ABDOMINAL PAIN DURING PREGNANCY
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Life is tough enough without having someone kick you from the inside. –

THE APPROACH
- Similar to the non-pregnant except...
  - Consider the new physiologic/anatomic changes
  - Fetal well-being and gestational age
  - Some causes may be more common or related to obstetrical complications

ANATOMY AND PHYSIOLOGY
- Always a must review
  - Uterus becomes an abd organ at 12 weeks
  - Enlargement may impede PE
  - Affects normal location of organs
  - Mask or delay peritoneal signs
  - Laxity of abd wall may diminish peritoneal signs

Kidneys
- Mild hydronephrosis
- Dilated ureters/renal pelvis
  - Right greater than left
- Renal plasma flow increases 75%
- Mean value 840 ml/min
- Excretes more HCO3 –

Uterus
- aortocaval compression

Diaphragm
- Higher position up to 4 cm
- Chest diameter increases 2 cm or more
- Barrel shaped chest
- Slowed motility and GB emptying
- Slowed gastric emptying
- Lower esophageal sphincter tone

Peritoneum
- Small amounts of peritoneal fluid is normally present

Musculoskeletal
- Widened symphysis pubis and sacroiliac joints

VITAL SIGNS
- HR
- BP
- Resp
- Temp
- 83 +/- 10
- Pre pregnancy +/- 10%
- Increases 2-3 breaths/min
- 1-2 degrees...less than 100.4
**PHYSIOLOGIC**
- WBCs increase to a normal
  - 10,000-14,000
- Bandemia is not normal
- Modest decrease in Hgb
  - 10.5 to 11

**GENERALITIES**
- Abdominal discomfort is common
- Pain Red Flags
  - Severe
  - Sudden
  - Constant
  - Associated with N/V, vaginal bleeding
  - Upper abdomen
- The above suggest disease rather than normal physiological entities
- **PERITONEAL SIGNS ARE NEVER NORMAL**

**EXAMPLE**
- N/V
  - Common in early pregnancy usually abate
  - Normal
  - N/V not normal
    - abd pain
    - fever
    - diarrhea
    - Headache
    - localized abd findings

**NON-PREGNANT RELATED CAUSES**
- Acute appendicitis
- Gallbladder disease
- Bowel obstruction
- Inflammatory bowel disease
- Pancreatitis
- Diverticulitis
- Perforated Ulcer
- Nephrolithiasis
- Trauma
- Pneumonia
- GE

**ACUTE APPENDICITIS**
- Most common cause of acute surgical abd in pregnancy
- Ranges from 0.06 to 0.1%
  - Slightly higher in second trimester
  - Infected appendix more likely to rupture possibly because of delay in diagnosis and intervention
- Less likely than age-matched nonpregnant women
- What is the most common symptom of appendicitis?

- Right lower quadrant pain
  - Occurs close to McBurney’s point to the vast majority
  - Even though the appendix migrates a few centimeters cephalad
- **Dx**
  - Can be complicated because of the physiologic change of WBCs
  - N/V with pain not just N/V
  - Pyuria may be treated as UTI when the actual diagnosis is appendicitis
  - Peritoneal findings may be less prominent
    - Lift and stretch anterior abd wall away from inflamed appendix
IMAGING
- Imaging of choice graded compression U/S
  - Noncompressible blind ended tubular structure RLQ with diameter greater than 6mm
  - Gravid uterus can interfere
- MRI
  - Prolonged wait before and during MRI
  - Increased risk of rupture
- CT
  - RLQ inflammation, enlarged nonfilling tubular structure and/or appendicolith
  - Can limit fetal radiation to less than 300 mrad

MANAGEMENT
- Consult a general surgeon
- Delay for more than 24 hours increases the risk of perforation
- Risk of fetal loss is higher in patients with perforation
- Surgery is not without its risk
  - Maternal morbidity is low
  - Pregnancy complications are frequent particularly in 1st and 2nd trimester

GALLBLADDER DZ
- Pregnancy increases risk of gallstone formation
  - Risk remains elevated for 5 years
- Pain is usually deep and gnawing with occasional sharp/severe pains
  - Crescendo over a number of hours then resolves
- Localized to RUQ/epigastrium
- Acute cholecystitis = right upper quadrant pain, fever, and leukocytosis associated with gallbladder inflammation

CHOLELITHIASIS
- Pregnancy increases bile lithogenicity & sludge formation b/c estrogen increases cholesterol synthesis and progesterone impairs gallbladder motility
- >12% pregnancy compared to 1-2% controls
- Pregnancy does not increase severity of complications
- Most gallstones are asymptomatic
CHOLELITHIASIS

Symptoms:
- Biliary colic in epigastrium/RUQ
- May radiate to back, flank, or shoulders
- Pain often associated with post prandial states (especially fatty foods)
- Pain typically lasts 1 to several hours
- Diaphoresis, nausea, & emesis common

Physical exam often unremarkable apart from occasional RUQ tenderness

1/3 patients no additional episode X 2 yrs
Complications of cholelithiasis include cholecystitis, choledocholithiasis, jaundice, cholangitis, biliary stricture, sepsis, abscess, empyema, gallbladder perforation, & gallstone pancreatitis

CHOLECYSTITIS

- Inflammation usually caused by cystic duct obstruction & supersaturated bile
- 3rd most common nonobstetric surgical emergency
- Same symptoms but pain more prolonged
- Often get tachycardia, fever, R subcostal tenderness, & Murphy’s sign
- Leukocytosis common
- Serum LFT’s may be slightly abnormal
- Jaundice may suggest choledocholithiasis

TX FOR CHOLECYSTITIS

- Cholecystectomy
- Pre-op NPO, IV fluid, abx
- Abdominal surgery best in T2
- T1 associated with fetal abortion & T3 with premature labor
- Cholecystectomy may be deferred in appropriate cases
- Lap chole safe in earlier pregnancy
- Intraoperative cholangiography only for strong indications
- Maternal & fetal mortality < 5%

CHOLEDOCHOLITHIASIS

- Abdominal pressure & jaundice
- Endoscopic u/s
- Fever/chills, leukocytosis, n&v
- ERCP & sphincterotomy with cholecystectomy PP

INFLAMMATORY BOWEL DISEASE

- Look for changes in bowel movements (loose, bloody or mucus), fever and weight loss

- Diverticulitis
  - Been described in case reports, usually from Meckel’s diverticulum
What is Meckel’s diverticulum?

- a true congenital diverticulum, small bulge in small intestine that is present at birth. Remnant of the omphalomesenteric duct. 2% of the population have it more frequently male

GERD

- Up to 80% in pregnancy
- Gastric compression by uterus & gastrointestinal dysmotility
- Epigastric discomfort, nausea, emesis, anorexia, regurgitation, water brash
- PUD decreases secondary to decreased gastric secretion, decreased motility, & increased mucus secretion

TREATMENT OF GERD

- Lifestyle modifications
- H2 Blockers
- PPI’s
- Consider deferring H Pylori eradication until PP because of possible teratogenic effects of certain medication regimes
- Surgery for GERD best delayed until PP

- GI Bleeding
- Esophagogastroduodenoscopy (EGD) for bleeding & surgery if unstable as fetus tolerates maternal hypotension poorly

PERFORATED ULCER

- History of PUD
  - Pain is sudden and severe, diffuse
  - Tachycardia, low temperature and peritoneal signs evolve over the first 12 hours

PYELONEPHRITIS

- Renal alterations in 70-90%
- More pronounced T2 & T3 when risk pyelonephritis is greatest
- Asymptomatic bacteriuria (ASB) in about 7%
- Acute cystitis 2%
- ASB treated to prevent pyelonephritis (cephalosporins, nitrofurantoin ...)
- 25-40% untreated ASB develop pyelo
- 30% retreatment
**Peyonephritis**
- Acute pyelo in 1-2% pregnancies
- Symptoms & Signs:
  - Fever/chills
  - N & V
  - Flank pain
  - CVA tenderness
- Complications include sepsis, shock, ADRS, Pulmonary edema, renal insufficiency/abscess, & recurrent infection

**Peyonephritis**
- Tx is IV abx until patient clinically improves and then PO abx
- Renal u/s if no improvement after 3 days
- Associated with preterm labor and delivery

**Nephrolithiasis**
- Usually occurs in 2 and 3rd trimester
- Acute flank pain (90%)
- Hematuria present in 75-95%
- Usually occurs in 2 and 3rd trimester with acute flank pain (90%)
- Hematuria present 75-85%

**Nephrolithiasis**
- Symptomatic < 5/1000 pregnancies but accounts for the most nonobstetric hospitalizations
- About 50% causes by hypercalciuria
- Usually T2 or T3
- Symptoms & Signs:
  - Abdominal/flank pain often radiating to groin
  - Gross hematuria, urgency, frequency
  - N&V, diaphoresis, fever/chills
  - Fluoroscopy relatively contraindicated
  - U/S initial test of choice
  - Tx includes hydration, analgesia, & abx if infection – most responds well
  - Obstruction, sepsis requires ureteral stent
  - Surgery in refractory cases
  - Risk premature labor

**Acute Pancreatitis**
- 0.1-1% pregnancies
- Most common T3 & PP
- Gallstones cause > 70%
- EtOH uncommon but other causes include drugs, surgery, trauma, etc
- Pregnancy does not affect
- Epigastric pain most common complaint
- Pain may radiate to back, shoulders, or flanks
- Nausea, emesis, fever common
ACUTE PANCREATITIS CONT...

- Signs:
  - Midabdominal tenderness
  - Occasional rebound
  - Guarding
  - Hypoactive BS
  - Distension
  - Tympany

Elevated Lipase

U/S for cholelithiasis & bile duct dilation

Endoscopic u/s for choledocholithiasis

Pancreatitis in pregnancy usually mild and responds well to medical therapy
- NPO
- IV fluids
- Gastric acid suppression
- Analgesia
- ? NGT suction

Severe pancreatitis with abscess, sepsis, phlegmon requires ICU, Abx, TPN, & possible radiologic/surgical intervention

Pregnancy should not delay CT or surgery in these cases

Endoscopic spincterotomy can be performed during pregnancy with minimal fetal radiation exposure

Maternal mortality low with uncomplicated but > 10% with complicated pancreatitis

T1 – fetal abortion ; T3 – preterm labor

TRAUMA

- A whole other lecture

PNEUMONIA

- Involving lower lobes in a common cause of abd pain

GYNECOLOGICAL CAUSES
GYNECOLOGIC CAUSES

- Ovarian torsion
  - Presentation of torsion is similar in both preg and non preg states
  - Low abd pain, nausea, vomiting, low grade fever, leukocytosis
  - Most common in first trimester
  - Adnexal mass palpable in early preg

- Rupture of ovarian cyst
  - Sudden unilateral lower abd pain
  - Often begins during physical activity
  - May be accompanied by bleeding into pelvis and hemodynamic instability

GYNECOLOGIC CAUSES

- PID
  - Rare to have PID during pregnancy
  - It can occur in the first 12 weeks of gestation before the mucus plug and the decidua seal off the uterus from ascending bacteria

ABDOMINAL PAIN

PREGNANCY-RELATED CAUSES
ABORTIONS

TERMINOLOGY
- Spontaneous abortion
- Threatened abortion
- Inevitable abortion
- Complete abortion
- Incomplete/missed abortion
- Blighted ovum (aneembryonic pregnancy)
- Habitual/recurrent abortion

THREATENED ABORTION
- Threatened Ab: bleeding or cramping with closed cervix in first half of pregnancy
- Inevitable Ab: above with dilatation of cervix
- Complete Ab: all products have been expelled
- Incomplete Ab: POC remain in uterus
  - Missed: death of the fetus with no signs or symptoms of pregnancy loss
- Habitual Ab: three or more Abs in succession
- Septic Ab: uterine infection with POC in uterus

INEVITABLE ABORTION
- Cervix is open
- Management
  - Observation
  - Medical therapy (misoprostol)
  - Surgical evacuation of the uterus
    - manual vacuum aspiration (MVA)
    - dilation and curettage (D&C)

Bed rest does not prevent loss
- Pelvic rest is advised
- Even though nothing can be done, constant f/u with patient is warranted
- Give strict warning signs, anticipate complications, heavy bleeding
- If Rh neg: give Rhogam within 72 hours
Incomplete abortion
- Cervix is open, incomplete expulsion
- Observation
- Medical therapy (misoprostol)
- Surgical evacuation of the uterus

Completed spontaneous abortion
- Completed expulsion
- If tissue is available for examination, inspect for villi

Misoprostol
- 600 micrograms intravaginally
- Second dose if miscarriage was not complete by day 1
- If miscarriage was not complete by day 7, evacuation of retained products was performed

Misoprostol versus Expectant Management
- Overall success 88.5% miso (46/52) versus 44.2% EM (23/52)
- Incomplete: no significant difference in success rate (100 miso versus 85.7% EM)
- Early pregnancy failure success 87% miso versus 29% with EM (OR 13.96)
- Time to completion
  - by day 1 (92.7 miso versus 5.8% EM)
  - by day 2 (75.1 miso versus 13.5% EM)
- No differences in side-effects, bleeding duration, analgesia use, pain score and satisfaction with treatment.
- Fewer outpatient visits (4.4 miso versus 5.06 EM)
- More women in the medical group (90.4 versus 73.1%; OR 1.26, 95% CI 1.05, 1.5) would elect the same treatment in the future.

Lessons
- These patients need follow up either as an
  - Immediate consult
  - 48 hour follow up with repeat quant


Blighted Ovum
- For diagnosis, the sac must be of sufficient size that the absence of normal embryonic elements is established
  - anembryonic if a transvaginal ultrasound reveals a sac with a mean gestational sac diameter (MGD) greater than 13 mm and no yolk sac.
  - or an MGD >18 mm with no embryo.
  - transabdominal scan is a MGD of 25 mm or more without an embryo.
  - or an MGD of 20 mm or more without a yolk sac.
- Rather than do a transvaginal exam at the time of the initial visit, many centers prefer to do only a transabdominal study and offer mothers a follow-up ultrasound 10 days later to see if a normal pregnancy subsequently develops.
LET'S TALK ABOUT THE ONE NO ONE WANTS TO MISS

- 15% of all maternal mortality
- 98% occur in the fallopian tube
- 2% other portions of cornua, cervix, ovary, abd
- Increased incidence with risk factors

ECTOPIC PREGNANCY
- Pregnancy that implants outside of the endometrial cavity of the uterus
- Risk factors:
  - Prior Tubal surgery (including tubal ligation)
  - Current Intrauterine device
  - In vitro fertilization
  - Prior ectopic pregnancy
  - Tobacco use
  - History of infertility
  - Prior PID
  - Advanced maternal age

CLINICAL PRESENTATION
- Pelvic/abd pain-100%
- Tenderness on exam-80%
- Bleeding-75%
- Amenorrhea-74%
- Adnexal mass-50%
- Diagnosis:
  - AWARENESS OF THE POSSIBILITY

PHYSICAL EXAM
- Orthostatic changes
- Pelvic exam:
  - Document
  - Abd pain
  - Adnexal masses/pain
  - CMT
  - Uterine size
  - Remember if early, exam may be normal
**ECTOPIC PREGNANCY**

- HcG >1500 with no IUP
- HCG not doubling in pt with vaginal bleeding
- Pseudosac
- Empty uterus-get HCG for correlation
  - May need to repeat the history/PE daily
  - Serial HCGs and US
- Evidence of DEFINITIVE IUP almost certain to exclude ectopic

**DIAGNOSIS- NOT ALWAYS SO CERTAIN**

- Don't be fooled by the double decidual ring still doesn't confirm an IUP

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**Ectopic Pregnancy**
Ectopic Pregnancy

Medical management
- Methotrexate: Folic acid antagonist inhibits dihydrofolate reductase and interferes with DNA synthesis, repair, and replication.
- Optimal candidates: hemodynamically stable willing to comply with posttreatment hCG <5000 no fetal cardiac activity mass size less than 3-4 cm.

Surgical management:
- Laparoscopy if the patient is stable
- Laparotomy if the patient is hemodynamically unstable
- Salpingostomy versus salpingectomy

Molar Pregnancy

Gestational Trophoblastic Disease
- Abnormal trophoblastic proliferation
  - Complete mole is 46XX (all paternal)
  - Partial moles have 69 chromosomes (maternal and paternal)
  - 1:1500-1:2000 pregnancies
- Up to 20% risk of malignancy, highest for complete
- High hCG levels
- More common in pts> 40 yo

“Snowstorm” appearance of engorged, grape-like chorionic villi

Molar Pregnancy
- Treatment is surgical evacuation
- Serial hCGs
GOLDEN RULES OF FIRST TRIMESTER BLEEDING
- Always check a pregnancy test
- Rule out ectopic
- Check the Rh status and give Rhogam regardless of the cause
- Don’t rely on bHCG in order to do the ultrasound—do the ultrasound
- Don’t be afraid to consult OB
- These patients need follow up

Which of the following is decreased during pregnancy?
- a). Cardiac output
- b). Urinary frequency
- c). Gastrointestinal motility
- d). Gastroesophageal reflux

Pelvic ultrasound is useful in the diagnosis of each of the following conditions except:
- a). Abruptio placenta
- b). Ectopic pregnancy
- c). Intrauterine pregnancy
- d). Molar pregnancy
- e). Placenta previa

A 15 yo female presents to the ED by ambulance pale, diaphoretic, and c/o sudden onset abd pain. During evaluation, the patient loses consciousness. Physical exam: BP 60/0, p140, rr 20, afebrile Abd soft, bs+, no masses, hemoccult negative, The diagnosis in this patient is
- a). Rule out ruptured appendix
- b). Rule out ectopic pregnancy
- c). Rule out renal colic
- d). Rule out ruptured aortic aneurysm
- e). Rule out cardiac arrhythmia

Which of the following statements regarding the diagnosis of appendicitis in pregnancy is correct?
- a). Positive urinary WBC esterase and bacterial nitrite are usually seen in appendicitis
- b). The appendix rotates from McBurney’s point as pregnancy progresses, ultimately lying near the midline in the upper abdomen
- c). The incidence of appendicitis is increased in pregnancy
- d). The incidence of perforated appendix is increased in pregnancy