Maternity Care Manual

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CHAPTER 1

Introduction

This maternity care manual is intended for University of Wisconsin family medicine residents on their OB rotation. Topics include: rotation basics, hypertensive disorders of pregnancy, diabetes in pregnancy, preterm labor, VBAC, postdates pregnancy, intrapartum fetal monitoring, nausea and vomiting of pregnancy, suturing and ultrasound. The reference section has links to the University of Wisconsin's Ebling Library. If you need a NetID to access Ebling Library, please contact Michelle McCrumb (Michelle.McCrumb@fammed.wisc.edu; (608) 265-8166). Each section of this manual poses ethics questions for discussion. Issues unique to developing countries are also addressed in each section. Links for videos for providers and patients are included. Each section closes with five review questions. It is expected that residents will read the "basics" chapter their first week of their rotation and will finish this ibook by the end of their rotation.

CHAPTER 2

The basics

SECTION 1

Review of basic labor and delivery procedures

Procedures

1. Sterile Speculum Exam on L&D

☐ Locate Supplies

- Sterile speculum
- Sterile swabs
- Slides
- Nitrazine paper
- Collection kits for GC/chlamydia, fetal fibronectin, wet mount, GBS
- Bedpan
- Lighting

☐ Demonstrate how to position patient and lighting in a hospital bed to get a decent exam

☐ Demonstrate how to use the microscope and read slides

☐ Deposit used speculum in dirty utility room

2. Cervical Exams

☐ Locate the board at the nursing station (this is one way to double-check your exams).

☐ Perform an exam with the senior resident or with nursing staff.

☐ Locate gloves and gel for exams.

3. AROM

☐ Learn how to position fingers on plastic hook to protect maternal tissues, sliding the hook along as it rests between the index and middle fingers.

☐ Learn how to catch and break the membranes; easiest during a contraction

4. Placement of Internals

☐ IUPC

☐ Fetal scalp electrode

5. Basic Interpretation of Fetal Heart Tracings

☐ Contraction frequency, strength (with IUPC), Montevideo units, pushing

☐ FHTs baseline, variability, accels and decels, category 1,2,3

6. Ultrasound:

☐ Locate Ultrasound machine

☐ Turn machine on

☐ Hold the transducer with mark to woman's right (transverse) or head (longitudinal)

☐ Find the baby's head

☐ Landmarks (orbits, corpus collosum, spine)

Documentation/Electronic Medical Record (EMR)

1. Overview:

☐ Review all common documentation for the floor with the Senior Resident (including recent examples of their own documentation).

2. Admissions:

☐ Work through documentation on new admissions with the Senior Resident. If there are no new patients to admit, the Senior resident will talk you through an admission from start to finish so you can anticipate what you will be doing during your shift.

3. Orders

☐ Admission

☐ GBS

☐ Induction/augmentation

- Cervidil
- Misoprostil
- Pitocin
- Foley

☐ Post-partum

☐ TOLAC

☐ Other common orders

4. Notes

☐ Admission H&P

☐ Progress notes

☐ Delivery summary (done by attendings)

- [ ] Postpartum

Tour of Floor

1. Locate the following:

- [ ] Changing room by OR
- [ ] Call room
- [ ] Triage
- [ ] MD and nursing lounges
- [ ] Family care suites
- [ ] Stair wells/elevators to use to get to the cafeteria
- [ ] Perinatology office
- [ ] Scrubs

Operational and Interpersonal

- [ ] Overview of how the floor works and tips on working with nursing and attendings.
- [ ] Locate scheduling book for procedures, caesarians, and inductions.

SECTION 2

Notes and Presentations

Start all notes and presentations with format:

PATIENT NAME is a XX year old G X P XXXX with a history of XXX @ XX weeks by XXX (LMP; X week US; or LMP consistent with X week US)

Dating

Choose EDC by comparing:

1) EDC by first day of last menstrual period (LMP) with

2) EDC by first ultrasound

Per ACOG, change to ultrasound date if difference is:

>5 days at <9w0d

>7 days at 9w0d to 15w6d

>10 days at 16w0d to 21w6d

>14 days at 22w0d to 27w6d

>21 days at 28w0d and beyond

Ultrasound reports often recommend whether to use the EDC based on the LMP or the (first) ultrasound.

IMPORTANT: If the due date is significantly different than the established due date on a second or subsequent ultrasound, DO NOT CHANGE THE DUE DATE. Instead, look at the fetal growth for the established gestational age. A later EDC may indicated growth restriction. An earlier EDC may indicated macrosomia.

Wording:

"by LMP" implies patient has not had an ultrasound and dating is by LMP only

"by X week ultrasound" implies that there was a great enough discrepancy between the LMP EDC and first US EDC that first US EDC was chose

"by LMP consistent with X week US" implies that the EDC from first US was close enough to EDC from LMP that dating was confirmed

SECTION 4

Cervical checks

Most start residency with little experience in cervical checks.

Have nurse/attending/OB resident double check your exam until you feel completely comfortable with your exam

Make sure that your exam fits with the clinical picture. Don't make the common mistake of calling a patient complete when her cervix is actually closed and so posterior it is hard to reach

Exam will vary slightly between different providers; check patient early in your shift so you can tell if she has changed over time

SECTION 5

Wet mount

Q-tip in posterior fornix to saline

One drop of saline with sample on two sides of slide or two separate slides

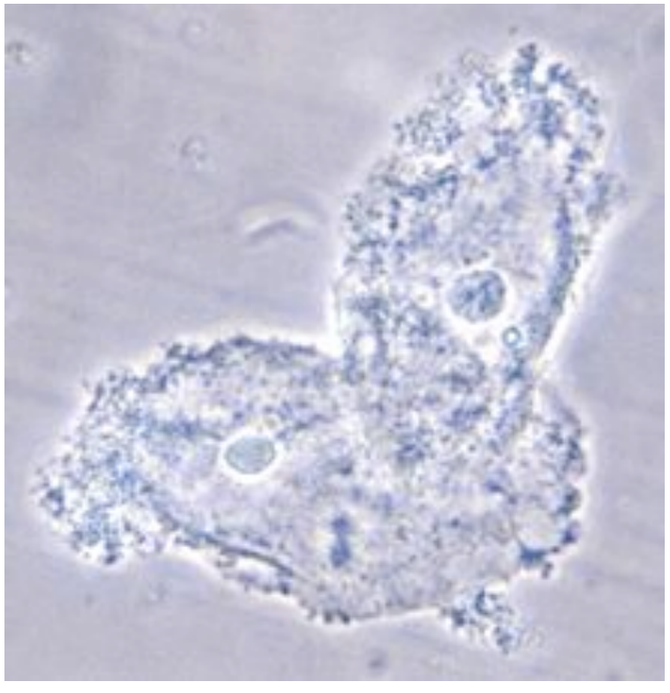
Add drop of KOH to one side

What to look for:

No KOH: clue cells (Bacterial Vaginosis); trichomoniasis

With KOH: whiff (Bacterial Vaginosis); budding yeast and/or hyphae (yeast) -- aka “spaghetti and meatballs”

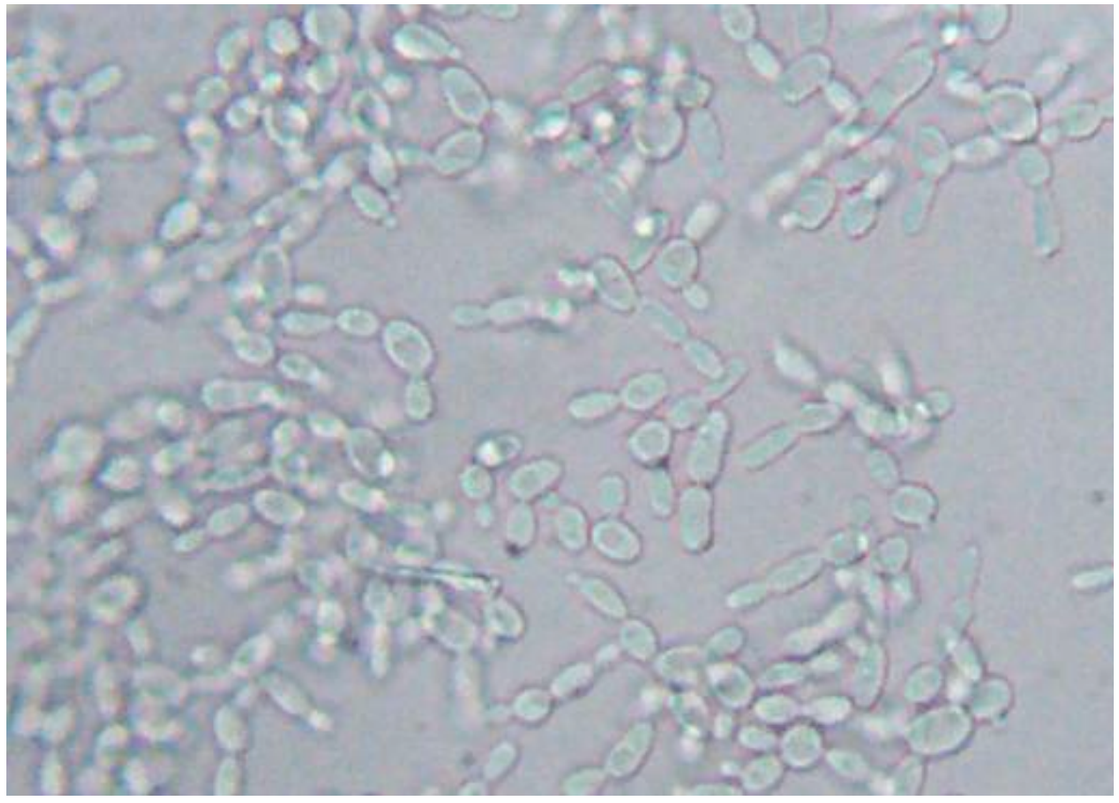
Clue Cells:



Trichomoniasis:

video

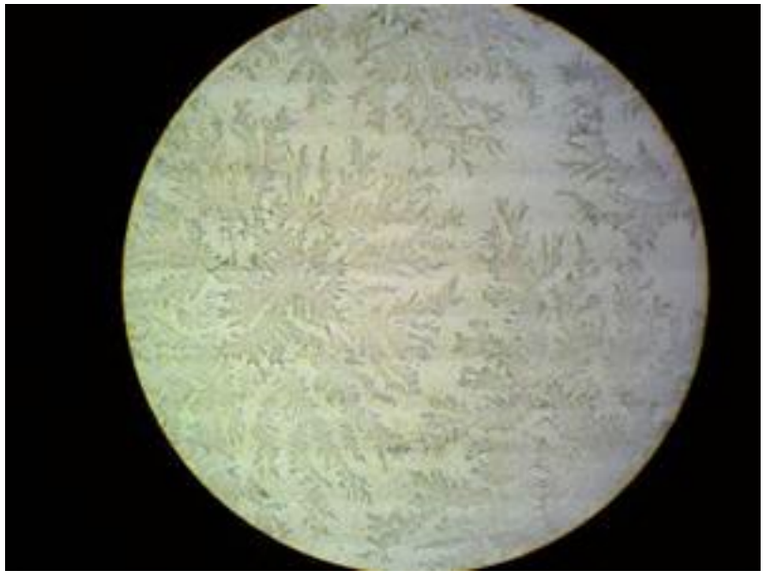
Yeast:



SECTION 6

Ferning

- Need to be certified at St. Mary's
- Obtain slide sample on sterile speculum exam with sterile Q-tip
- Apply fluid from Q-tip to slide
- Do NOT add saline which can give false positive
- Allow to dry before reading; can read at edges first



SECTION 7

TeamSTEPPS

Curriculum to promote teamwork and better communication.

Website: http://teamstepps.ahrq.gov/

Concepts:

Briefing -- care team meets before patient care to review risk factors and plan

Huddle -- care team meets during patient care to discuss significant events

Debriefing -- care team meets after patient care to discuss what went well and what could be done better in the future

Recommendation:

Three-way (resident, nurse, attending) call from triage -- especially in first year of residency

Quarterly TeamSTEPPS “coaches” meeting

New Innovations

New Innovations

Click on “department manuals”

then “maternity care material”

-- ACOG Committee Opinions

-- ACOG Practice Bulletins

-- Core topics (ACOG Committee Opinions, Cochrane Reviews, and other articles for over 80 topics)

-- Evidence Based Practice articles

-- Meriter OB consultation guidelines

-- Meriter new resident orientation

-- Resident presentations

-- Topics by Sarina Schrager

SECTION 9

Evaluations

You will receive feedback from multiple sources on your OB rotation including:

1) Faculty evals

- During your OB rotation, please have at least 5 faculty members fill out an evaluation card and place it in the locked box on labor and delivery

2) Lee Dresang

- Will complete New Innovations eval for each resident on their OB rotation

3) Nursing evaluations

References

ACOG Committee Opinion:

(Search Ebling Library PubMed Single Citation Matcher)

Committee opinion no 611: method for estimating due date

CHAPTER 3

Hypertensive disorders of pregnancy

SECTION 1

Epidemiology

- 6-8 % of pregnancies are complicated by hypertensive disorders
- Approximately 50 % of women diagnosed with GH between 24 and 35 weeks ultimately develop preeclampsia
- Blood pressure is only mildly elevated in 30 to 60 % of women with eclampsia; Blood pressure is normal in 15 %
- 80 % of eclamptic seizures are preceded by headache and 45 % by visual changes
- Timing of eclamptic seizure: antepartum (53%); intrapartum (19%); postpartum (28%)
- HELLP syndrome (Hemolysis, Elevated liver enzymes, and Low Platelets) occurs in less than 1 % of all pregnancies, but 20 % of pregnancies complicated by preeclampsia with severe features
- HELLP may present at term (18 %), preterm (53 %, including 11 % prior to 27 weeks) or postpartum (30 %).
- Of women with HELLP, 12 to 18 % are normotensive and 13% without proteinuria

Diagnosis

Chronic hypertension:

• Use of antihypertensive medications before pregnancy

• Onset of hypertension before 20th week of gestation

• Persistence of hypertension for greater than 12 weeks post-partum

• Systolic blood pressure of 140 or greater OR diastolic blood pressure of 90 or higher on two occasions at least 4 hours apart before 20 weeks gestation

Gestational hypertension:

- Systolic blood pressure of 140 or greater OR diastolic blood pressure of 90 or higher on two occasions at least 6 hours apart after 20 weeks gestation in woman with normal blood pressure previously
- No proteinuria or other pre-eclampsia criteria

Pre-eclampsia:

- Systolic blood pressure of 140 or greater OR diastolic blood pressure of 90 or higher on two occasions at least 4 hours apart (or BP > 160/110 once)

AND

- proteinuria (≥300 mg protein/24 hour urine; urine protein/creatinine ratio > 0.3; Two urine dipstick measurements >1+ (30 mg/dl) 6 hours apart if first two methods not available)

  OR

- laboratory criteria (Platelets <100,000; Creatinine > 1.1 OR doubling of creatinine in absence of other renal disease; Doubling of AST or ALT)
- The terms mild and severe preeclampsia have been eliminated. New categories are preeclampsia with and without severe features.
- Severe features:
  - BP > 160/110 four hours apart on bedrest (unless on antihypertensive)
  - Platelets < 100,000
  - Doubling of AST or ALT AND/OR severe RUQ not explained by other pathology
  - Creatinine > 1.1 OR doubling of creatinine in absence of other renal disease
  - Pulmonary edema
  - New cerebral or visual disturbances

- Proteinuria no longer necessary for diagnosis of pre-eclampsia and not a severe feature.
- Intrauterine growth restriction not a severe feature.

HELLP syndrome:

- Hemolysis
    - Abnormal peripheral blood smear -- evidence of damaged erythrocytes –schistocytes, burr cells, helmet cells
    - Serum bilirubin greater than, or equal to, 1.2 mg/dL
    - LDH greater than 600 IU/L
- Elevated Liver Enzymes
    - Transaminases (AST and/or ALT) > twice upper limit of normal
- Low Platelet Count
    - Less than 100,000 per mm

Eclampsia:

- pre-eclampsia
- seizure
    - General; usually 60-90 seconds

Note: ACOG recommends against using the non-specific term “Pregnancy Induced Hypertension” (PIH)

Management

Chronic hypertension:

- Dating ultrasound by 20 weeks; sooner if uncertain dates
- Perinatal consult
- Home blood pressure monitoring
- Baseline pre-eclampsia labs (CBC, CMP, LDH, Uric Acid, 24 hour urine protein)
- Perinatal anatomic survey
- Growth ultrasound every 3-4 weeks starting at 24 weeks (viability)
- Umbilical dopplers only if intrauterine growth restriction
- Antenatal testing (twice weekly NST/weekly AFI) by 32 weeks
- Consult perinatology regarding timing of delivery (38 weeks if good dating, well-controlled blood pressures, reassuring antenatal testing)
- Antihypertensive therapy recommended if BP≥160/105:
    - Recommended antihypertensives: labetolol, nifedipine, methyldopa
    - Not recommended: ACE, ARB, renin inhibitor, mineralcorticoid receptor antagonist
    - Target blood pressure for those on antihypertensive is 120 to 160/80 to 105

Gestational hypertension and pre-eclampsia without severe features:

- Blood pressure twice weekly, at least once in the office
- Do not recommend bed rest
- Platelets and liver enzymes weekly
- Weekly urine protein assessment; no need to repeat once positive and pre-eclampsia diagnosed
- Growth ultrasound every 3-4 weeks
- Twice weekly NST/weekly AFI
- Deliver by 37 weeks
- Consult perinatology if severe pressures (≥160/110) before 37 weeks
- Do not administer anti-hypertensives outpatient
- No magnesium if no severe blood pressure and no other severe features

Pre-eclampsia with severe features:

- Transfer of care to OB/perinatology
- If pre-viable, deliver once stable
- If severe features at ≥ 34 weeks or if unstable woman or fetus:
    - Stabilize and deliver
- If severe preeclampsia at <34 weeks and stable woman and fetus
    - Expectant management only at facilities with appropriate perinatal and neonatal resources
    - Give steroids and try to delay delivery for 48 hours if preeclampsia with severe features, viable fetus at <34weeks EGA and:
        - Preterm premature rupture of membranes
        - Labor
        - Platelets < 100,000
        - Persistent elevated AST or ALT (over twice upper limit normal)
        - Growth restriction (< 5 % EFW for EGA)
        - Severe oligo (< 5cm)
        - Reverse end-flow on umbilical Doppler
        - New or worsening renal dysfunction
    - Give steroids (unless IUFD) but don't delay delivery if preeclampsia with severe features, fetus at < 34 weeks EGA and:
        - Uncontrollable severe HTN
        - Eclampsia
        - Pulmonary edema
        - Placental abruption
        - DIC
        - Category III fetal tracing
        - Intrapartum fetal demise
    - Magnesium sulfate
    - Antihypertensive (Labetolol or Hydralazine) if SBP≥160 or DBP≥110
    - GBS prophylaxis if indicated
    - Postpartum
        - continue magnesium 24 hours

Eclampsia:

- During seizure, protect from self-harm
- If no magnesium yet, give magnesium
- If on magnesium, re-bolus with additional 2 grams magnesium
- Expedite delivery

HELLP syndrome:

- Deliver after stabilization if pre-viable
- Deliver after stabilization if ≥ 34 weeks EGA
- If viable and < 34 weeks EGA, administer steroids and delay delivery 24 to 48 hours if maternal and fetal condition stable

Magnesium sulfate:

- 6 mg IV load, then 2 mg per hour IV
- follow deep tendon reflexes for sign of toxicity
- order level (therapeutic level is 4-7 mg per dL) if losing reflexes, urine output<30ml/hour, respiratory distress or CNS changes
- Antidote is calcium gluconate 1 gram IV

Antihypertensives:

- labetolol 20mg IV; double the dose to 40mg and 80mg at 10 minute intervals (maximum dose 220mg in 24 hours)
- hydralazine 5-10mg IV every 15-30 minutes (maximum dose 30mg)

Fluid management:

- foley to monitor urine output
- write for total fluid restriction (IV + po) of approx 125cc/hour; it is possible for women with pre-eclampsia to drink their way into pulmonary edema

Postpartum:

- Monitor closely for 72 hours in hospital (or outpatient equivalent)
- Follow up in clinic at seven to ten days
- If women develop new hypertension with headache or blurred vision or preeclampsia with severe hypertension, magnesium is recommended
- Women with postpartum BP > 150/100 for four to six hours or women with BP>160/110 should be started on antihypertensive

Prevention:

- If early-onset preeclampsia with preterm delivery < 34 weeks OR preeclampsia in more than one pregnancy, give low dose aspirin from late first trimester
- Recommendation against vitamin C or E supplementation, bed rest or salt-restriction

References

ACOG Committee Opinions:

(search Ebling Library PubMed Single Citation Matcher)

Committee Opinion No. 623: Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period.

Committee Opinion no. 514: emergent therapy for acute-onset, severe hypertension with preeclampsia or eclampsia.

ACOG Practice Bulletins:

(search Ebling Library PubMed Single Citation Matcher)

Hypertension in pregnancy. Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy.

ACOG Practice Bulletin No. 125: Chronic hypertension in pregnancy.

American Family Physician:

Hypertensive disorders of pregnancy

Cochrane Reviews:

Abdominal decompression for suspected fetal compromise/pre-eclampsia

Altered dietary salt for preventing pre-eclampsia, and its complications

Alternative magnesium sulphate regimens for women with pre-eclampsia and eclampsia

Ambulatory versus conventional methods for monitoring blood pressure during pregnancy

Antihypertensive drug therapy for mild to moderate hypertension during pregnancy

Antioxidants for preventing pre–eclampsia

Antiplatelet agents for preventing pre-eclampsia and its complications

Bed rest with or without hospitalization for hypertension during pregnancy

Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems

Chinese herbal medicines for treating pre-eclampsia

Corticosteroids for HELLP (hemolysis, elevated liver enzymes, low platelets) syndrome in pregnancy

Diuretics for preventing pre-eclampsia

Drugs for treatment of very high blood pressure during pregnancy

Exercise or other physical activity for preventing pre-eclampsia and its complications

Garlic for preventing pre-eclampsia and its complications

Interventionist versus expectant care for severe pre-eclampsia before term

Low-dose dopamine for women with severe pre-eclampsia

Magnesium sulphate and other anticonvulsants for women with pre-eclampsia

Magnesium sulphate versus diazepam for eclampsia

Magnesium sulphate versus lytic cocktail for eclampsia

Magnesium sulphate versus phenytoin for eclampsia

Nitric oxide for preventing pre-eclampsia and its complications

Oral beta-blockers for mild to moderate hypertension during pregnancy

Plasma volume expansion for treatment of pre-eclampsia

Prevention and treatment of postpartum hypertension

Progesterone for preventing pre–eclampsia and its complications

Rest during pregnancy for preventing pre-eclampsia and its complications in women with normal blood pressure

Tight control of mild-moderate pre-existing or non-proteinuric gestational hypertension

SECTION 5

Ethics

If a new screening program were available for detecting women likely to develop pre-eclampsia later in pregnancy, what factors would help you decide whether to implement the screening program?

What are potential harms from a screening program?

What are potential benefits?

What other information do you need?

(search Ebling Library PubMed Single Citation Matcher)
ETHICAL ISSUES RELATED TO SCREENING FOR PREECLAMPSIA

A 36yo G7P6006 Hmong woman presents to clinic at 39w4d by LMP c/w 18 week US with a blood pressure of 148/92 and +1 protein on urine dip. She has no HA, vision changes or RUQ pain. She agrees to go to the hospital for additional monitoring. Repeat blood pressures are 142/90 and 154/94. Her cervix is 2/50/high. The fetal heart tracing is category 1. She is not contracting. Pre-eclamptic labs are normal.

You recommend induction but she refuses and wants to go home. What do you do?

SECTION 6

Developing countries

- Hypertensive disorders of pregnancy account for 12-16% of maternal mortality
- Over 50,000 women die from eclampsia annually
- Lack of recognition of pre-eclampsia and tools to diagnose and treat
- Consider IM magnesium protocols where IV magnesium not feasible

Alternative magnesium sulfate regimens for women with pre-eclampsia and eclampsia

Global ALSO

(Disclosure -- Lee Dresang is Chief Editor/author for Global ALSO; no royalties received from sales)

Videos

World Health Organization (WHO) reproductive health library (RHL):

Blood pressure measurement

For patients

WebMD pre-eclampsia

Review

Question 1 of 5

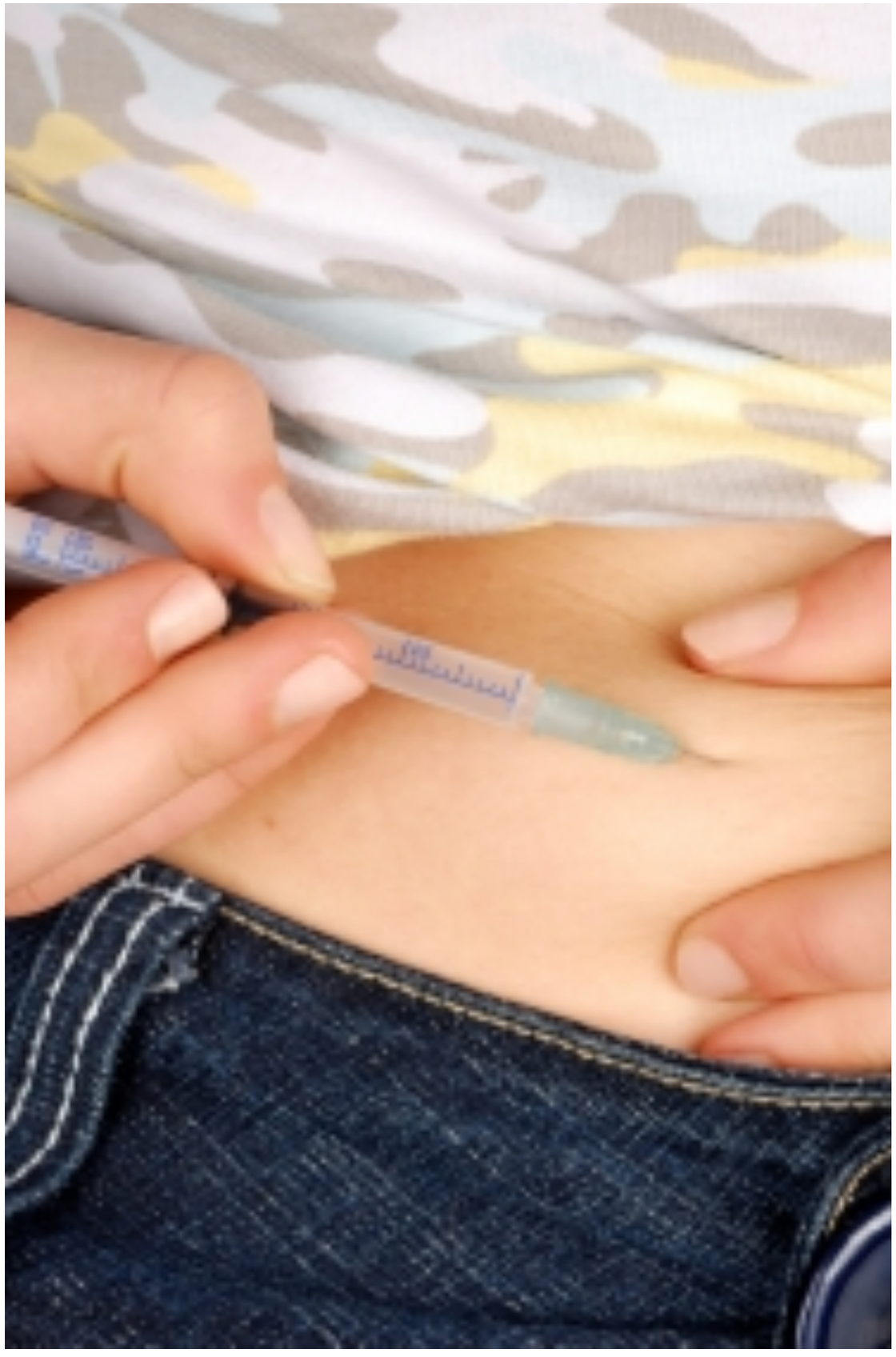
Hypertensive disorders complicate what percentage of pregnancies?

- ✓ **A.** 2-12
- **B.** 12-22
- **C.** 22-32
- **D.** 32-42

◀ Check Answer ▶

CHAPTER 4

Diabetes in pregnancy



SECTION 1

Epidemiology

90% of diabetes in pregnancy is gestational diabetes

Gestational diabetes occurs in 6-7% of US pregnancies

Pre-gestational diabetes is found in 1% of pregnancies

Fifteen to 50 percent of women who have gestational diabetes develop type II diabetes later in life

5-10% of women with pregestational diabetes have chronic hypertension

6-12% of women with pregestational diabetes have babies with major congenital anomalies (most common -- VSD; also complex cardiac defects, central nervous system anomalies, such as anencephaly and spina bifida, and skeletal malformations, including sacral agenesis)

A hemoglobin A1C of 10% is associated with a 20-25% risk of congenital anomalies

Neonates of women with diabetes in pregnancy are at a higher risk of hypoglycemia, hyperbilirubinemia, polycythemia, respiratory distress syndrome

Diagnosis

The International Association of Diabetes in Pregnancy study group recommends a “one step” 75 gram load fasting 2 hour glucola for gestational diabetes screening.

2011 ACOG Committee Opinion recommends sticking with traditional “two step” approach to screening with 1 hour glucola followed by a 3 hour glucose tolerance test for women with an abnormal 1 hour glucola.

Rationale for ACOG decision:

- “one step” approach with 2 hour glucola would increase diagnosis of gestational diabetes (to 18% of pregnancies)
- There is no evidence that “one step” approach would improve maternal or neonatal outcomes
- “one step” approach would increase costs

White’s Classification:

- Class A1: Gestational diabetes with diet control
- Class A2: Gestational diabetes necessitating medicines
- Class B: Onset age 20 y or older and duration less than
- 10 y
- Class C: Onset age 10–19 y or duration 10–19 y
- Class D: Onset age younger than 10 y, duration over
- 20 y, background retinopathy, or hypertension (not
- preeclampsia)
- Class R: Proliferative retinopathy or vitreous hemorrhage
- Class F: Nephropathy with over 500 mg/d proteinuria
- Class RF: Criteria for both Classes R and F coexist
- Class H: Arteriosclerotic heart disease clinically evident
- Class T: Prior renal transplantation

American Diabetes Association new classification:

- Gestational diabetes: Diabetes diagnosed during pregnancy that is not clearly overt (type 1 or type 2) diabetes
- Type 1 diabetes: Diabetes resulting from beta-cell destruction, usually leading to absolute insulin deficiency
  - a. Without vascular complications
  - b. With vascular complications (specify which)
- Type 2 diabetes: Diabetes resulting from inadequate insulin secretion in the face of increased insulin resistance
  - a. Without vascular complications
  - b. With vascular complications (specify which)
- Other types of diabetes (eg, genetic in origin, associated with pancreatic disease, drug-induced or chemically induced)

Type of glucola	When ordered	Glucose load (grams)	Fasting? (Y/N)	Timing of blood draws	Normal values
1 hour	24-28 weeks; earlier with risk factors; glucosuria	50	N	1 hour after glucola	Normal<140; Borderline 130-140 repeat in 4 weeks; ≥200 GDM with no need for 3 hour
2 hour	6 weeks postpartum for women with GDM	75	Y	Fasting; 2 hours	Normal <110 /<140; GDM≥126 / ≥200
3 hour	Abnormal 1 hour	100	Y	Fasting; 1 hour; 2 hours; 3 hours	GDM -- 2 or more abnl Carb intolerance -- 1 abnormal (Repeat 3 hour in 4 weeks) 105;190;165;145 (National Diabetes Data Group Conversion or 95;180;155;140 (Carpenter/Coustan)

Management

- Refer for diabetic education/nutritionist
- Prescribe glucometer, test strips, lancets, sharps container
- Have patient record fasting blood sugar and 1 or 2 hour post prandial blood sugars X3. Goal:
    - Fasting<95
    - 1 hour postprandial goal <140
    - 2 hour postprandial <120
- See patient weekly at first
- Have patient call if more than occasionally out of normal range and with questions
- Meds
    - Start med if more than occasionally above target range
    - Glyburide ok for mildly elevated blood sugars
    - Metformin used with polycystic ovarian syndrome patients continued in pregnancy; seems safe
    - Insulin if not well controlled with oral med
- Gestational diabetes (diet controlled) -- GDM A1
    - No need for antenatal testing
    - No need for early delivery (ok to go past due date)
- Gestational diabetes (on medicine)
    - Growth ultrasound every 3-4 weeks starting at 24 weeks (viability)
    - Twice weekly NST/weekly AFI by 32 weeks or time of diagnosis if later
    - Consult perinatology regarding timing of delivery (39 weeks if good dating, well-controlled blood sugars, reassuring antenatal testing)
- With pregestational diabetes:
    - Hemoglobin A1C
    - 24 hour urine protein and creatinine clearance
    - Anatomic survey and fetal echo at 20 weeks with perinatology (increased risk VSD and other anomalies)
    - Growth ultrasound every 3-4 weeks starting at 24 weeks (viability)
    - Twice weekly NST/weekly AFI by 32 weeks
    - Consult perinatology regarding timing of delivery (39 weeks if good dating, well-controlled blood sugars, reassuring antenatal testing)

- Route of Delivery
    - Cesarean if estimated fetal weight 4500 grams or more

References

ACOG Committee Opinions:

(search Ebling Library PubMed Single Citation Matcher)

ACOG Committee Opinion No. 435: postpartum screening for abnormal glucose tolerance in women who had gestational diabetes mellitus. 2009.

Committee opinion no. 504: screening and diagnosis of gestational diabetes mellitus. 2011

ACOG Practice Bulletins:

(search Ebling Library PubMed Single Citation Matcher)

Practice Bulletin No. 137: Gestational diabetes mellitus. 2013

ACOG Practice Bulletin. Clinical Management Guidelines for Obstetrician-Gynecologists. Number 60, March 2005. Pregestational diabetes mellitus.

American Diabetic Association:

Diagnosis and classification of diabetes mellitus

International Association of Diabetes and Pregnancy Study Group:

Screening and diagnosis of gestational diabetes mellitus

Evidence Based Practice:

How should women with a history of gestational diabetes be screened for future diabetes?

Is induction of labor indicated for suspected fetal macrosomia?

Screening for gestational diabetes: Are there differences in outcomes using a cutoff of 130 or 140 mg/dL for the 1-hour glucose challenge test?

What's the best treatment for gestational diabetes?

Cochrane Reviews:

Continuous subcutaneous insulin infusion versus multiple daily injections of insulin for pregnant women with diabetes

Dietary advice in pregnancy for preventing gestational diabetes mellitus

Different intensities of glycaemic control for pregnant women with pre–existing diabetes

Different strategies for diagnosing gestational diabetes to improve maternal and infant health

Elective delivery in diabetic pregnant women

Exercise for diabetic pregnant women

Exercise for pregnant women for preventing gestational diabetes mellitus

Interventions for pregnant women with hyperglycaemia not meeting gestational diabetes and type 2 diabetes diagnostic criteria

Oral anti-diabetic agents for women with pre-existing diabetes mellitus/impaired glucose tolerance or previous gestational diabetes mellitus

Preconception care for diabetic women for improving maternal and infant health

Screening and subsequent management for gestational diabetes for improving maternal and infant health

Treatments for gestational diabetes

SECTION 5

Ethics

"A 39-year-old G1P0 at 30 weeks gestation with chronic hypertension, diabetes, end stage renal disease, and completely intact decisional capacity, is likely to die within 2 weeks from renal failure. She refuses life-saving dialysis or delivery at this time for what she repeatedly states are personal reasons. The patient has a blood pressure of 162/94, ultrasound estimated fetal weight less than fifth percentile, and an amniotic fluid index of 4.2 cm with elevated umbilical artery Doppler values."

What ethical issues are involved?

What would you do in this case?

SECTION 6

Developing countries

- The incidence of gestational diabetes varies widely
    - 0.6 percent of pregnant women in Taipei, Tiawan
    - over 20% of Pima women in US
- Incidence varies greatly among ethnic groups in same geographic region
- Incidence of gestational diabetes in a population tends to reflect the pattern of adult onset diabetes mellitus in that population
- Glucose monitors and supplies, meds, syringes are often not available in developing countries
- Internationally, many diagnose gestational diabetes according to WHO or IADPSG criteria

Epidemiology of GDM

Section 7

Video

For patients:

American Diabetic Association

Gestational diabetes

How to deal with gestational diabetes

Review

Question 1 of 5

What percentage of pregnant women have gestational diabetes?

- **A.** 1-2 percent
- **B.** 2-5 percent
- **C.** 5-10 percent ✓
- **D.** 15-25 percent

◀ Check Answer ▶

CHAPTER 5

Preterm labor

SECTION 1

Epidemiology

- Preterm birth is leading cause of US neonatal mortality
- Preterm labor accounts for 35% of US health care costs
- Approximately 12% of US births are preterm
- Less than 15% of women presenting with preterm contractions delivery prematurely
- In 2012 in US, preterm delivery rate was 16.5 for black women, 11.6 for hispanic women and 10.3 for non-hispanic white women
- From 1980 until 2006, the preterm delivery rate increased by 30% to 12.8%; the preterm delivery rate has been decreasing since then
- Cause of preterm labor:
    - 50% spontaneous labor with intact membranes
    - 25% preterm premature rupture of membranes (PPROM)
    - 25% iatrogenic (cesarean or induction for indictations including hypertensive disorder of pregnancy, IUGR, bleeding placenta previa, placental abruptions, concerning fetal monitoring)
- Risk factors
    - History of prior preterm delivery (especially if prior spontaneous preterm birth)
        - More risk if history of prior term delivery followed by prior preterm delivery than opposite
    - Short cervical length (<25mm at <24 weeks)
    - Genital tract infections
    - History cervical conization (may be environmental and/or behavioral factors)
    - History UTI (previous studies associating untreated early pregnancy bacturia with preterm delivery not confirmed with recent studies/Cochrane review)
    - Maternal pre-pregnancy BMI<19.8
    - Multiple gestation (twins, triplets…)
    - Peridontal disease (but treatment doesn't help and increased preterm delivery in one study)
    - Substance abuse
    - Short interpregnancy interval (ideal is 18-23 months)
    - Tobacco use
    - Vaginal bleeding

Diagnosis

Preterm delivery is delivery before 37 weeks

Terminology

Preterm labor -- preterm contractions with CERVICAL CHANGE

Premature onset of contractions -- preterm contractions with NO CERVICAL CHANGE

Underlying causes

Whether “preterm labor” or “premature onset of contractions” evaluate for underlying cause:

- dehydration
    - IV or oral rehydration
- cervicitis
    - send GC/CT, wet mount (yeast, trich, BV)
- urinary tract infection
    - UA C+S
- drug abuse
    - consider urine tox screen
- trauma
    - consider domestic violence
- polyhydramnios
    - Ultrasound
    - rescreen for gestational diabetes if normal glucola but new polyhydramnios
- twin gestation
    - Ultrasound
- macrosomia
    - Ultrasound

Fetal fibronectin

- Screening does not improve prenatal outcomes
- May be useful when it is unclear whether a woman is in pre-term labor
- obtain swab from posterior fornix if any question of preterm labor; can always discard but will likely be positive for 24 hours after digital exam

- Excellent negative predictive value (ruling out preterm labor): >99% for preterm delivery in next 14 days
- Poor positive predictive value: 13-30% for delivery in next 7-10 days

Cervical length

- not indicated for routine pregnancy
- Transvaginal ultrasound; shortest of 3 measurements
- Cervical funneling does not add to risk of preterm labor
- Evaluation of preterm labor risk for women presenting with preterm contractions
    - excellent negative predictive value (ruling out preterm labor): 98.5% if cervix>3.0 cm at 28 weeks
    - poor positive predictive value: 16.7% if cervix≤2.0 cm at 28 weeks
    - not helpful after 32 weeks as effacement often begins at this point in normal pregnancies

Group B strep

- obtain test (rectal and vaginal swab) at time of exam unless negative within 5 weeks
- order sensitivities including erythro and clindamycin if woman has history of anaphylactic reaction to penicillin
- Rapid test is acceptable (available at Meriter in Madison)
- Recommend prophylaxis and no need to test if:
    - GBS in urine current pregnancy, or
    - previous child with GBS sepsis

Assess presentation

- ultrasound
- higher rate of malpresentation and higher rate of head entrapment if vaginal breech delivery

Prevention

17 alphahydroxyprogesterone (17 OH-P)

- women with singleton pregnancy and previous preterm delivery
    - weekly 250mg IM injection from 16-24 through 36 weeks EGA decreases preterm delivery rate (number needed to treat = 6)
    - Intravaginal progesterone not indicated
    - Once IM progesterone started, should not be discontinued early or may increase preterm delivery rate
- women with singleton pregnancy and short cervix ≤ 20mm found incidentally on ultrasound before 20 weeks
    - daily 90mg vaginal progesterone gel or 200 mg micronized vaginal progesterone from diagnosis through 36 weeks EGA
- women with mutiple gestation (twins or triplets)
    - Progesterone not indicated

Cerclage

- Women with a prior preterm delivery should have a cervical length checked every other week from 16-24 weeks
- cercalge is indicated for women with a singleton pregnancy and prior preterm delivery before 34 weeks with a cervix ≤ 25 mm
- Evidence is mixed for women with no prior preterm delivery found to have a short cervical length
- Cerclage is NOT indicated for women with mutiple gestation (twins or triplets) and a short cervix
    - cerclage may increase the preterm delivery rate

Other interventions to prevent preterm delivery

- smoking cessation interventions decrease the preterm birth rate (RR = 0.84; 95% CI, 0.72 to 0.98).
- treatment of asymptomatic bacturia decreases low birth weight but not preterm delivery
- treatment of peridontal disease has not been shown to decrease preterm delivery rates
- screening and treating BV is controversial; clindamycin seems to be more effective in preventing preterm delivery than does metronidazole; CDC recommends clinda 2% gel qhs for 7 days OR clinda 300 po bid for 7 days
- If short cervix, no evidence to support: bedrest, indomethacin, antibiotics, omega-3 fatty acids, vitamin C, vitamin E, calcium, protein

Management

Site of delivery

- best outcomes if delivery in facility with level III NICU
- communication with tertiary care facility to make decisions regarding transport including whether to transport, how to transport, what medicines to administer, whether to send NICU team to outlying facility

Route of delivery

- there is no evidence that outcomes are improved with cesarean or forceps-assisted vaginal delivery for perterm delivery
- vacuum assisted delivery is contraindicated before 34 weeks

Tocolytics

- to delay delivery for 48 hours while steroids administered
- no evidence for long-term labor suppression
- Nifedipine appears to be first line tocolytic
    - Calcium channel blockers have fewer side effects than betamimmetics
    - Nifedipine causes fewer adverse maternal events and NICU admission than magnesium sulfate
    - Nifedipine dose is 30mg IV load, then 10-20 IV every 4-6 hours as needed
    - NSAIDs (indomethacin) may have fewest maternal side effects but can cause oligohydramnios and premature closure of the ductus arteriosis

Steroids

- indicated for threatened preterm delivery at 24-34 weeks
- decrease neonatal mortality, respiratory distress syndrome, necrotizing enterocolitis and intraventricular hemorrhage
- betamethasone (12mg IM every 24 hours x2 doses)
- dexamethasone (6mg IM every 12 hours x4 doses)
- A first dose should be given, even if it looks like delivery will happen before a second dose
- If a woman remains at increased risk for delivery at <33 weeks from 14 days after receiving steriods, a second course is indicated.
- More than two courses of steroids are not indicated.

Group B strep prophylaxis

- Give GBS prophylaxis if test positive in last 5 weeks, GBS in urine current pregnancy or previous child with GBS sepsis
- If GBS status unknown and <37 weeks, give prophylaxis until rapid test or culture result available

- PCN 5.0 million units IV load, then 2.5 million units IV every 4 hours
- If non-anaphylactic PCN allergy, cefazolin 2g IV load, then 1g IV every 8 hours until delivery
- If anaphylactic PCN allergy:
- if sensitive to clindamycin and erythro, give clindamycin 900 IV every 8 hours until delivery
- if not or not available, vancomycin 1 gram IV every 12 hours until delivery

Neuroprophylaxis with magnesium

- with inevitable preterm delivery, magnesium may decrease rates of cerebral palsy
- More research is needed on optimal dosing
- Two options:
    - 4g bolus and then 1 g per hour until birth or 24 hours
    - 6g bolus and then 1g per hour until birth or 12 hours

Preterm Premature Rupture of Membranes (PPROM)

- IV erythromycin (250mg IV every 6 hours x 48 hours followed by 333mg po every 8 hours for 5 days) and ampicillin (2g IV every 6 hours x 48 hours followed by 250mg po every 8 hours for 5 days) can prolong the latency period
- Antenatal steroids are recommended at <34 weeks EGA despite rupture of membranes
- Tocolysis is not recommended in setting of PPROM

SECTION 5

References

ACOG Committee Opinions:

(search Ebling Library PubMed Single Citation Matcher)

ACOG Committee Opinion No. 445: antibiotics for preterm labor.

ACOG Practice Bulletins:

(search Ebling Library PubMed Single Citation Matcher)

ACOG practice bulletin no. 127: Management of preterm labor

Practice bulletin no. 130: prediction and prevention of preterm birth.

ACOG Practice Bulletin No.142: Cerclage for the management of cervical insufficiency.

American Family Physician:

Preterm labor

Evidence Based Practice:

17-Alpha hydroxyprogesterone for reducing preterm labor

Fetal fibronectin as predictor of preterm delivery in women with symptoms of preterm labor

Magnesium sulfate for fetal neuroprotection in preterm birth

Cochrane Reviews:

Amnioinfusion for preterm premature rupture of membranes

Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth

Antenatal lower genital tract infection screening and treatment programs for preventing preterm delivery

Betamimetics for inhibiting preterm labour

Calcium channel blockers for inhibiting preterm labour

Caesarean section versus vaginal delivery for preterm birth in singletons

Cervical assessment by ultrasound for preventing preterm delivery

Cyclo-oxygenase (COX) inhibitors for preventing preterm labour

Cyclo-oxygenase (COX) inhibitors for treating preterm labour

Fetal fibronectin testing for reducing the risk of preterm birth

Home uterine monitoring for detecting preterm labour

Hydration for treatment of preterm labour

Magnesium maintenance therapy for preventing preterm birth after threatened preterm labour

Magnesium sulphate for preventing preterm birth in threatened preterm labour

Maintenance therapy with calcium channel blockers for preventing preterm birth after threatened preterm labour

Maintenance therapy with oxytocin antagonists for inhibiting preterm birth after threatened preterm labour

Nitric oxide donors for the treatment of preterm labour

Oral betamimetics for maintenance therapy after threatened preterm labour

Oxytocin receptor antagonists for inhibiting preterm labour

Probiotics for preventing preterm labour

Progestational agents for treating threatened or established preterm labour

Prenatal administration of progesterone for preventing preterm birth in women considered to be at risk of preterm birth

Prophylactic antibiotics for inhibiting preterm labour with intact membranes

Prophylactic oral betamimetics for preventing preterm labour in singleton pregnancies

Prophylactic oral betamimetics for reducing preterm birth in women with a twin pregnancy

Relaxation therapy for preventing and treating preterm labour

Repeat digital cervical assessment in pregnancy for identifying women at risk of preterm labour

Repeat doses of prenatal corticosteroids for women at risk of preterm birth for improving neonatal health outcomes

Specialised antenatal clinics for women with a pregnancy at high risk of preterm birth (excluding multiple pregnancy) to improve maternal and infant outcomes

Terbutaline pump maintenance therapy after threatened preterm labor for preventing preterm birth

Tocolytics for preterm premature rupture of membranes

Transplacental versus direct fetal corticosteroid treatment for accelerating fetal lung maturation where there is a risk of preterm birth

SECTION 6

Ethics

Kristina Flores is a 24yo G3P0111@23w5d who presents with rupture of membranes 2 hours ago followed by contractions which are now painful and every 3-4 minutes.

What additional information do you need?

Parents ask you what the plan is. What do you say?

Executive Summary of the Workshop on the Border of Viability

Developing countries

- 28% of the 4 million annual neonatal deaths worldwide are due to preterm delivery.
- 85% of preterm births occur in Africa and Asia where almost 11 million births are estimated as preterm each year.
- Preterm birth rates are 25% compared to 5% in developed countries
- Without respiratory and other support the age of viability rose from 23.5 weeks to approximately 30 weeks
- Additional risk factors in developing countries include: malnutrition, anemia, malaria, HIV, multiple gestation
- Lack of ultrasound for dating
- Lack of supplies including sterile speculums, microscope for ferning
- Nifedipine may be tocolytic of choice; may be given orally
- Lack of steroids, surfactant and respirators
- Lack of fetal fibronectin, 17 alphahydroxyprogesterone

Global ALSO

(Disclosure -- Lee Dresang is Chief Editor/author for Global ALSO; no royalties received from sales)

Videos

World Health Organization (WHO) reproductive health library (RHL):

Kargaroo mother care

Other videos:

Kangaroo care Colombia

Review

Question 1 of 5

An 18 yo G2P0101@30 weeks presents with contractions every 10 minutes. The most accurate test to determine whether she needs

A. Serum corticotropin-releasing hor-

B. Maternal serum alpha-fetoprotein

C. Serum human chorionic gonado-

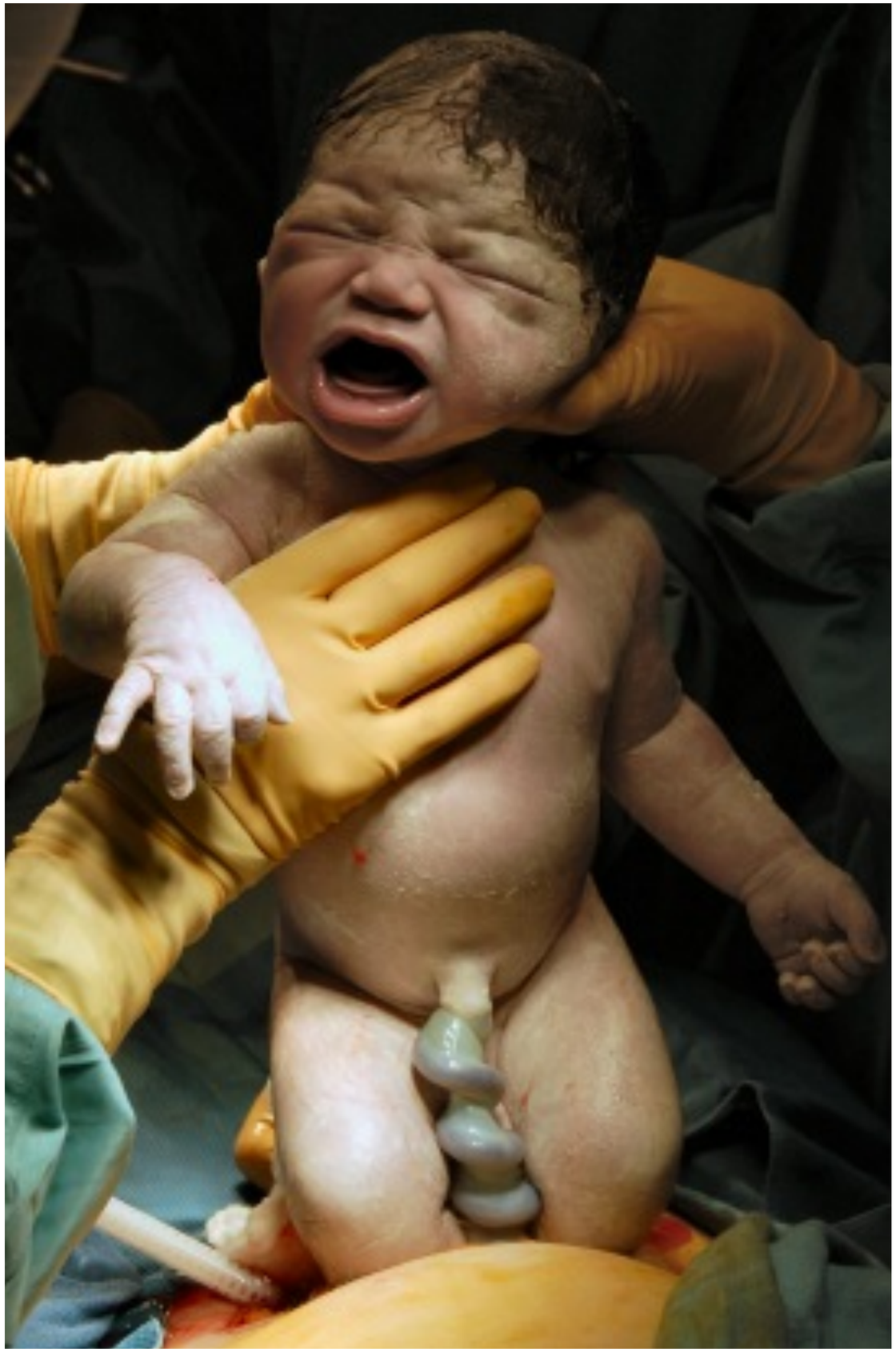
D. Salivary estriol concentration

E. Vaginal fetal fibronectin

Check Answer

Chapter 6

Vaginal birth after cesarean (VBAC)



Epidemiology

- Cesarean delivery is the most common major surgery in US with approximately 2 cesareans every second
- from 1970 to 2010 the US cesarean rate rose from 5% to over 32%
- the vaginal birth after cesarean (VBAC) rate went from 5% in 1985 to a high of 28.3% in 1996 back down to 8.3% in 2007; It trended up slightly each year since then to 10.2% in 2012 however recent data is hard to interpret as each year more states start using data from a new 2003 birth certificate
- Rise in cesarean rate and decrease in VBAC rate since 1999 ACOG statement: “VBAC should be attempted in institutions equipped to respond to emergencies with physicians immediately available to respond to provide emergency care.”
- In 2010 an NIH consensus conference encouraged institutions to facilitate access to trial of labor after cesarean (TOLAC)
- 2011 revised ACOG statement: “When resources for immediate cesarean are not available, the College recommends that health care providers and patients considering TOLAC discuss the hospital’s resources and availability of obstetric, pediatric, anesthetic and operating room staffs.After counseling, the ultimate decision to undergo TOLAC or a repeat cesarean delivery should be made by the patient in consultation with her health care provider.”
- Indications for cesareans: labor dystocia (40.3%), elective repeat (21.2%), breech (13.4%), concerning fetal monitoring (9.8%), and other (15.4%)

Counseling

UWMF EPIC smart phrase:

.TOLAC

Contraindications to TOLAC:

- ACOG: " Those at high risk for complications (eg, those with previous classical or T-incision, prior uterine rupture, or extensive transfundal uterine surgery) and those in whom vaginal delivery is otherwise contraindicated (eg, those with placenta previa) are not generally candidates for planned TOLAC."

Risks of TOLAC include:

- Uterine rupture
  - 0.7 % risk with previous low transverse uterine incision
  - 1 in 2000 risk that uterine rupture will occur and will lead to fetal death or permanent brain injury; this is similar to risk of vaginal delivery with a nulliparous woman
- Increased risks during cesarean after unsuccessful TOLAC than after scheduled repeat elective cesarean

Risks of repeat elective cesarean:

- Anesthesia risk
- Bleeding
  - average blood loss during cesarean is double that of average blood loss during vaginal delivery
  - hemorrhage requiring hysterectomy (OR 2.1; 95% CI 1.2–3.8)
- Fetal morbidity
  - transient tachypnea of the newborn
- Infection
  - risk of wound infection
  - risk of endometritis higher after cesarean
  - major puerperal infection (OR 3.0; 95% CI 2.7–3.4)
- Maternal morbidity
  - longer hospital stay (1-2 days after VBAC vs 2-4 days after repeat cesarean)
  - longer recovery time

- severe morbidity (OR 3.1; 95% CI 3.0–3.3)
- hysterectomy (OR 3.2; 95% CI 2.2–4.8)

- Maternal mortality
  - overall risk 3.8/100,000 for TOLAC vs 13.4/100,000 for elective repeat cesarean
  - cardiac arrest (OR 5.1; 95% CI 4.1–6.3)
- Organ damage
  - potential damage to bladder or intestines (rare)
- Venous thromboembolism (VTE)
  - Increased risk after repeat cesarean (OR 2.2; 95% CI 1.5–3.2)
  - VTE is leading cause of maternal mortality in US

Increasing risk with increasing number of cesareans

- Risk of invasive placenta, transfusion, hysterectomy, bowel or bladder injury, and intensive care unit (ICU) admission increases with the increasing number of cesareans
- hysterectomy required in 0.65% first, 0.42% second, 0.90% third, 2.41% fourth, 3.49% fifth, and 8.99% sixth or more cesarean deliveries

Women with undocumented uterine scar

- ACOG: “ TOLAC is not contraindicated for women with previous cesarean delivery with an unknown uterine scar type unless there is a high clinical suspicion of a previous classical uterine incision.”

Women with two or more previous cesareans

- ACOG: “ Women with two previous low transverse cesarean deliveries may be considered candidates for TOLAC.”
- No increased risk uterine rupture in women with 2 or more cesareans but risk of hysterectomy and transfusion is increased compared with TOLAC after 1 cesarean

External cephalic version

- ACOG: “ External cephalic version for breech presentation is not contraindicated in women with a prior low transverse uterine incision who are at low risk for adverse maternal or neonatal outcomes from external cephalic version and TOLAC.”

SECTION 3

Management

- Induction with cervical ripening agents (cervadil, misoprostol) in women with a prior cesarean is contraindicated
- Safety of of balloon induction is not well documented; may be safest means of induction with TOLAC
- Pitocin augmentation/induction carries a 3-5 times increase risk of uterine rupture; if indicated patient should be given option of choosing repeat cesarean instead
- TOLAC labor management
    - continuous electronic fetal monitoring
    - pre-op labs at admission (CBC and type and screen)
    - repeat TOLAC vs repeat elective cesarean counseling and obtain written patient consent
    - make sure patient is aware she can change her mind at any point
    - epidural is safe
- Signs of uterine rupture include concerning fetal heart tracing, cessation of contractions, loss of station, vaginal bleeding

References

ACOG Practice Bulletin:

(search Ebling Library PubMed Single Citation Matcher)

ACOG Practice bulletin no. 115: Vaginal birth after previous cesarean delivery

2010 NIH Consensus Statement:

Vaginal birth after cesarean (VBAC)

AAFP Position Statement:

Trial of labor after cesarean (TOLAC)

American Family Physician:

Increasing patient access to VBAC: New NIH and ACOG recommendations

Uterine rupture: What family physicians need to know

Low cesarean/High VBAC rates:

Zuni, New Mexico

LaFarge, Wisconsin

Evidence summary:

Cesarean Delivery

Prenatal counseling regarding cesarean delivery

Cochrane Reviews:

Elective repeat caesarean section versus induction of labour for women with a previous caesarean birth

Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

SECTION 5

Ethics

Lilliana Villapando is a 28yo G3P2002@28 weeks by LMP c/w 12 week ultrasound who is seeing you for prenatal care in Madison, WI. Ms. Villapando had both of her cesareans in Mexico. The first was for arrest of descent after pushing for 3 hours. The second was an elective repeat cesarean.

Ms. Villapando asks whether she can have a “normal” (vaginal) delivery.

How do you respond?

Will it affect your advice if you cannot obtain an operative report for either cesarean?

What if you obtain an operative report noting the need to “T” the incision with the second cesarean because of difficulties delivering a back-down transverse baby with the second cesarean? What if the woman says she had a horrible recovery from her second cesarean and she refuses another?

TOLAC references

Developing countries

- Cesarean delivery rate of less than 2% in some sub-Saharan countries
- Risk of uterine rupture after cesarean great where there is poor access to safe cesarean
- Avoiding cesarean best when possible
    - Role of symphysiotomy in some settings
- Risks go up with each cesarean so TOLAC may be preferable when multiple pregnancies desired
- Most common cesarean technique in Mexico involves vertical skin incision and lower uterine segment transverse incision
- High cesarean rates (approaching 85%) in some populations
    - Brazil with high cesarean rates in wealthy private sector still has cesarean rate less than 5% for 25% of population

Global ALSO

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Videos

Trial of Labor After Cesarean - Results in a Community Setting

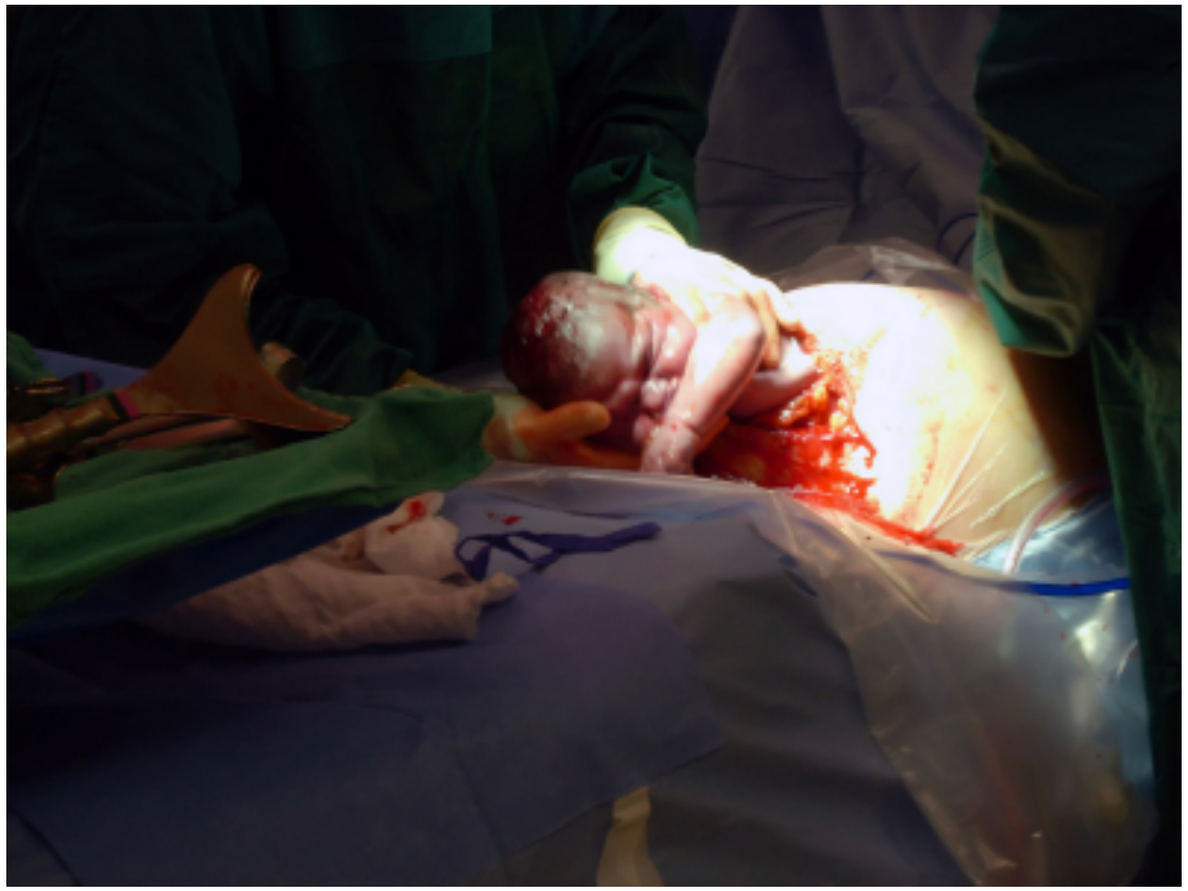
Review

Question 1 of 5

Which one of the following is the most reliable clinical symptom of uterine rupture?

- **A.** Sudden, tearing uterine pain
- **B.** Vaginal bleeding
- **C.** Loss of uterine tone
- ✓ **D.** Concerning fetal heart tracing

◀ Check Answer ▶



Chapter 7

Postdates pregnancy

SECTION 1

Epidemiology

5-10 percent of pregnancies go past 42 weeks (without intervention)

Early dating ultrasounds decrease the incidence of post-term pregnancies

Prior post-term pregnancy and primagravidy are biggest risk factors for post-term pregnancy

Genetics may play a role in post-term pregnancy

The perinatal death rate is twice as high after 42 weeks and 6 times as high after 43 weeks compared with 37-42 weeks.

Post-term pregnancy is associated with a higher cesarean rate, more complications at cesarean and a higher rate of perineal trauma.

Diagnosis

post-term meads past 42 weeks gestation

post-dates is less clearly defined but is often used to mean past 40 weeks

See “Dating” in “The Basics”

Management

- There is no evidence of benefit or harm for antenatal testing between 40 and 42 weeks
- There is no evidence that induction of post-dates or post-term women with a favorable cervix improves outcomes, but this is a common practice because risk of failed induction and cesarean delivery is lower when the cervix is favorable
- With unfavorable cervix, induction with cervical ripening agent is recommended
- Induction at 41 weeks is associated with a lower rate of perinatal mortality with no increase in cesarean rate
- There is limited data on management of women with a prior cesarean who go past their due date; a woman should be counseled on the risk of induction vs expectant management vs repeat cesarean

References

American Family Physician:

Management of post-term pregnancy

Cochrane Review:

Induction of labour for improving birth outcomes for women at or beyond term

SECTION 5

Ethics

Zyla Mitchell is a 38yo G2P1001@41w4d by LMP c/w 8 week ultrasound seeing you for prenatal care. You recommend inducing her by 42 weeks. She says that she believes strongly that her baby will be born when it is ready and she does not want to schedule the induction.

How do you respond?

What factors would influence your advice?

Ethical issues in obstetrics

SECTION 6

Developing countries

- Lack of access to ultrasound leads to increased incidence of post-term pregnancy
- Lack of access to electronic fetal monitoring and ultrasound for monitoring post-dates pregnancies
- Lack of access to medicines induction of labor

Review

Question 1 of 5

The definition of post-term pregnancy is a pregnancy that has reached:

- **A.** 40 weeks' gestation
- **B.** 41 weeks' gestation
- **C.** 42 weeks' gestation ✓
- **D.** 43 weeks' gestation

◀ Check Answer ▶

CHAPTER 8

Intrapartum fetal monitoring

SECTION 1

Epidemiology

85% of births in the US are monitored with electronic fetal monitoring

In a study of term babies with asphyxia, 63% had no risk factor

Electronic fetal monitoring has a high false positive rate

Electronic fetal monitoring decreases rate of neonatal seizures but does not decrease perinatal mortality or cerebral palsy

Electronic fetal monitoring increases cesarean and assisted vaginal delivery rates

Current guidelines are based on 2008 National Institute of Child Health and Human Development (NICHD) guidelines

Reinforced by 2009 ACOG Practice Bulletin and ALSO Intrapartum Fetal Surveillance workshop since 2009

Diagnosis

Baseline rate:

- Lasts at least 2 minutes during 10 minute period
- Rounded to nearest 5 beats per minute
- Normal 110-160 beats per minute
- Bradycardia <110
- Tachycardia >160

Variability:

- Absent
- Minimal -- less than 5 beat per minute variation
- Moderate -- 6-25 beat per minute variation
- Marked -- over 25 beat per minute variation

Accelerations:

- at least 15 beats above baseline at peak
- at least 15 seconds from start to end of acceleration
- 10 beats above baseline for 10 seconds before 32 weeks

Decelerations:

- Early -- head compression; mirrors contraction
- Variable -- cord compression
    - more concerning if: deeper, recurrent, “variable with late return”, absent or minimal variability, loss of “shoulders”, abnormal baseline, large overshoot
- Late -- placental insufficiency; beginning, peak and return delayed when compared with contraction
- Sinusoidal -- differentiate from “pseudo-sinusoidal”; ominous; associated with fetal anemia (causes include bleeding vasa previa, alloimmune disease, parvovirus)
- Recurrent -- occur with at least half of the contractions

Categories

Category 1:

- Baseline rate: 110–160 beats per minute
- Baseline FHR variability: moderate
- Late or variable decelerations: absent
- Early decelerations: present or absent
- Accelerations: present or absent

Category II

- everything which is not a category 1 or category III

Category III

• Absent baseline FHR variability and any of the following:

—Recurrent late decelerations

—Recurrent variable decelerations

—Bradycardia

• Sinusoidal pattern

Five-tier classification

- With three-tier system, majority of tracings are category II
- Five-tier system breaks category II stips into 3 categories
- Green, Blue, Yellow, Orange, Red
- Downside: complicated
- Outcome studies in progress
- App: FHR 5-Tier

Algorithm for management of category II heart tracings

- Article containing algorithm
- Web based algorithm: http://cat2.perigen.com/cat2/

- Hyperstimulation is non-specific term and should be avoided; instead refer to tachysystole if there are too many contractions
- tachysystole -- more than five contractions within 10 minutes averaged over 30 minutes
- Tachysystole should be further qualified with the presence or absence of decelerations

Fetal pulse oximetry

- not shown to improve outcomes

Structured intermittent auscultation

- listen to heart rate through a contraction every 15-30 minutes in active labor
- listen to heart rate through a contraction every 5-15 minutes during the second stage of labor

Management

Structured Intermittent Auscultation

- For low-risk deliveries
- Those who are not candidates include:
    - Hypertensive disorders of pregnancy, insulinHypertensive insulin-dependent gestational diabetes, history of previous Cesarean or other uterine surgery, maternal substance abuse, SLE and other maternal illnesses which can affect the placenta and fetal status, vaginal bleeding
    - Concerning fetal heart tracing, IUGR, fetal anomaly, multiple gestation, preterm labor (<37 weeks), meconium
    - Epidural, pitocin, cervadil, , misoprostil, initially , after nubain
- Switch to electronic fetal monitoring if indication including development of new risk factor (for example high blood pressure, oxytocin augmentation or epidural) or concerning fetal heart rate (for example abnormal baseline, decelerations or bradycardia)
- Try resuscitative maneuvers below

Electronic fetal monitoring

With concerning fetal tracings, consider:

- position changes
- IV fluids
    - Ideally 1 liter bolus
- oxygen
    - It is unclear whether oxygen is helpful; use when other resuscitative measures have not worked
- cervical check
    - eval for prolapsed cord
        - if prolapsed cord, elevate head, trendellenberg, pitocin off, terb 0.25mg SQ, head to OR
    - Evaluate dilatation and station
- turning off pitocin +/- giving terbutiline for tachysystole with decelerations
- giving IV fluids and calling anesthesia for ephedrine if maternal hypotension and late decelerations after an epidural
- amnioinfusion for repetitive variable decelerations
    - 500 normal saline via double lumen IUPC, then 100cc per hour
    - make sure there is return of fluid

- warm if preterm

- try scalp stimulation or acoustic stimulation
  - NOT therapeutic
  - If acceleration, reassurance that baby has reserve
  - If no acceleration, uncertain whether reserve

Category 1 tracings -- no action is required

Category 2 tracings -- ongoing evaluation. Depending on the situation, further evaluation or intervention may be indicated

Category 3 tracings -- If no rapid response to measures above, consider expedited delivery with cesarean section or assisted vaginal delivery.

Note:

- moderate variability has a 98% negative predictive value for fetal acidosis or 5 minute APGAR<7
- minimal or absent variability with recurrent late decelerations has a 23% positive predictive value for fetal acidosis or 5 minute APGAR<7 with absent variability more predictive

Bradycardia:

- Consider underlying cause:
  - Fetal hypoxia
  - Prolonged cord compression
  - Cord prolapse
  - Tetanic uterine contractions
  - Paracervical block
  - Epidural and spinal anesthesia
  - Maternal seizures
  - Rapid descent
  - Vigorous vaginal examination

Tachycardia:

- Consider underlying cause:
  - Chorioamnionitis
  - Fetal hypoxia
  - Maternal fever
  - Hyperthyroidism

- Maternal or fetal anemia
- Parasympatholyticdrugs drugs ----Atropine, Hydroxyzine (Atarax)
- Sympathomimetic drugs --- Ritodrine, Terbutaline
- Fetal tachyarrhythmia
- Prematurity

References

ACOG Practice Bulletin:

(search Ebling Library PubMed Single Citation Matcher)

ACOG Practice Bulletin No. 106: Intrapartum fetal heart rate monitoring: nomenclature, interpretation, and general management principles

ACOG practice bulletin No 116: management of intrapartum fetal heart rate tracings

ACOG Committee Opinion:

(search Ebling Library PubMed Single Citation Matcher)

Amnioinfusion does not prevent meconium aspiration syndrome: ACOG Committee Opinion No. 346

Five-tier classification system:

(search Ebling Library PubMed Single Citation Matcher)

A framework for standardized management of intrapartum fetal heart rate patterns

Cochrane Reviews:

Amnioinfusion for meconium-stained liquor in labour

Amnioinfusion for potential or suspected umbilical cord compression in labour

Antenatal cardiotocography for fetal assessment

Cardiotocography versus intermittent auscultation of fetal heart on admission to labour ward for assessment of fetal well-being

Continuous cardiotocography (CTG) as a form of electronic fetal monitoring (EFM) for fetal assessment during labour

Fetal and umbilical Doppler ultrasound in high-risk pregnancies

Fetal electrocardiogram (ECG) for fetal monitoring during labour

Fetal pulse oximetry for fetal assessment in labour

Fetal vibroacoustic stimulation for facilitation of tests of fetal wellbeing

Internal versus external tocodynamometry during induced or augmented labour

Management of reported decreased fetal movements for improving pregnancy outcomes

Maternal oxygen administration for fetal distress

Near-infrared spectroscopy for fetal assessment during labour

Tocolytics for suspected intrapartum fetal distress

Late decelerations on fetal monitoring are thought to indicate which one of the following?

- ✅ **A.** Answer 1
- **B.** Answer 2
- **C.** Answer 3
- **D.** Answer 4
- **E.** Answer 5

Check Answer

SECTION 5

Ethics

Lindsay Lewis is an 28yo G3P1011@37 weeks 0 days by LMP c/w 18 week ultrasound who was admitted in active labor at 5cm with intact membranes. Ms. Lewis' pregnancy has been been complicated by IUGR discovered on ultrasound this week ordered because her fundal height at 36 weeks was 32 cm. Her umbilical dopplers and biophysical profile were normal two days earlier. Ms. Lewis is asking to be taken off the monitor to smoke and does not want to wear the monitors when she is in bed because they make her uncomfortable.

What is your approach?

Developing countries

- Lack of access to electronic fetal monitoring
- Reliance on fetoscope for intermittent fetal auscultation
    - Every 15 minutes in active labor
    - Every 5 minutes in second stage of labor
- Structured intermittent auscultation is equivalent to electronic fetal monitoring in detecting deteriorating fetal status in low risk pregnancies

Global ALSO

(Disclosure -- Lee Dresang is Chief Editor/author for Global ALSO; no royalties received from sales)

Videos

Electronic fetal monitoring -- Chalk talk

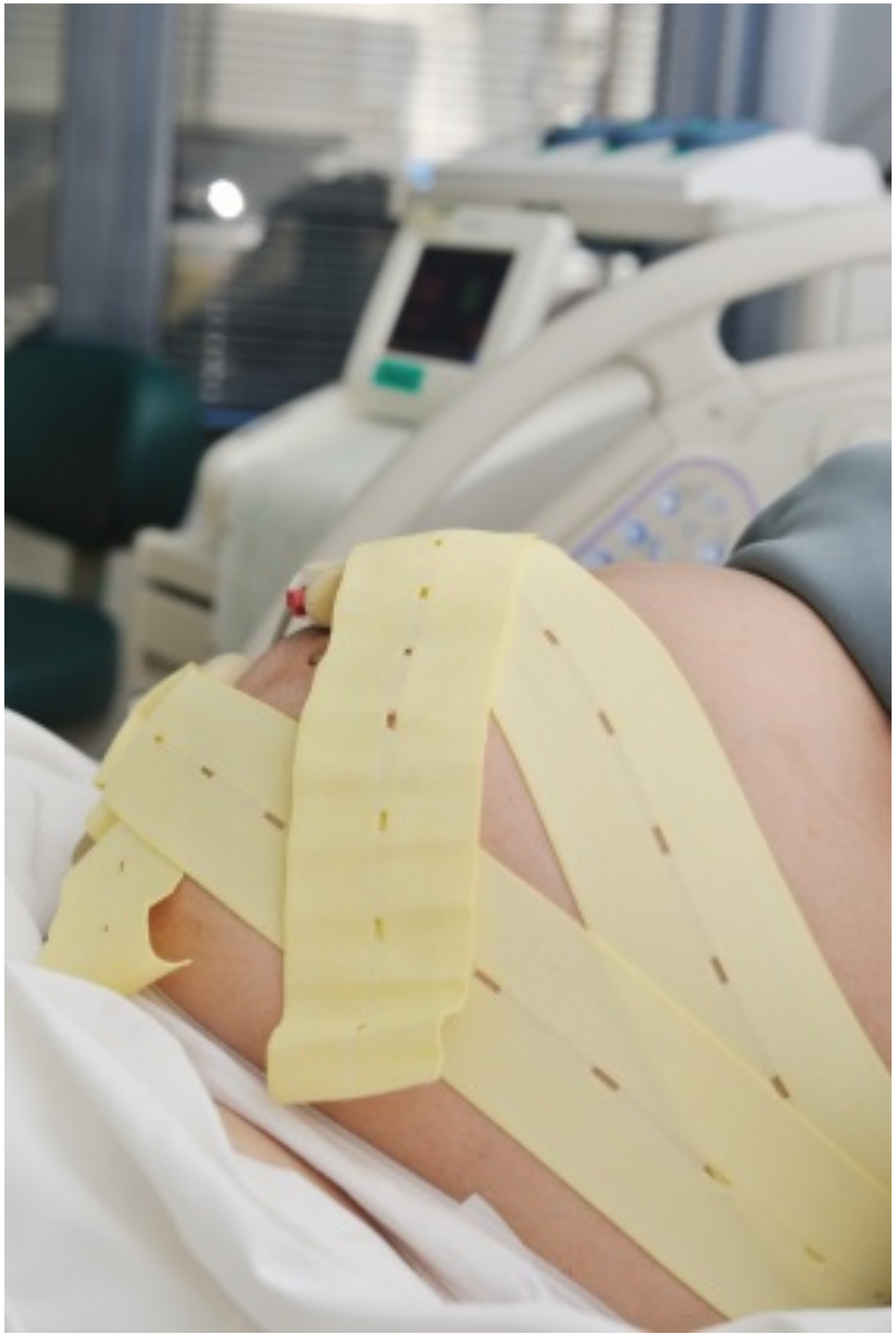
Review

Question 1 of 5

Late decelerations on fetal monitoring are thought to indicate which one of the following?

- **A.** Fetal head compression
- **B.** Umbilical cord compression
- **C.** Fetal sleep
- **D.** Uterine hypotonus
- ✓ **E.** Uteroplacental insufficiency

◀ Check Answer ▶



CHAPTER 9

Nausea and vomiting in pregnancy

SECTION 1

Epidemiology

- Nausea with no vomiting effects 25% of pregnant women
- Nausea with vomiting effects 50% of pregnant women
- Hyperemesis gravidarum affects 0.5-2 percent of pregnant women
    - Most common reason for hospital admission in first trimester
- Risk factors include:
    - family or personal history
    - Migraines
    - larger placenta
    - female fetus

Diagnosis

- Underreported
- Assess each woman's perception of her severity of symptoms
- Assess each woman's desire for treatment
- Monitor weight
- Hyperemesis gravidarium
    - No universally accepted diagnosis criteria
    - Some define as more then 5% weight loss from pre-pregnancy weight
- Differential diagnosis includes:
    - thyroid disorders
        - however 70% of women with hyperemesis gravidarium will have low TSH and elevated free T4; usually resolved by 20 weeks
        - only order Free T4 and TSH if goiter
        - hyperthyroidism usually does not cause significant emesis
    - UTI
    - gastroenteritis
    - drug side effect
    - migraines
    - multiple gestation
    - molar pregnancy

Management

Preconception counseling

- Two studies showed that women taking a multivitamin at the time of conception were less likely to need medical attention for emesis

Non-medical management

- frequent, small meals
- Dry foods (crackers)
- Bland foods
- Ginger (make sure contains ginger -- many forms of ginger ale do not)
- Rest
- Avoidance of stimuli which exacerbate symptoms
- Acupressure points
    - P6 or Nenguian Point no better than placebo, but large placebo effect

Medical management

- vitamin B6 every 6-8 hours
    - vitamin B6 + doxylamine removed from US market in 1983
    - 10mg vitamin B6 + 10mg doxylamine available through compounding pharmacies
- Emetrol (phosphorated carbohydrate) 15-30 mL PO q15 min until vomiting stops; not to exceed 5 doses/hr (Category A)
- Metoclopramide (reglan) 10mg 30 minutes before meals and bedtime (category B)
- Odansterone (Zofran) 4-8 mg bid (category B) $$$
- Prochloroperazine (Compazine) 5-10mg po every 6-8 hours; 25mg rectally bid (category C)
- Promethazine (Phenergan) 12.5-25 mg po or rectally every 4-6 hours (category C)
- Thiamine, intravenously, 100 mg daily for 2–3 days (followed by intravenous multivitamins), is recommended for every woman who requires intravenous hydration and has vomited for more than 3 weeks for prevention of Wernicke's encephalopathy

Total parenteral nutrition (TPN)

- For weight loss despite medicines

Hospitalization

- For weight loss despite outpatient treatment

References

ACOG Practice Bulletin:

(search Ebling Library PubMed Single Citation Matcher)

ACOG (American College of Obstetrics and Gynecology) Practice Bulletin: nausea and vomiting of pregnancy

Cochrane Reviews:

Interventions for nausea and vomiting in early pregnancy

Interventions for preventing nausea and vomiting in women undergoing regional anaesthesia for caesarean section

Ethics

Violet Childress is a 15yo G1P0@ 10 weeks by 6 week ultrasound who is seeing you with severe nausea and vomiting of pregnancy. She is living with her parents but has not told them that she is pregnant. She asks you for a note stating that she has a bad flu and that does not mention that she is pregnant.

How do you respond?

(search Ebling Library PubMed Single Citation Matcher)

Minor's rights versus parental rights: review of legal issues in adolescent health care

Developing countries

- consequences of hyperemesis gravidarium are greater when there is baseline malnutrition or anemia from malaria
- allopathic medicines may not be available
- traditional medicines or non-medical approaches (such as acupressure/acupuncture) may play a greater role in management of nausea and vomiting of pregnancy

Videos

Morning sickness during pregnancy

Review

Question 1 of 5

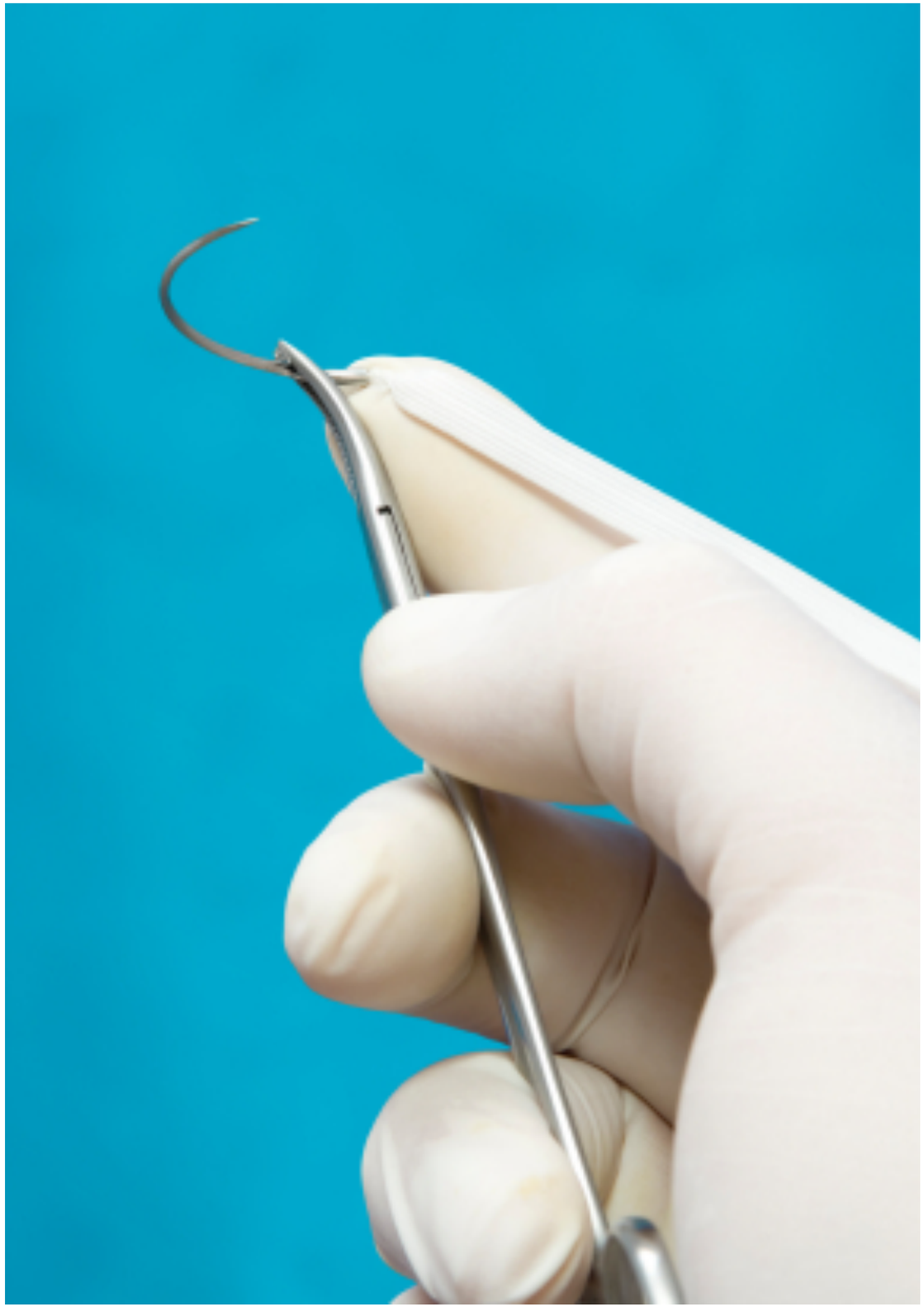
Which of the following is a category B medicine for nausea and vomiting in pregnancy?

- **A.** Promethazine (Phenergan)
- **B.** Prochlorperazine (Compazine)
- ✓ **C.** Metoclopramide (Reglan)
- **D.** Carbamezapine (Tegretol)

◀ Check Answer ▶

Chapter 10

Suturing



SECTION 1

Epidemiology

- perineal laceration repair is one of the most commonly performed maternity care procedures
- 51-77% of women have a laceration needing repair following delivery
- 3-4% of deliveries result in a third or fourth degree lacerations
- potential sequelae include chronic perineal pain, dyspareunia, and urinary and fecal incontinence
- 20-50 precent of women have rectal incontinence or urgency after a third degree repair
- perineal massage once or twice a week from 35 weeks can reduce the risk of perineal lacerations

Diagnosis

- 1st degree perineal laceration -- epithelium only
- 2nd degree perineal laceration -- perineal muscles
- 3rd degree perineal laceration -- external anal sphincter
- 4th degree perineal laceration -- rectal mucosa
- periurethral laceration -- anterior laceration near urethra
- complex laceration -- may involve multiple extensions, perineum and one or both vulva

Management

Please see suture workshop podcast from UW DFM Digital Media Library

- Anesthesia
  - Local
    - Lidocaine max dose 4 mg/kg to 280 mg (14 ml 2%, 28 ml 1%)
    - Lidocaine with epi max dose 7 mg/kg to 500 mg (25 ml 2%, 50 ml 1%)
  - General
    - For complex or extensive repairs
- Vicryl causes less pain than Chromic or catgut for perineal repair
- Use pickups; don't grab needle with hand to decrease risk of needle stick
- 1st degree perineal laceration
  - May not require repair
  - Repair if bleeding despite applying pressure
- 2nd degree perineal laceration
  - Variety of acceptable techniques
  - 3 stage repair
    - anchoring suture above apex in vaginal floor; running locking 3'0 vicryl to hymenal ring
    - transition stitch; close dead space transversely reapproximating bulbocavernosis and transverse perineal muscles with non-locking running sutures
    - transition to apex and run subucateously to reapproximate skin (Optional)
- 3rd degree perineal laceration
  - 0 vicryl or 2'0 vicryl
  - PISA (Posterior, Inferior, Superior, Anterior) technique
  - Overlapping technique (preferable)
  - Close fascial capsule (not just muscle)
  - 2nd degree repair after repairing anal sphincter
  - Stool softener for 6 weeks
- 4th degree perineal laceration
  - Irrigate copiously
  - 2nd or 3rd generation cephalosporin prior to repair

    - Interrupted or running 4’0 vicryl to reapproximate rectal mucosa to anal verge; try not to penetrate entire mucosa to anal canal
    - Reapproximate internal rectal sphincter
    - 3rd degree repair after closure anal sphincter
    - Do not take down repair if suture palpated in anal canal after repair
    - Stool softener for 6 weeks
- Periurethral laceration
    - May not require repair
    - Repair if needed to restore anatomy
    - Repair if bilateral (or labia may fuse together during healing)
    - Repair to reduce burning during urination
    - Place catheter to avoid placing suture through urethra
    - Running 3’0 or 4’0 vicryl through epithelium

Complex laceration

- May need to repair one part of laceration, tie off and then repair another

References

American Family Physician:

Repair of obstetric perineal lacerations

Cochrane Reviews:

Absorbable suture materials for primary repair of episiotomy and second degree tears

Antenatal perineal massage for reducing perineal trauma

Continuous and interrupted suturing techniques for repair of episiotomy or second-degree tears

Episiotomy for vaginal birth

Methods of repair for obstetric anal sphincter injury

Surgical repair of spontaneous perineal tears that occur during childbirth versus no intervention

SECTION 5

Ethics

Lizbeth Juarez is a 32 yo G1P0 who just delivered a 9#8oz girl. You are a resident and your attending is supervising your repair. You tell your attending you think Ms. Juarez may have a third degree perineal tear. Your attending assures you it is just a large second degree laceration and asks you to proceed with the second degree repair in the usual fashion. You don't have any experience with third degree laceration repairs but your gut tells you you are right.

What do you do?

TeamSTEPPS

Developing countries

- Unrecognized/un-repaired third and fourth degree lacerations can lead to incontinence and fistulas
- Lack of suture, sterile instruments and anesthesia can complicate repair
- Prevention of fistula requires identification of labor obstruction and access to assisted vaginal delivery and cesarean delivery
- Episiotomy should be avoided

Global ALSO

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Videos

NEJM -- Basic Laceration Repair

Suture - Basic Technique 1

Surgical Knot Tying - One / Two Handed Knot and Surgeon's Knot -- LEFT HANDED

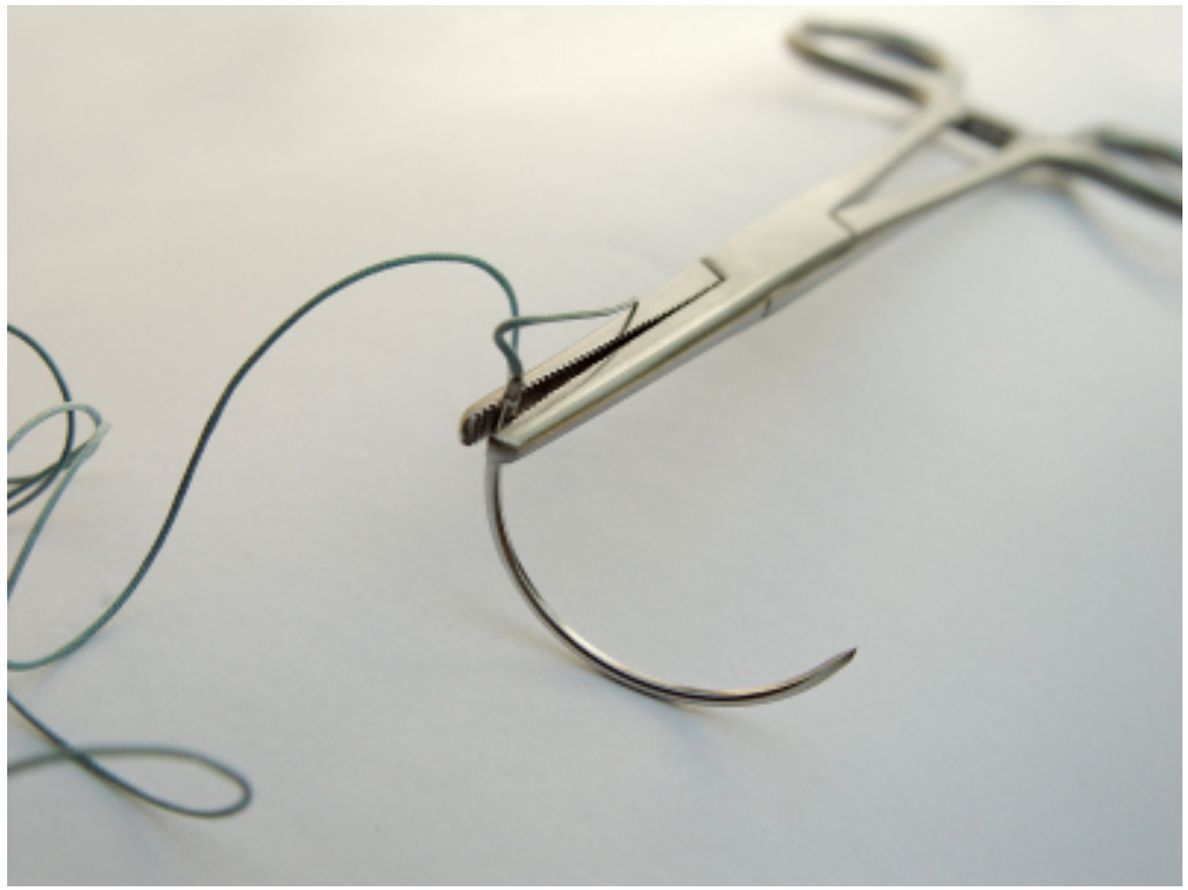
Review

Question 1 of 5

You discover a 10-cm enlarging hematoma adjacent to the episiotomy site in a patient whose baby you delivered 6 hours ago. The

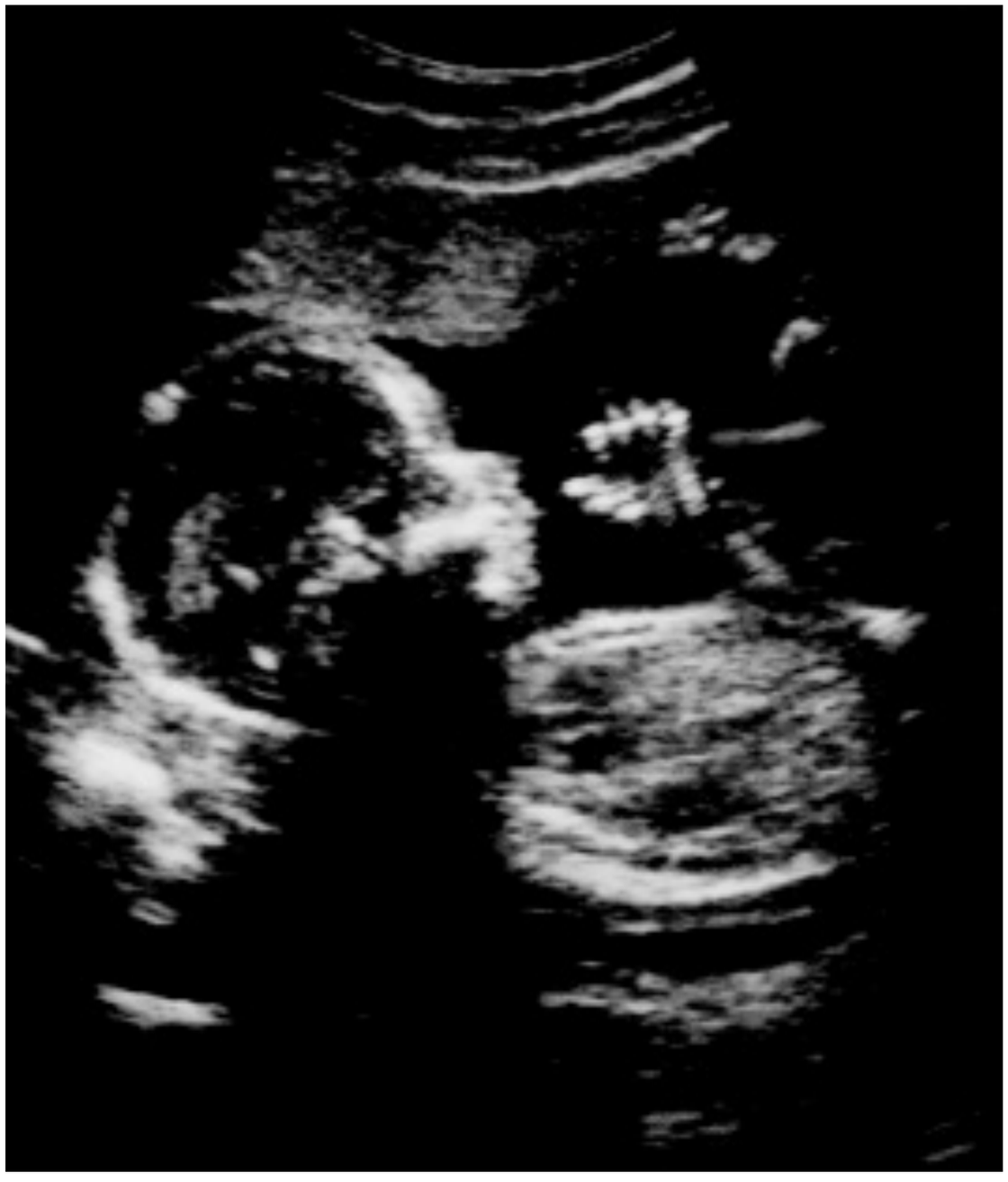
- **A.** A perineal pad and cold com-
- **B.** Removal of the sutures and clots,
- **C.** Hypogastric artery ligation
- **D.** Needle aspiration of the he-

◀ Check Answer ▶



CHAPTER 11

Ultrasound



SECTION 1

Epidemiology

- Most women have at least one ultrasound in pregnancy
- American Institute of Ultrasound in Medicine (AIUM) determines requirements for scanning
    - certifies practices, but not individuals
- anatomic survey after 18 weeks
- ultrasound before 20 weeks good for dating
- umbilical doppler only helpful in monitoring intrauterine growth restriction (IUGR)
- 90% of women with congenital anomalies have no risk factors
- 40% sensitivity for detecting fetal anomalies

Diagnosis

- ALSO level basic “labor and delivery” level scan
    - fetal number
    - fetal viability
    - fetal presentation
    - placental location
    - amniotic fluid index
        - Sum of deepest pocket in 4 quadrants of abdomen
        - Always hold transducer perpendicular to back
        - Normal 8-20
- Complete scan
    - fetal biometry
    - anatomic survey
    - adnexa
    - components of limited scan
- Biophyscical profile
    - 2 -- fetal movement
    - 2 -- flexion/extension
    - 2 -- fetal heart rate (NST)
    - 2 -- amniotic flud assessment
    - 2 -- tone
- Cervical length
    - only indicated for high risk pregnancies (prior preterm delivery, LEEP)
    - IUGR
        - less than 10% EFW for gestational age
        - symmetric vs aysmmetric

Management

- 3 day ultrasound course sponsored every other year
- Supervised scanning 50-200 exams
- first trimester scan
    - intrauterine yolk sac documents intrauterine pregnancy
    - Without yolk sac or embryo, may be pseudogestational sac (with ectopic pregnancy) or missed abortion (blighted ovum)
- earliest scan used for dating
- 4D ultrasound only indicated for abdominal wall defects
- Document thoroughly
- Oligohydramnios
    - GU anatomic abnormality
    - placental insufficiency
    - postdates
- Polyhydramnios
    - ENT, neuromuscular, upper GI or alloimmune abnormality
- Gestaional DM
- Ideopathic

References

ACOG Practice Bulletin:

(search Ebling Library PubMed Single Citation Matcher)

ACOG Practice Bulletin No. 101: Ultrasonography in pregnancy

Cochrane Reviews:

Amniotic fluid index versus single deepest vertical pocket as a screening test for preventing adverse pregnancy outcome

Cervical assessment by ultrasound for preventing preterm delivery

Fetal and umbilical Doppler ultrasound in high-risk pregnancies

Fetal and umbilical Doppler ultrasound in normal pregnancy

Routine ultrasound in late pregnancy (after 24 weeks' gestation)

Ultrasound for fetal assessment in early pregnancy

Utero-placental Doppler ultrasound for improving pregnancy outcome

American Institute of Ultrasound in Medicine (AIUM):

Practice guideline for the performance of obstetric ultrasound examinations

SECTION 5

Ethics

Betzaida Beniquez is a 24yo G3P2002@8w2d by LMP seeing you for her first prenatal visit. She is wondering about genetic screening options. How do you counsel her?

What risks are involved in genetic testing?

Do you think how patients are counseled affects the decisions they make? If so, how?

(search Ebling Library PubMed Single Citation Matcher)

ACOG Committee Opinion No. 410: Ethical issues in genetic testing

Developing countries

- Basic ultrasound can have high impact
    - Detection of malpresentation in time for intervention
    - Detection of placenta previa in time to deliver in facility with cesarean capabilities and blood bank
    - Detection of multiple gestation in time to manage pregnancy and delivery accordingly

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Videos

Fetal Medicine Foundation -- Fetal echocardiography

Pregnancy week by week -- Mayo Clinic

Ultrasound Training: Assessment of Fetal Growth and High-Risk Pregnancies

How to: OB Ultrasound - Normal Pregnancy Case Study

Review

Question 1 of 5

Which one of the following fetal ultrasound measurements gives the most accurate estimate of gestational age in the first trimester (up to 14 weeks)?

- **A.** Femur length
- **B.** Biparietal diameter
- ✓ **C.** Crown-rump length
- **D.** Scapulo-sacral length
- **E.** Abdominal circumference

◀ Check Answer ▶