

## CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

A 30 year old woman presents with a three hour history of acute onset right upper quadrant pain. She has had a single episode of vomiting. She has no diarrhea or fever. On physical exam, she is an obese healthy woman with normal bowel sounds and a soft abdomen, but with severe pain on palpation of the right upper quadrant. The patient has normal CBC, UA, and pregnancy tests.

Which imaging study is most appropriate in the setting of acute right upper quadrant pain suspected to be originating from the gallbladder and/or biliary tree?

- (a) plain films of the abdomen
- (b) ultrasound of the right upper quadrant
- (c) computed tomography of the abdomen and pelvis, performed with both oral and IV contrast
- (d) magnetic resonance imaging of the abdomen and pelvis, performed with IV contrast

<b>RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION</b>
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A 30 year old white woman presents with a three hour history of acute onset right upper quadrant pain. She has had a single episode of vomiting. She has no diarrhea or fever. On physical exam, she is an obese healthy woman with normal bowel sounds and a soft abdomen, but with severe pain on palpation of the right upper quadrant. The patient has a normal CBD, UA, and pregnancy test.

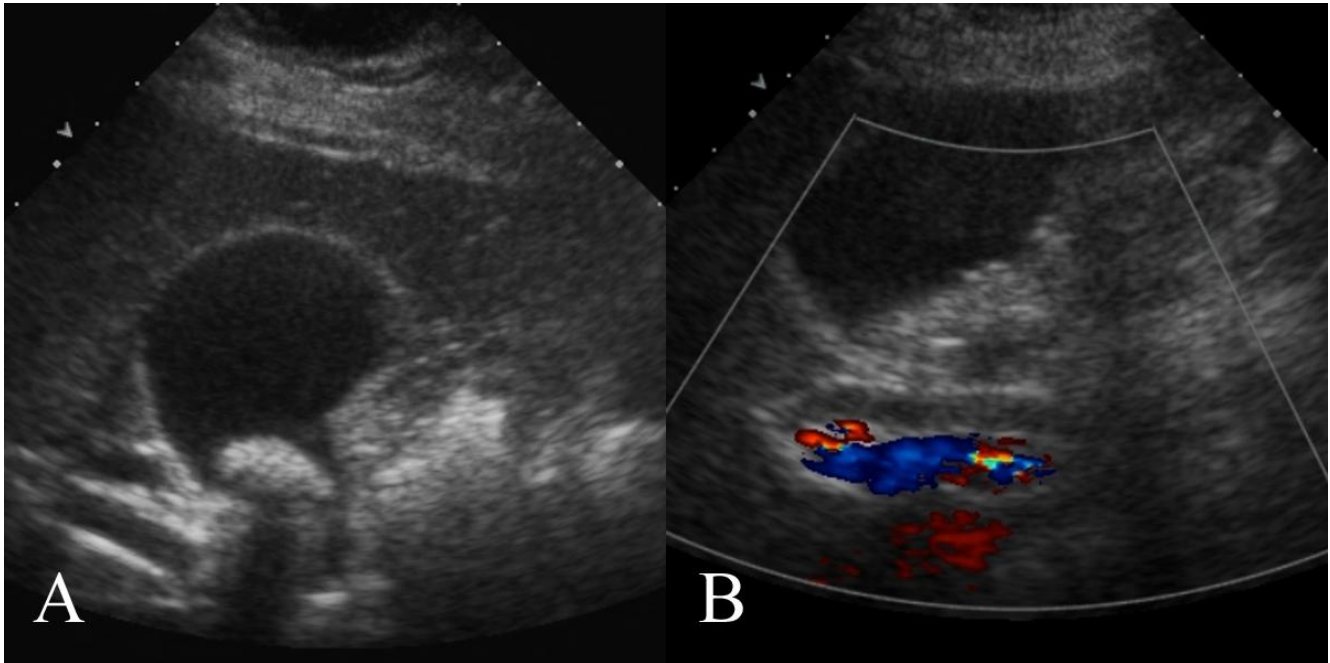
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Answer: (b), ultrasound of the right upper quadrant, is the correct answer.

Plain films of the abdomen are of little utility in evaluating biliary colic, and (a) is incorrect. Computed tomography may be used following right upper quadrant ultrasound in a patient with biliary colic if the ultrasound study is negative or confusing, but is not the first imaging study of choice, and (c) is incorrect. Magnetic resonance imaging, similarly, may sometimes be used for evaluation of the biliary tree if the ultrasound study is nondiagnostic, but MR is not the imaging study of choice, and (d) is incorrect.

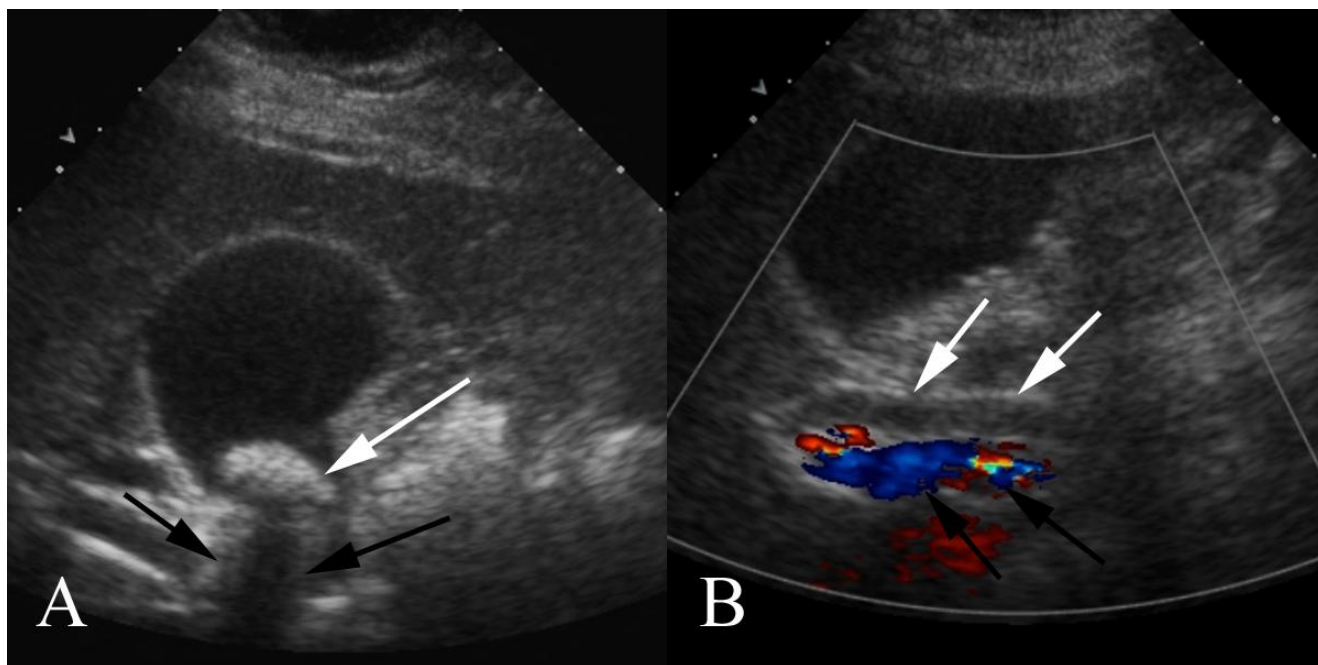
## IMAGING STUDY AND QUESTIONS



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 ANSWERS



- 1) What type of study is shown in the figure? The images are from a right upper quadrant ultrasound study. A. Right upper quadrant study through the gallbladder. B. Right upper quadrant ultrasound with color Doppler (inside the white trapezoidal outline) of the common duct and portal vein.
- 2) Are there any abnormalities? In A, there is a highly echogenic oval gallstone (white arrow) causing acoustic “shadowing” (the black area marked by the black arrows). In B, the white arrows mark the common duct, which demonstrates normal caliber, in its usual position anterior to the portal vein (black arrow, showing flow on the color image).
- 3) What is the most likely diagnosis? Cholelithiasis.
- 4) What is the next step in management? If the patient has typical symptoms of gallstone disease (such as this patient had), surgical referral with the expectation that a cholecystectomy will follow.

<b>PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP</b>
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The patient was referred to a surgeon who concluded that the patient's symptoms were in all likelihood coming from acute cholecystitis and she was taken to the operating room where she underwent laparoscopic cholecystectomy. The patient had a rapid, excellent recovery and had no further right upper quadrant pain.

## SUMMARY

**Presenting symptom:** Right upper quadrant pain has multiple cause including gastritis, duodenitis, and ulcer disease, but in patients with the new onset of significant right upper quadrant pain, gallbladder disease should be excluded. Clinical features are usually not specific enough to do this, and most of these patients will require imaging.

**Imaging work-up:** Ultrasound examination is the study of choice for patients with right upper quadrant pain of possible biliary origin. Ultrasound involves no ionizing radiation or specific preparation (although having the patient NPO for 4 to 8 hours before the test is usually very helpful), can be done quickly and even portably if necessary, and is relatively inexpensive (compared to cross sectional imaging such as CT and MR). While plain films are typically less costly, they rarely add significant useful information to the work-up of right upper quadrant pain and usually do not need to be obtained.

**Establishing the diagnosis:** The appearance of gallstones is, in most cases, highly characteristic: gallstones are structures within the gallbladder with move with patient motion, are densely echogenic, and cast shadows. When these three properties are not all met, alternative explanations of should be considered. For example, a gallbladder polyp may be seen within the lumen of the gallbladder, but polyps will not move independent of the gallbladder wall and usually are less echogenic (and less likely to cast shadows) than gallstones. Fluid around the gallbladder and increased thickness of the gallbladder wall usually indicate inflammation (and cholecystitis).

**Take-home message:** The first imaging study to perform in patients with right upper quadrant pain suspicious for biliary colic is right upper quadrant ultrasound.

### FURTHER READING

Penner RM, Majumdar SR. Diagnostic approach to abdominal pain in adults. UpToDate, accessed 7/6/09.

Renfrew, DL. "First step" imaging of gastrointestinal symptoms. Chapter 7 of *Symptom Based Radiology*, Symptom Based Radiology Publishing, Sturgeon Bay, WI, 2010, available for no charge at [www.symptombasedradiology.com](http://www.symptombasedradiology.com).