What To Expect When They’re Expecting: MR Imaging of the Acute Abdomen in Pregnancy

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Objectives
1. Discuss the clinical challenges and the role of imaging in the evaluation of pregnant patients with abdominal pain.
2. Review differential diagnoses, and illustrate MR imaging findings of acute abdominal pain during pregnancy.

Normal Causes of Pain in Pregnancy
- Enlarging uterus
- Fetal position or fetal movement
- Braxton-Hicks uterine contractions
- Pain related to round ligaments

Anatomic Alterations in Pregnancy
- Abdominal and pelvic structures are displaced from their normal anatomic locations by the enlarging gravid uterus
- Enlarged uterus may compress the urinary tract

Physiologic Alterations in Pregnancy
- Nausea and vomiting common in early pregnancy
- High progesterone levels lead to decreased: – Tone of the lower esophageal sphincter – Bowel and colonic motility – Gastric emptying – Ureteral tone
- White blood cell count increases to normal range of 10,000 to 14,000 cells/mm³
- Increase in plasma volume results in physiologic hydronephrosis

Role of Imaging
- Conventional diagnostic procedures that utilize ionizing radiation should be avoided in pregnancy to limit carcinogenic and deterministic risks to the fetus
- Radiography and CT should not be withheld if a delay in diagnosis may result in adverse maternal or fetal outcomes
- Ultrasound is frequently the first-line imaging modality due to its wide availability and lack of ionizing radiation
- MRI preferred when US inconclusive
  - Wide field of view, high soft tissue contrast, and lack of ionizing radiation

Physiologic Hydropneumorhesis
- In up to 80% of gravid females
- Progesterone decreases urothelial tone
- Uterus may compress the ureters
- Right more prominent
- Usually asymptomatic

Hydropsyndrome
- Normal size kidneys
- Absent perinephric fluid
- Smooth widening of the ureter, usually between the uterus and psoas muscle

Obstructive Hydrothorax
- Renal stone most common cause
- Right = Left
- Complications: pyelonephritis; pyelectasis

MRI Findings in Acute Appendicitis
- Diameter >7 mm; Wall thickness >2 mm
- High T2 signal of luminal contents

Acute Appendicitis in Pregnancy
- Most common non-obstructive indication for emergency surgery
- Imaging indicated to reduce delays in surgical intervention
  - Delay of >24 hrs after onset of symptoms increases risk of perforation; Risk of fetal loss >36% when appendix perforates
- ACR Appropriateness Criteria: ultrasound is first line

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Inflammatory Bowel Disease in Pregnancy
- Peak incidence overlaps with the age of reproductive populations
- Terminal ileum involvement is most common, and may mimic appendicitis clinically

- Findings include bowel wall thickening, mural edema, mucosal enhancement, luminal narrowing, and fluid or edema in the adjacent soft tissues
  - Complications include abscess, fistulae, and strictures

Acute Cholecystitis in Pregnancy
- Gallstones common during pregnancy due to increased cholesterol content of bile and decreased gallbladder motility
- Ultrasound used for gallstones and acute cholecystitis
- 2nd most common indication for emergency surgery
- High risk of recurrence with medical management

Venus Thromboembolism in Pregnancy
- Leading cause of maternal death in US
- Pregnancy is a risk factor for DVT
- Gonadal vein thrombosis more common postpartum, on the right side (90-94%), and due to septic thrombophlebitis
- Treatment is anticoagulation and thrombolysis

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Imaging Venous Thromboembolism
- Ultrasound 1st line in extremities but limited by gravid uterus and bowel gas
- DVT: intermediate to high signal thrombus
- T2WI high signal thrombus
- May see adjacent inflammation

Abdominal pain in pregnancy may result in adverse maternal and fetal outcomes. Ultrasound is an imaging modality that is preferred when US is inconclusive due to its wide availability and lack of ionizing radiation. However, conventional diagnostic procedures that utilize ionizing radiation should be avoided in pregnancy to limit carcinogenic and deterministic risks to the fetus. Radiography and CT should be withheld if a delay in diagnosis may result in adverse maternal or fetal outcomes. Ultrasound is frequently the first-line imaging modality due to its wide availability and lack of ionizing radiation. MRI is preferred when US is inconclusive due to its wide field of view, high soft tissue contrast, and lack of ionizing radiation.