

## **Case Based Teaching Abdominal Pain**

### **Pregnant patients with abdominal pain**

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Acute appendicitis (AA) is the most common cause of abdominal pain that requires surgical treatment during pregnancy. However, the differential diagnosis of abdominal pain in this patient population is broad and includes both surgical and non-surgical conditions {Mayer, 1998 #68}.

US with graded compression technique has been considered the imaging study of choice for evaluating pregnant patients with abdominal pain because of its wide availability and lack of ionizing radiation {Lim, 1992 #8}. However, this technique has limitations including the difficulty in compressing the cecum with the US probe, particularly in the third trimester {Lim, 1992 #8}, and limited visualization of a normal appendix (between 0% and 4%, even in non-pregnant patients){Birnbaum, 2000 #4; Jeffrey, 1988 #165; Puylaert, 1987 #197}. Computed tomography is considered less desirable in this patient population because of the associated risk of radiation. For these reasons, the use of Magnetic Resonance Imaging (MRI) in the evaluation of pregnant patients with clinically suspected acute appendicitis is increasing.

Because of the anatomic and physiologic changes that occur during pregnancy, abdominal MRI protocols must be specifically designed to facilitate the recognition of normal anatomy and pathology. Physiologic motion (i.e. respiratory, bowel peristalsis) in the mother and fetal motion may degrade the image quality, making the interpretation of the images difficult. An MR imaging protocol specifically tailored for evaluation of pregnant patients with abdominal pain will be presented and alternative protocols will be discussed, emphasizing their advantages and disadvantages.

Oral preparations with iron oxide particles render the bowel containing oral contrast dark signal on all sequences, due to T2\* effect. Darkening of the appendiceal signal and an appreciable enlargement on T2\*-weighted images (“blooming effect”) is characteristic of a normal appendix filled with oral contrast or air. In contradistinction, a fluid filled obstructed and inflamed appendix demonstrates high signal intensity in its lumen and a thickened hypointense wall. Visualization of periappendiceal inflammation, when present, is facilitated by fat-saturated T2-weighted images. Alternative MRI protocols without oral contrast administration, as well as administration of rectal contrast and air will be also discussed.

This case-based presentation will include multiple MR images of pregnant patients to illustrate the appearance of the normal and abnormal appendix. The MR appearance of various forms of acute appendicitis, including complicated appendicitis, will be discussed. This presentation will also emphasize on potential pitfalls in interpretation caused by anatomic changes in the location of the appendix, venous varices of the gonadal vein, and fluid-filled loops of bowel in the right lower quadrant. Examples of MRI examinations with other common and uncommon pathology which can masquerade as acute appendicitis will be shown.