. Jacqueline Galvan

In this episode, episode 54, I welcome back Dr. Jacqueline Galvan and we discuss complications and physiology of term pregnancy. This is part 1 of a 2 part series.

Part 2

Questions & Notes

Hyperlinks to section of notes.

Pathophysiology of preeclampsia

Prophylaxis for preeclampsia?

How to approach preeclampsia?

HELLP syndrome

Eclampsia management

HELLP management

Preeclampsia management

How to treat high blood pressure in preeclampsia?

MATERNAL HYPOTENSION

When most commonly seen?

Management?

When is aortocaval compression most concerning?

APPROACH TO GASTRIC CONTENT ASPIRATION PROPHYLAXIS?

PREGNANT WITH HISTORY OF C-SECTION

What can we do?

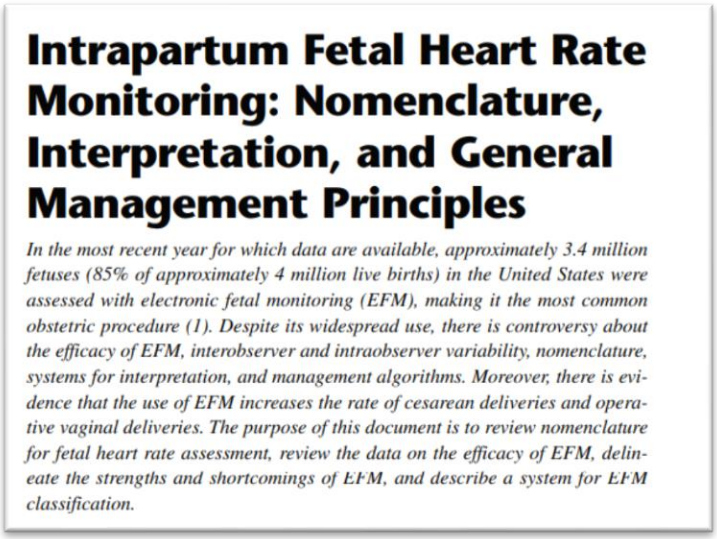
CONSIDERATIONS FOR MULTIPLE GESTATION?

TAKE HOME POINTS

What are some maternal problems during term pregnancy?

1:04

- Importance of fetal assessment
- Closed claims:
    - Lots of neonatal injury occur during urgent/emergent situations
- We may not fully understand what OB talking about or what terminology means → suboptimal anesthetic technique
- 2009: American College of Obstetricians and Gynecologists (ACOG) fetal heart rate monitoring to help w/ timely assessments



Intrapartum Fetal Heart Rate Monitoring: Nomenclature, Interpretation, and General Management Principles

In the most recent year for which data are available, approximately 3.4 million fetuses (85% of approximately 4 million live births) in the United States were assessed with electronic fetal monitoring (EFM), making it the most common obstetric procedure (1). Despite its widespread use, there is controversy about the efficacy of EFM, interobserver and intraobserver variability, nomenclature, systems for interpretation, and management algorithms. Moreover, there is evidence that the use of EFM increases the rate of cesarean deliveries and operative vaginal deliveries. The purpose of this document is to review nomenclature for fetal heart rate assessment, review the data on the efficacy of EFM, delineate the strengths and shortcomings of EFM, and describe a system for EFM classification.

    -
- Red flags
    - Moms w/ cyanotic heart disease, Lupus, DM, HTN
- Acquired during pregnancy
    - Oligohydramnios, polyhydramnios

External fetal heart tone monitoring

3:32

- Doesn't correlate w fetal outcomes like Apgar or pH or cerebral palsy
- But only thing we have to make decisions
- Example: tool to detect fetal acidemia sensitivity is only 26%

Fetal heart rate (FHR) Categories

5:01

- Cat 1 = best, most reassuring
- Cat 2 = gray area.
- Cat 3 = baby not doing well. Moving towards delivery, likely involve anesthesia

Basics of FHR

6:03

- Should be 110-160 bpm

- Baby stress → parasympathetic take over → fetal bradycardia
- Should show good variability, fetal movement

FHR tracings

6:34

- Early deceleration: normal, intact fetal neurologic activity
- Late: uteroplacental insufficiency
- Variable: not correlate = cord compress
- **Mnemonic**: same order as baby comes out
    - Early: head
    - Variable: cord
    - Late: placenta

What do we do with fetal assessments?

8:03

- Non-reassuring heart tone, or Cat 2:
    - Go see patient.
        - Airway? Need backup equipment?
        - Access?
    - Early epidural where appropriate.
    - Avoid hypotension or swings in hemodynamics
- ACOG recommends monitor tones before/after neuraxial
- If epidural placed and not reassuring tracing, assess epidural to use
- Communicate with OB/nurses to facilitate planning

How much should trainees understand the tracings?

11:17

- Should be able to talk w OB providers about the tracings, what they're worried about, plans
- Also comes up on board exams!

Preterm labor and viable birth

12:13

- Preterm = before 37wks gestation
    - More likely to have preterm deliveries
    - Resp distress
    - Intraventricular hemorrhage
- Viable = 24-25wks
- Risk factors
    - Intrauterine infection
    - Distension like multiple infants

What to anticipate for preterm labor?

13:02

- What is delivery plan?
- Stay 24 hrs w steroids?
- Floor and deliver?
- Position of fetus because can determine direct to OR
- Early delivery (24-25 wks)
    - OB may elect for classical vertical incision for C/s = more bleeding for mom
        - Lower uterine segment not fully developed at this time
        - Can also pertain to fetal position

Role of steroids in preterm labor?

14:18

- Steroids → stimulate lung maturity if given for 48 hrs
- Effective during 24wks to 34 wks gestation
- Also
    - Tocolysis
    - Magnesium for neuroprotection

Anesthesia for cerclage?

15:50

- Low volume spinal
- IVGA or MAC
- Stitch through cervix to hold it close

General assessment for preterm?

16:16

- NPO?
- Fetal lie

Long term approach for preterm labor?

17:06

- Cerclage
- Tocolytic agent

Tocolytics

17:26

Terbutaline side effects?

- Beta agonist
    - Pulmonary edema
    - Hypotension
    - Tachycardia
    - hyperkalemia
    - hyperglycemia
- Also nifedipine
- Magnesium is NOT tocolytic
    - For neuroprotection

Other practical tips for preterm labor?

18:30

- Know management plan, NPO status, fetal lie
- Easy to brush off patient admitted for observation.
    - Make sure to assess patient in event of going to OR

Definition of maternal fever?

19:27

- Definition varies!
- Mechanism:
    - Mismatch b/w maternal heat production and dissipation
    - Shift in thermoregulatory mechanism
    - Non-sterile inflammatory state w/ IL-6 or IL-8
    - Actual infection, eg chorioamnionitis, pneumonia, pyelonephritis

If little fever is normal, when to worry about it?

20:38

- Literature shows association between labor epidural analgesia and maternal fever
    - Yes association. Not necessarily causation
- Women who have dysfunctional labor (large infants, pelvic disproportions, maternal obesity, long induction of labor, unfavorable cervix --- all clues to possible maternal fever) more likely to ask for epidural analgesia
    - Self-selecting into this group
    - Leads to unnecessary antibiotics, instrumentation, procedures that all increase risk of maternal fever

Common maternal infections?

Chorioamnionitis

23:10

- Infection of endometrial cavity.
- Presentation
    - Maternal fever
    - New onset maternal tachycardia, fetal tachycardia
    - Uterine tenderness
    - Foul smelling discharge
- Prolonged labor of open passage increases risk of infection
- Consequences
    - Preterm labor, placental abruption, uterine atony
    - Cerebral palsy
- Tx
    - Antibiotics
- Note that placenta will be more acidic so some drugs not as effective
- Add bicarb to lidocaine
- Consider chloroprocaine because very lipophilic

- Make sure epidural works so don't need GA

Pyelonephritis

25:28

- Kidneys displaced by uterus so predisposed to stones
- Also
  - Respiratory tract infections
  - Postpartum infection related to surgical site infection

How does pregnancy affect diagnosis of sepsis?

26:11

- SIRS criteria may not be applicable to pregnant patients
  - Expect some degree of tachycardia in moms, low BP, ↑ WBC
- Needs more development
- QSOFA
  - Only 1/3 applicable
    - Altered mental status
    - not hypotension or tachypnea

What do we do instead?

28:08

- Identify patients at risk
- Be aware of change from baseline
- Be part of care

If we don't have great way to differentiate, still place epidural w/ fever?

28:59

- Bacterial meningitis from epidural placement risk is extremely low
- Be aware of active infection
- During timeout before epidural, address any active infection, temperature
- If florid sepsis, neuraxial probably not good idea

Epidural and herpes?

30:14

- Some literature reports association of reactivation with morphine, but still standard of care for postop analgesia after c-section

Maternal hypertension

31:00

- Maternal hypertensive disorders are associated with maternal death
- Preeclampsia = new onset HTN after 20 wks gestation
- Before = probably chronic HTN
- Gestational = latter, 35-37 wks gestation without evidence of organ damage

- Preeclampsia – don't need proteinuria any more
- Risks:
    - History, young maternal age, primiparity,
    - Lupus, antiphospholipid syndrome, HTN, DM, multiparity
- Gestational vs preeclampsia?
    - 140/90 or severe 160/110

Pathophysiology of preeclampsia

33:32

- Theories
    - Fetal growth → maternal decidua and spiral arteries that feed placenta. The formative cells contribute to hypoxia of placenta → inflame response misaligned w placental perfusion → abnormal vascular remodeling and endothelial disfunction
        - Systemically, uteroplacental insufficiency and preeclampsia
    - Mother has dysfunctional endothelial contributes to abnormal placental development
    - Placenta not getting enough blood → ↑ maternal BP to get more

Prophylaxis for preeclampsia?

35:34

- Aspirin affecting prostaglandins → endothelial cells
- Less evidence based: calcium, supplements, antioxidants
- High risk, eg lupus encouraged to take aspirin
- Keep comorbidities under control

How to approach preeclampsia?

36:54

- Top down:
    - Airway
    - Pulmonary edema, O2 saturation
    - Cardiovascular
        - HTN, SVR↑
    - Heme
        - Thrombocytopenia, DIC, HELLP
    - Renal:
        - Proteinuria, oliguria
    - Fetus:
        - Compromised/↓ uteroplacental flow

HELLP syndrome

38:05

- **H**emolysis, **E**levated **L**iver enzymes, **L**ow **P**latelets
    - these are severe features
- ↑ pressures, spectrum of dysfunction after 20 wks w/ preeclampsia and severe features
- Need delivery
- Diagnosis of preeclampsia w/ severe features

Eclampsia management

39:42

- Secure airway, supplementary O2
- Prevent injury, access, monitors
- Midazolam to break seizures
- Magnesium

HELLP management

40:12

- Rarely gets to point where we can't offer anesthesia
- If catch early enough to not deteriorate
- T&S, cryoprecipitate/platelets PRN
- Platelets at 100,000 and not spontaneously oozing blood at mucous membranes, yes epidural
- Even low as 70-75,000, but lower consider TEG

Preeclampsia management

42:03

- Core principle:
    - Control HTN
- Seizure prophylaxis w/ mag
- Delivery plan
- Airway plan w/ backup
- Hemodynamics: NIBP should be fine
- POC transthoracic echocardiogram
    - ↑ LV mass, diastolic dysfunction
    - Pericardial effusion
    - Shares spectrum with peripartum cardiomyopathy!
- Fluid mgt
    - Fluid restriction to ↓ pulmonary edema
    - ↓ oncotic pressure and leaky vessels
- Epidural if possible
- If GA, avoid hypotension
    - Use video laryngoscope to maximize success
    - Remifentanil or esmolol could be useful to blunt sympathetic response
- Preeclampsia w/ severe features have less significant drop in BP with spinals
- 2013 guidelines suggest magnesium be continued throughout perioperative period
- Institution: 2x IVs, one for maintenance Mag

How to treat high blood pressure in preeclampsia?

45:26

- Treat BP within 60 minutes, 30 if possible. Especially > 160/110
    - Hydralazine/labetalol first line
    - No IV? Oral nifedipine (10mg) without waiting
- California Maternal Quality Care Collaborative preeclampsia toolkit to help establish protocol

Maternal hypotension

46:24

When most commonly seen?

- When patient is supine as **Aortocaval compression**, described decades ago
  - One article from 1953
- After 20 weeks, gravid uterus compresses IVC → ↓ preload → ↓ cardiac output → hypotensive response

Management?

- Tilt up 15° though studies show not as effective as we think.
- 2017 RCT published in Anesthesiology looked at fetal acid/base status in moms tilted or not in elective sections. No difference.
- 2 MRIs studies looked at IVC volume on tilt, with no change. needed 30° to get some increase, which is not clinically feasible.
- LUD may not be clinically accurate

When is aortocaval compression most concerning?

48:58

- Maternal cardiac arrest
- SOAP and AHA: consensus statement that in maternal cardiac arrest, recommends LUD by push/pull, NOT tilting because may affect chest compressions
- Not necessary to always do LUD as long as maternal hemodynamics are stable (eg phenylephrine infusion and fluids)

Approach to gastric content aspiration prophylaxis?

51:44

- After 20 wks or sometime in second trimester, mechanical movement of LES displaced + relaxation by progesterone ↑ risk of gastric content aspiration.
- Elective non-obstetric procedures (lap appy) should get regimen
  - H2-blocker
  - Metoclopramide
  - Non-particulate antacid (Bicitra)
- ASA and ACOG
  - Low risk of going to OR can have small amount of clears
  - Prior to elective c/s, moms can have clears until 2 hrs
- If ↑ risk of aspiration (morbid obese, DM, known/potential difficult airway, cat 2/3) probably should be NPO
- If not increased risk factors, don't need to give Bicitra routinely

Pregnant with history of c-section

55:07

- TOLAC –trying to have vaginal delivery after c-section
- VDAC – successfully completed TOLAC
- Need to know previous uterine scar

    - Vertical/classical = right to OR
    - Low transverse/Pfannenstiel = can TOLAC
- Risk of rupture is 1%

What can we do?

- Timely epidural
- Low density epidurals will not mask signs of uterine rupture
    - Described as “pain above and beyond” what epidural covers
    - Deterioration of fetal heart tones
    - Recession of fetal parts (Station 0 → -3)

Considerations for multiple gestation?

59:02

- Neuraxial is helpful
- May be vertex-vertex but emergency can happen at any point
- These are always delivered in OR
- ↑ risk of uterine atony because 2 fetuses and may have trouble contracting down
- Contraindications to second line agents!

Take home points

- More than just awareness of own anesthesia plans
- Communication with OB providers who provide insight into how to mitigate disasters instead of adding to them

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