

CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

A 27 year old woman presents with a three day history of intermittent right abdominal pain which seems to be worsening and settling into the right lower quadrant region. The patient has no voiding complaints, no change in her bowel habits, and no vaginal discharge. The patient typically has regular periods but missed her last period and by the dates of her missed period is approximately 7 weeks pregnant. She has had no prior pregnancies. She has no history of prior pelvic inflammatory disease or intra-uterine device placement. The patient's vital signs are stable and she is afebrile. On physical examination, the patient has tenderness of the right lower quadrant without rebound or rigidity. A beta human chorionic gonadotropin is 8,828, her white count is 9,300, and her hemoglobin is normal.

Which of the following imaging studies is the initial examination of choice for evaluation of a pregnant patient with lower abdominal or pelvic pain?

- (a) magnetic resonance (MR) imaging of the pelvis
- (b) plain film examination of the pelvis
- (c) unenhanced computed tomography (CT-KUB) of the abdomen and pelvis
- (d) ultrasound (US) examination of the pelvis

RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION

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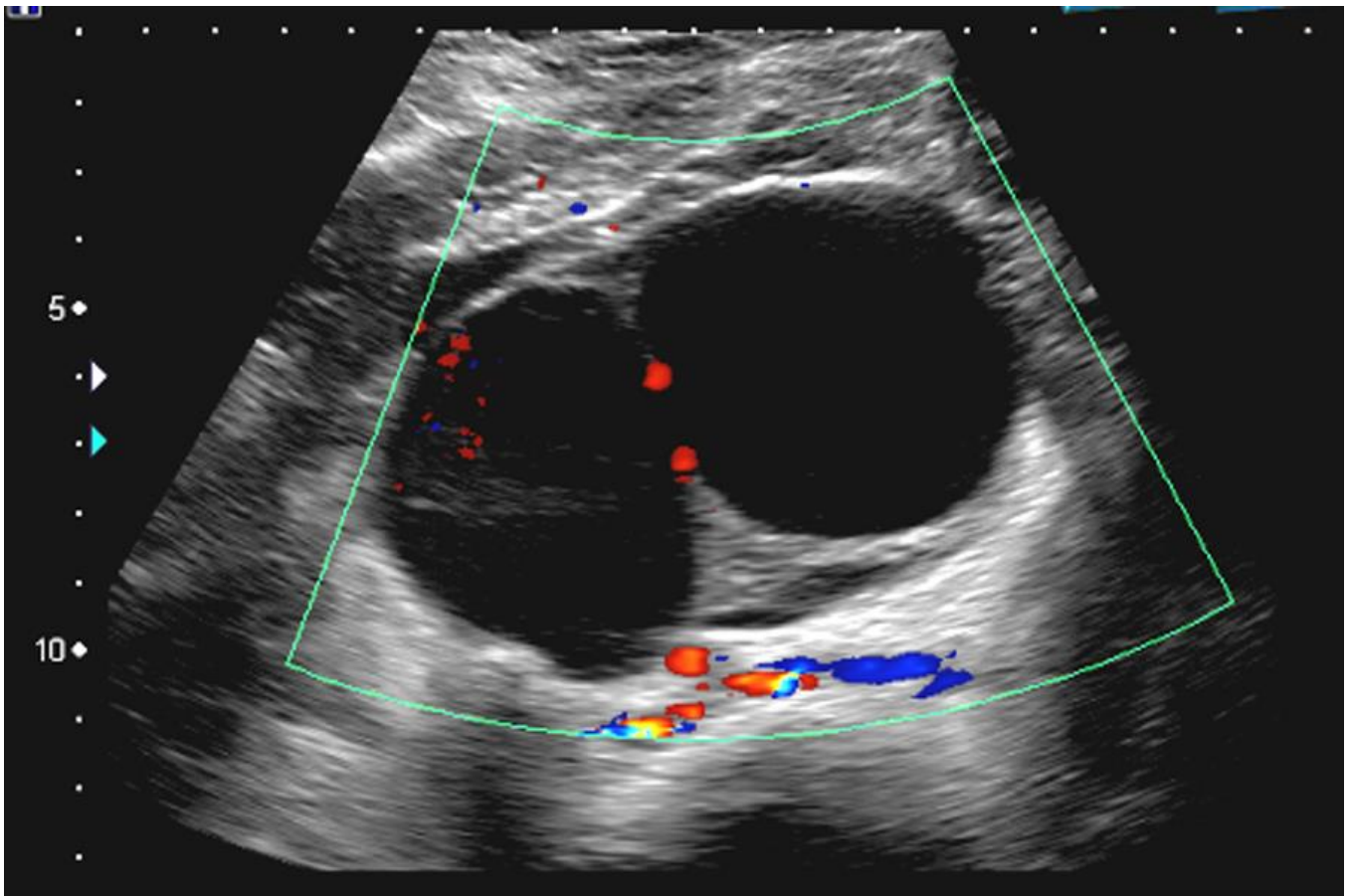
- (a) magnetic resonance (MR) imaging of the pelvis
- (b) plain film examination of the pelvis
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The initial imaging study in almost all pregnant patients with abdominal and pelvic pain is a pelvic ultrasound study, and (d) is correct.

MR imaging of the pelvis (a) may be helpful for evaluation of pregnant patients with abdomen and pelvic pain but is nearly never the *initial* imaging study of choice. It is generally performed only following US of the pelvis, and (a) is incorrect. Plain films of the abdomen for evaluation of pregnant patients with abdominal pain are typically not useful and (b) is incorrect. CT of the abdomen and pelvis (whether performed without any contrast as a CT-KUB or with contrast) may be used in some cases to evaluate for renal stones and/or appendicitis, but is usually performed only after US and not as the initial imaging study of choice, and (c) is incorrect.

IMAGING STUDY AND QUESTIONS

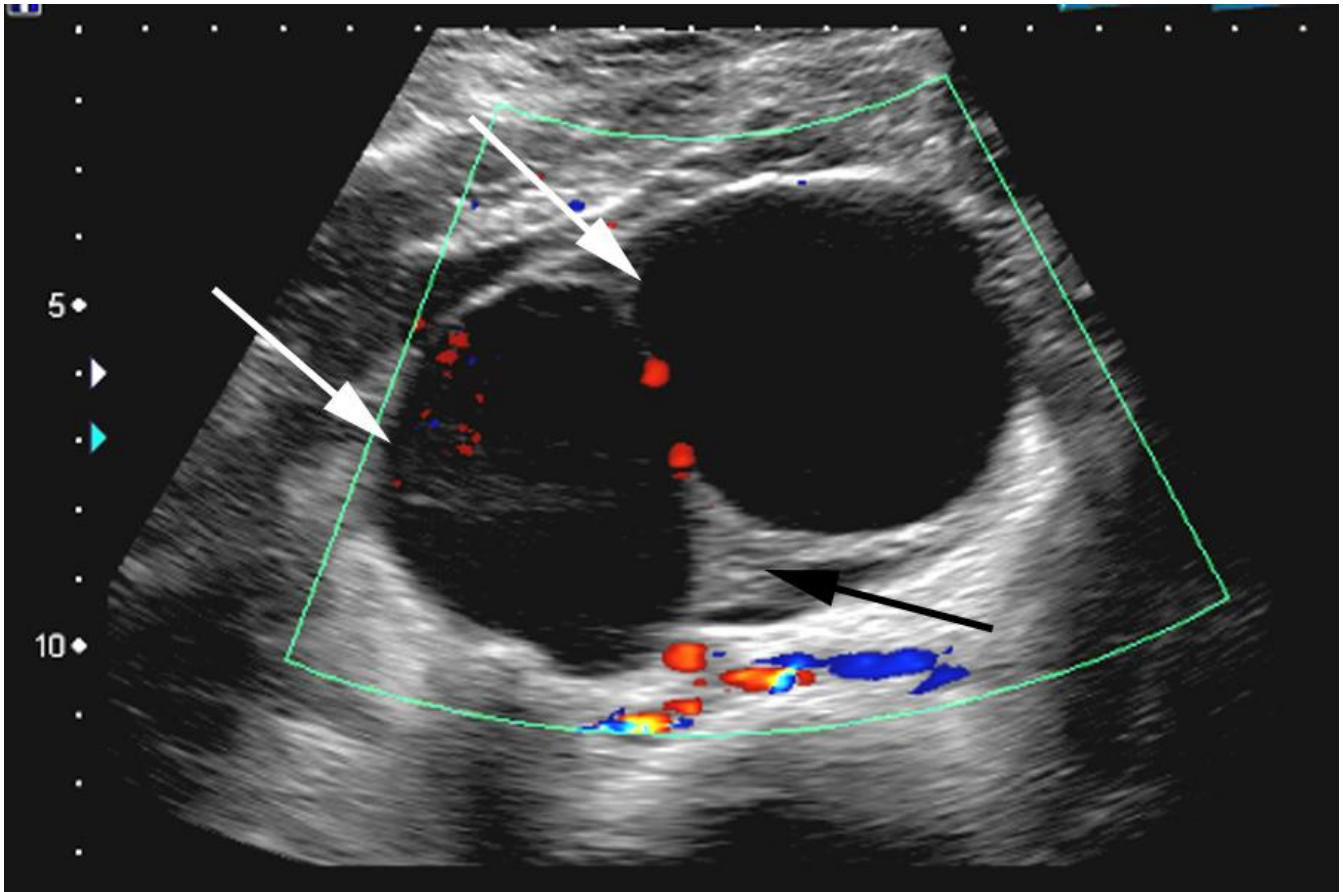
An imaging study was performed:



Imaging questions:

- 1) What type of study is shown?
- 2) Are there any abnormalities?
- 3) What is the most likely diagnosis?
- 4) What is the next step in management?

IMAGING STUDY QUESTIONS AND ANSWER

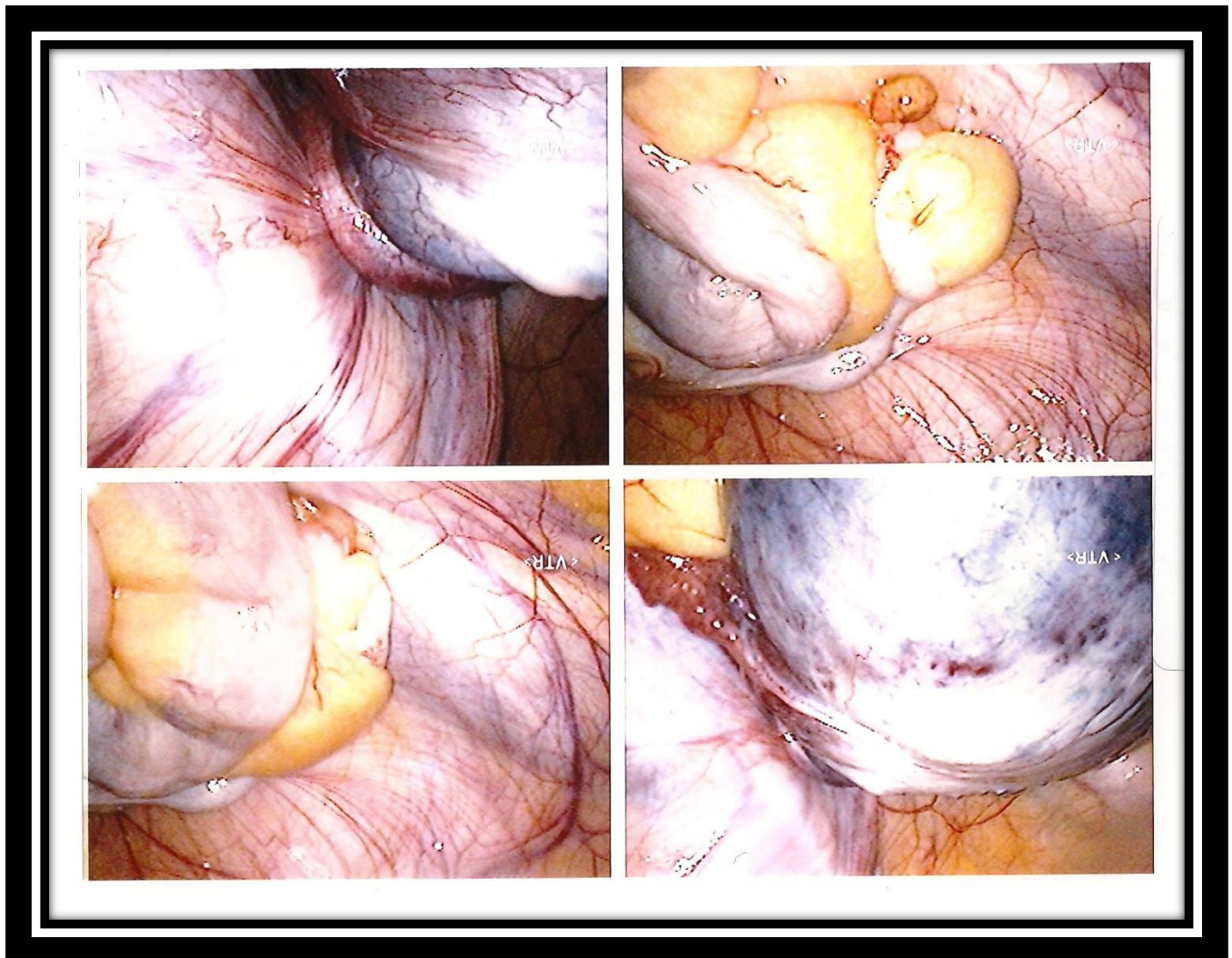


Imaging questions:

- 1) What type of study is shown? A color Doppler ultrasound. In this case, the examination is of the right ovary, although without labels there is no way to tell this.
- 2) Are there any abnormalities? Yes. There are two large cysts of the ovary (white arrows). There is a relative paucity of color flow to the ovarian tissue (black arrow).
- 3) What is the most likely diagnosis? Ovarian cysts with possible torsion of the ovary.
- 4) What is the next step in management? Obstetrical consultation with consideration for emergent surgery.

PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP

Obstetrical consultation was obtained and the patient was examined by the obstetrician. A repeat WBC count done two hours after the initial assessment demonstrated that the patient's WBC count had increased to 12,100. The patient was taken to the operating room where torsion of the ovary was found (see figure). The ovarian torsion was reduced and the ovarian cysts resected. One of these was the corpus luteum cyst, and the patient subsequently spontaneously aborted.



Laparoscopic images obtained at the time of surgery for ovarian torsion in a 27 year old with right lower quadrant pain in a patient who was approximately 7 weeks pregnant.

SUMMARY

Presenting symptoms: The patient presented with right lower quadrant pain, but was also approximately 7 weeks pregnant.

Imaging work-up: Imaging for young women with right lower quadrant pain depends on several factors, including whether the patient is pregnant, the pretest probability of renal colic or appendicitis as the cause of the pain, and local practice patterns. In *pregnant* patients, ultrasound is always the first imaging study of choice, to document a live, intrauterine pregnancy (and essentially exclude an ectopic pregnancy, at least if the patient is not taking fertility medications which substantially increases the likelihood of simultaneous intra- and extra-uterine pregnancy). CT scans are typically avoided because of concerns regarding exposure to ionizing radiation, and contrast material is avoided because of concerns regarding adverse effects on fetal thyroid function (for iodinated contrast used for CT studies) and possible teratogenic effects (for gadolinium based contrast used for MR studies). In *non-pregnant* patients, if renal colic is suspected, a CT-KUB is typically obtained (see RQW002 Flank Pain 01-08-11), and if appendicitis is suspected, a CT with contrast is typically obtained (see RQW024 Right Lower Quadrant Pain 06-11-11) although practice patterns vary and in some locations US may be done first.

Establishing the diagnosis: Cysts of the ovary can be confidently diagnosed on the basis of US findings, but torsion of the ovary is much more challenging to diagnose. Swelling of the ovary or diminished (although not necessarily absent) flow on color Doppler examination, along with abnormal spectral Doppler wave tracings, suggest the diagnosis.

Take-home message: The initial imaging study of choice for virtually all pregnant patients with lower abdomen and pelvis pain is typically US of the pelvis to document a live, intrauterine pregnancy. It may be difficult to exclude appendicitis and renal stone disease on the basis of the US study. Because of concerns with ionizing radiation and contrast material (both iodine-containing and gadolinium containing), plain films, CT, and contrast-enhanced MR examinations are usually undertaken only following consultation with a obstetrician/gynecologist.

FURTHER READING

Katz DS, Klein MA, Ganson G, Hines JJ. Imaging of appendicitis in pregnancy. Chapter in the syllabus from the course, *Practical Approaches to Common Clinical Conditions Course Syllabus*, American Roentgen Ray Society, 2010.

Spalluto LB, Woodfield CA, DeBenedictis CM, Lazarus E. MR imaging evaluation of abdominal pain during pregnancy: appendicitis and other nonobstetric causes. *RadioGraphics* 2012;32:317-334.

Wang PI, Chong ST, Kiellar AZ et al. Imaging of pregnant and lactating patients: Part1, evidence-based review and recommendations. *AJR* 2012;198:778-784.

Wang PI, Chong ST, Kiellar AZ et al. Imaging of pregnant and lactating patients: Part 2, evidence-based review and recommendations. *AJR* 2012;198:785-792.