The Role of Magnetic Resonance Imaging in the Differential Diagnosis of Acute Right Lower Quadrant Pain during Pregnancy

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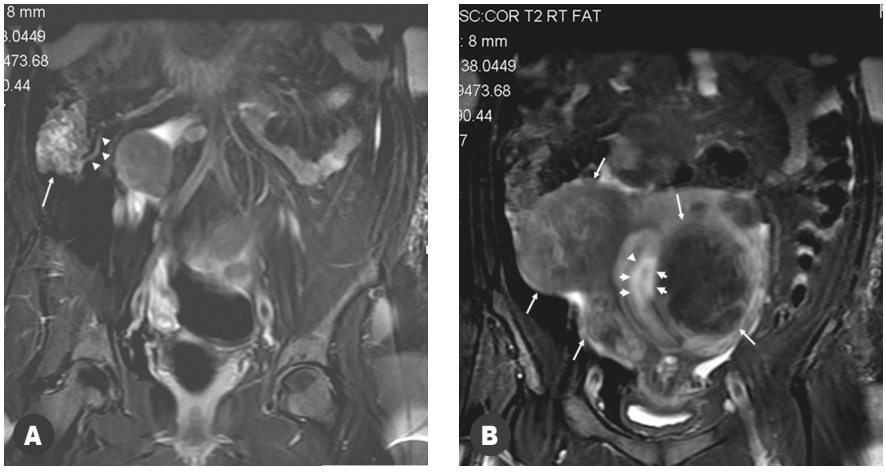
Acute abdominal pain in a pregnant woman presents a significant diagnostic challenge because of the physiological and anatomic changes related to the pregnancy. Acute appendicitis complicates one of 766 pregnancies [1], but there is a long list of differential diagnoses related to the same symptoms and signs in the gravida, from normal pregnancy changes to obstetric, gynecological, gastrointestinal and genitourinary pathologies.

Sonography is the primary modality to rule out appendicitis, being readily available and functioning without ionizing radiation, particularly important in pregnant women. Ultrasound involves graded compression by transducer along the border of the cecum to displace bowel loops for greater field of view and to assess compressibility of appendix (inflamed appendix will not be compressible). Nevertheless, sonography has a number of limitations: the large gravid uterus prevents compression with the transducer on the patient's abdomen, and the appendix is displaced upward with the bowel loops by the enlarging uterus, both imposing difficulties on visualizing the appendix. Computed tomography contributes to the diagnosis of appendicitis in non-pregnant patients but is an undesirable option in pregnancy because of the radiation exposure to the fetus. Magnetic resonance imaging, on the other hand, is a modality that gives excellent resolution of the pelvic organs, with no ionizing radiation. Furthermore, it enables diagnosis of all possible causes of right lower quadrant pain [2,3].



Coronal T_2-weighted MR images with fat suppression demonstrating: **[A]** Perfectly normal "bright" appendix (arrow heads) originating from the cecum (long arrow) and surrounded by normal fatty tissue of low intensity (dark) secondary to its suppression. Note the reactive bright fluid on both sides of a right-sided leiomyoma, demonstrated adjacent to the appendix. **[B]** The uterine cavity (small arrows) is compressed between the right (10 cm diameter) and left (9.5 cm diameter) large uterine leiomyomae (long arrows), the right one having heterogeneous intensity consistent with degenerative features.

Patient Description

A 39 year old woman in the 10th week of pregnancy following in vitro fertilization treatment presented with RLQ pain accompanied by nausea and vomiting. There was no leukocytosis or fever. On physical examination, large myomatous uterus was palpated. RLQ tenderness was noted without any signs of peritoneal irritation or peritonitis. Trans-abdominal sonography was performed to rule out appendicitis. Several large fibroids were demonstrated in the gravid uterus but the appendix could not be identified. MRI was then performed using a GE 9.1 Signa MRI system of 1.5 Tesla. Coronal and sagittal T_1-weighted and T_2-weighted MR images with fat suppression were performed. Coronal T_2-weighted images depicted a normal-appearing appendix [Figure A], 6 mm wide and 4 cm long, surrounded by normal fatty tissue and no inflammatory infiltrate. The ovaries were within normal limits. A number of large leiomyomae were identified, including one 10 cm in size on the right side, compressing the fetal sac against a 9.5 cm left one,

RLQ = right lower quadrant

resulting in an hourglass-shaped uterine cavity containing the embryonal sac [Figure B]. The right leiomyoma was heterogeneous in intensity on T_2WI, as compared to the rather homogenous low intensity of the left one. A small amount of reactive fluid was shown on the right side, compatible with degeneration features, most probably representing the cause of the RLQ pain.

The patient was hospitalized for observation and received conservative analgesic treatment. No infectious parameters were noted over the subsequent days and she was discharged in good condition, with subsiding pains. In the 39th week of her pregnancy, the patient underwent cesarean section due to fetal decelerations. A prolapsed cord was found, along with several large subserosal fibroids, one of which presented with intrinsic hemorrhage as part of the degenerative changes. She had an uneventful postoperative course, and mother and baby were discharged in good condition.

Comment

Acute appendicitis in pregnant women is a highly morbid disease that can bring about premature labor and, sometimes, fetal and maternal mortality. The incidence of fetal loss is 1.5% in uncomplicated appendicitis and up to 20% when perforation occurs [4].

In recent studies, MRI has proven to be an excellent modality for excluding acute appendicitis and offering an alternative, correct diagnosis [2,3]. Low availability and lengthy study time (about 30 minutes) are disadvantages of MRI, but there is no doubt that it is the modality of choice when sonography fails to arrive at a definitive diagnosis for RLQ pain in the pregnant woman. In our patient, MRI exposed the degenerative leiomyoma [5] as the source of the abdominal pain and revealed a perfectly normal appendix, preventing unnecessary surgery.

In conclusion, MRI can be most effective in clarifying the correct cause of right lower quadrant pain during pregnancy.

References

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