

THE ACUTE ABDOMEN DURING PREGNANCY

Introduction

- 2% of pregnancies are complicated by nonobstetrical surgical problems
- The diagnosis of acute abdomen during pregnancy is challenging due to:
 - the blunting of symptoms
 - the enlarged uterus
 - the difficulty in evaluating the abdomen
 - Physiologic leukocytosis - white blood counts up to 16,000 and higher in the late stages.
- Common causes of acute abdomen are listed in Table 1.
- Imaging studies:
 - Although there are theoretical risks associated with ionizing radiation, most diagnostic radiographic procedures are associated with minimal or no risk to the fetus with doses of 5 rads or less(Table 2).
 - The risks are greater from 1st week after conception through week 25.
 - If there are good maternal indications, the benefits for the mother outweigh the small risks to the fetus.
 - Ultrasound
 - the most common and safest imaging technique.
 - Should be considered the first-line diagnostic test.
 - Judicious use with proper shielding and avoidance of repeat studies will minimize the radiation risk to the fetus.
 - Decision should involve the surgeon, radiologist and the mother.
- Surgery:
 - safest during the second trimester of pregnancy.
 - 1st trimester - pose a risk to the fetus
 - 3rd trimester - risk of premature labor.

Appendicitis

- The most common operative indication for nonobstetric surgery during pregnancy
- incidence of 1 in 1,500 deliveries representing more than 25% of the indications
- The diagnosis may be challenging because many of the symptoms of appendicitis are seen during pregnancy and due to dislocation of the appendix. (Fig 1).
- Pain in the right lower quadrant is the single most common and reliable symptom.
- Rebound tenderness and guarding are less frequently found in pregnant patients
- Ultrasonography –
 - study of choice
 - may be of limited value if bowel loops are distended.
- CT without contrast medium enhancement can be used.
- Helical CT - Advantage of being faster and safer compared to the standard CT scan.
- Treatment
 - Early diagnosis and immediate surgery.

- Incision should be made over the point of maximum tenderness (2nd and 3rd trimester).
- Uncertain diagnosis or peritonitis – midline incision
- Manipulation of the uterus should be avoided.
- Intraoperative or perioperative fetal monitoring is indicated for viable pregnancies older than 24 weeks.
- Tocolytics may be used to prevent preterm labor
- 2nd generation cephalosporin, extended-spectrum penicillin, or carbapenem are safe .
- Mortality is associated with the delay in treatment.
- Perforated appendix- fetal mortality up to 20% and maternal mortality 4%

Acute Cholecystitis

- 2nd most common cause: 1 in 1,600/ 1 in 10,000
- Pregnancy predisposes to gallstones due to increased bile stasis and decreased gallbladder contraction.
- Same symptoms as nonpregnant patients- unremitting RUQ pain, tenderness, guarding, and fever
- Murphy’s sign is less common in pregnancy
- Diagnosis-
 - Ultrasound
 - HIDA scanning is probably safe, although some authors believe it is contraindicated in pregnancy
- Initial management is medical (NPO, IVF, analgesia).
 - Cefazolin or an extended spectrum penicillin are relatively safe.
- Surgery – indicated for patients who fail to respond to medical therapy.
- IOC may be performed with the use of fetus shield.
- Delay of surgery in a patient with cholecystitis may increase perinatal morbidity.
- Laparoscopy in the 1st 2 trimesters.

Pancreatitis

- Rare 1 in 1,000 to 1 in 10,000.
- Usually late in the 3rd trimester or in the early postpartum period probably due to increased abdominal pressure on the biliary ducts.
- Cholelithiasis – most common cause.
- Can be a complication of severe preeclampsia or HELLP syndrome
- CT should be avoided in uncomplicated cases.
- ERCP seems to be safe

Bowel Obstruction

- The incidence of bowel obstruction is similar to that of the general population: 1 in 2,500 to 1 in 3,500 deliveries.
- Most common during the second and third trimesters

- Causes: Adhesion 60-70% . Volvulus 25%
- Patients have classic symptoms of abdominal colicky pain associated with hyperactive peristalsis, nausea and vomiting.
- Misdiagnosed with hyperemesis gravidarum (uncommon after 2nd trimester).
- Imaging: supine and upright abdominal plain films.
- There are significant maternal and fetal risks if the diagnosis is delayed.
 - Maternal mortality ranges from zero to 6%
 - fetal mortality ranges from 25 to 40%.
 - Preterm delivery occurs in most cases.
 - The mortality is greater when intestinal ischemia is present.
- Treatment- no different from in the nonpregnant state. Fluid, electrolyte replacement, bowel decompression , and laparotomy for failed medical management.

Adnexal Torsion During Pregnancy

- Is one of the few causes of acute abdomen that is more common in pregnant than in nonpregnants (82% vs. 7%)
- Lateral lower quadrant pain often sudden in onset, nausea, vomiting.
- US – Doppler
- Surgery should not be delayed.
- Midline incision

Laparoscopy vs Laparotomy during pregnancy

- Laparoscopy has been shown to have minimal apparent adverse effects, if any, compared with laparotomy.
- By the end of the second trimester, at 26 to 28 weeks, the size of the uterus often interferes with the laparoscopic view and approach and open surgery may be indicated.
- Major concerns of laparoscopy during pregnancy include
 - injury to the uterus
 - decreased uterine blood flow
 - preterm labor risk secondary to the increased intra-abdominal pressure
 - increased risk of fetal acidosis
 - unknown effects of CO₂ pneumoperitoneum
- Potential advantages:
 - Decreased fetal depression secondary to decreased narcotic requirement
 - decreased risk of wound complications
 - diminished postoperative maternal hypoventilation
 - decreased manipulation of the uterus
- SAGES guidelines for laparoscopic surgery during pregnancy.
 - Obtain an obstetrics consult preoperatively.
 - When possible, delay operative intervention in elective cases until the second trimester.
 - Use lower extremity pneumatic compression devices, as pregnancy and pneumoperitoneum may induce a hypercoagulable state.

- Follow maternal and fetal physiologic status intraoperatively. Follow maternal end tidal CO₂.
- Protect uterus with lead shield if contemplating intraoperative cholangiography.
- Use open technique to gain pneumoperitoneum.
- Tilt table left side down to move gravid uterus off vena cava.
- Minimize pneumoperitoneum to 8 to 12 mm Hg.

Conclusions

In general, in the urgent and emergent settings, care should proceed in the same manner as with a nonpregnant patient.

References

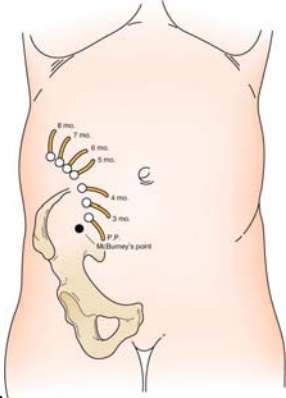
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Table 1. Common causes of Acute Abdomen during pregnancy

Right upper quadrant pain	Right Lower Quadrant	Flank	Lower Abdomen	Diffuse Abdominal Pain
<ul style="list-style-type: none"> • Acute cholecystitis • GERD • Peptic ulcer • Acute pancreatitis • Hepatitis • Acute fatty liver of pregnancy • HELLP syndrome • Preeclampsia • Pneumothorax • Pneumonia • Acute appendicitis • Hepatic adenoma • Hemangioma 	<ul style="list-style-type: none"> • Acute appendicitis • Ectopic pregnancy • Renal or ureteral colic • Pelvic inflammatory disease • Tubo-ovarian abscess • Endometriosis • Adnexal torsion • Ruptured ovarian cyst • Ruptured corpus luteum 	<ul style="list-style-type: none"> • Pyelonephritis • Hydronephrosis of pregnancy • Acute appendicitis (retrocecal appendix) 	<ul style="list-style-type: none"> • Threatened, incomplete, or complete abortion • Abruptio placentae • Preterm labor • Pelvic inflammatory disease • Tubo-ovarian abscess • Inflammatory bowel disease • Irritable bowel syndrome • Pyelonephritis 	<ul style="list-style-type: none"> • Early acute appendicitis • Small bowel obstruction • Acute intermittent porphyria • Sickle cell crisis

TABLE 2 -- Fetal Radiation Exposure with Radiographic Imaging	
Examination Type	Estimated Fetal Radiation Exposure (rads)
Two-view chest radiograph	0.00007
Cervical spine radiograph	0.002
Pelvis radiograph	0.04
Head CT	<0.050
Abdomen CT	2.60
Upper GI series	0.056
Barium enema	3.986
Hepatobiliary (HIDA) scan	0.150

Fig 1



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 April 25, 2005