

CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

A 40 year old woman comes to the clinic with persistent abdominal pain for approximately four days. Her pain is predominantly on the right side, and associated with several loose stools per day, a change from her normal pattern. She has had four episodes of vomiting over the past four days. The patient rates her pain as at predominantly a 3 on a 1-to-10 scale, with spasms of pain up to 9 or 10. She had a similar episode which resolved in five days, without any treatment, about two months ago. She has not had any recent antibiotic treatment, and no one in the family has had a similar illness. She has had no recent medication changes nor has she travelled or consumed any questionable water recently. The patient has an elevated white blood cell count.

Which diagnostic study is most appropriate for this patient?

- (a) plain films of the abdomen
- (b) ultrasound of the abdomen
- (c) computed tomography of the abdomen and pelvis
- (d) evaluation of a stool specimen for enteric pathogens

RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION

(See prior page)

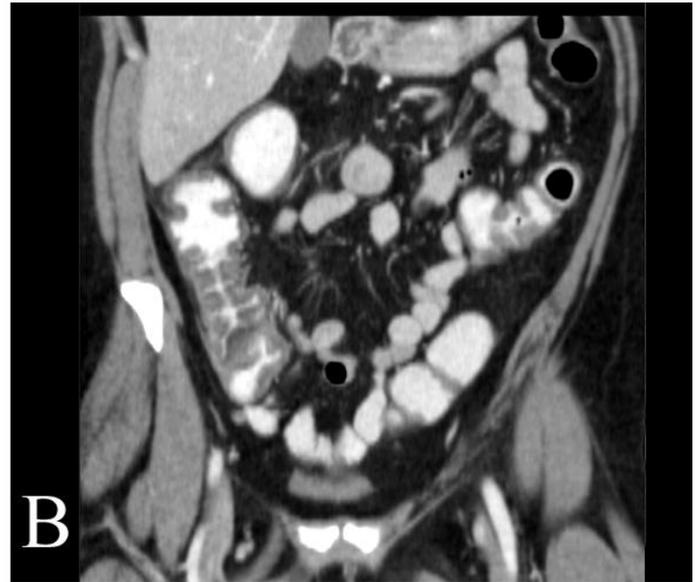
Which diagnostic study is most appropriate for this patient?

- (a) plain films of the abdomen
- (b) ultrasound of the abdomen
- (c) computed tomography of the abdomen and pelvis
- (d) evaluation of a stool specimen

Answer: (d), evaluation of a stool specimen. Recommendations vary somewhat, but generally the stool should be cultured for *Campylobacter*, *Salmonella*, *Shigella*, *Yersinia*, *Vibrio*, and *E. coli* O157. The stool may also be examined for *Giardia*, *Cryptosporidium*, *Cyclospora*, and also for *C. difficile* toxins. While CT examination is the study of choice for “abdomen pain plus” where the “plus” represents inflammation (fever, elevated white count, rebound tenderness, peritoneal signs), suspected obstruction (distension with nausea/vomiting), and such constitutional symptoms as weight loss, in the case of diarrhea, even when associated with an elevated white count, the first step should probably be evaluation of a stool specimen. Depending on the results of this test, colonoscopy should probably be considered prior to imaging, since the problem is more likely to be in the colonic mucosa (much more readily evaluated with colonoscopy, which also allows biopsy) than deeper tissues (better seen with CT).

Plain films of the abdomen are generally of little utility in the evaluation of abdominal pain, with the possible exception of suspected obstruction. Even when obstruction is suspected, a plain film may be false-negative if the distended bowel loops are filled with fluid, and even if the plain film shows abnormal air-distended small bowel loops, a CT is often done evaluate the location and cause of obstruction. Therefore, (a) is incorrect. Ultrasound of the abdomen is the study of choice for suspected biliary colic, but is not nearly as effective in diagnosing causes of abdominal pain originating in the other quadrants, or for evaluation of “abdominal pain plus.” While CT is the imaging study of choice for patients with “abdominal pain plus” the “plus” does *not* include “diarrhea”, and (c) is incorrect.

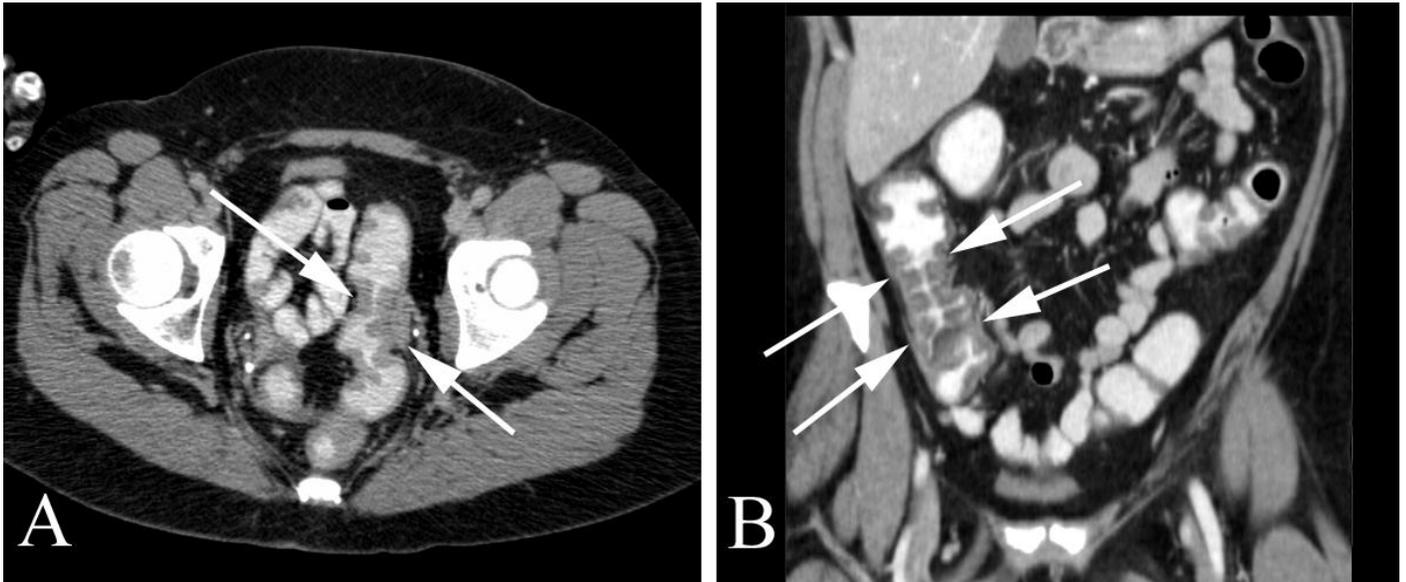
IMAGING STUDY AND QUESTIONS



Imaging questions:

- 1) What type of study is shown in the figure?
- 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



Imaging questions:

- 1) What type of study is shown in the figure? An abdomen and pelvis CT study, performed with oral and IV contrast material.
- 2) Are there any abnormalities? Yes. There is marked mucosal thickening in both the sigmoid colon (arrows in A) and cecum (arrows in B).
- 3) What is the most likely diagnosis? Mucosal thickening is a nonspecific finding but likely represents some sort of colitis (especially considering the patient's history), although malignancy (e.g., lymphoma) could have a similar appearance.
- 4) What is the next step in management? Note that in this case, the CT study was actually acquired prior to evaluation of the patient's stool specimen. The history indicated for the CT study was "Abdominal pain and elevated white blood cell count," and the CT was performed as an indicated study for "abdominal pain plus" where the "plus" was inflammation. Once the colonic thickening was identified, the radiologist called the referring clinician and the patient then underwent evaluation of a stool specimen.

PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP

As noted above, the patient underwent evaluation of a stool specimen. The specimen was positive for a moderate number of white blood cells and blood. The stool specimen was negative for salmonella, shigella, campylobacter, and e. coli O157. The stool sample was also negative for Giardia lamblia and cryptosporidium. The patient's stool was positive, however, for C. difficile toxin, and the patient was diagnosed with pseudomembranous colitis. The patient was treated with flagyl and rapidly improved, with prompt resolution of diarrhea and abdominal pain.

SUMMARY

Presenting symptom: Abdominal pain with an elevated white count has multiple causes, but when combined with diarrhea the main considerations are inflammatory/infectious conditions of gastrointestinal mucosa, particularly the colonic mucosa.

Imaging work-up: As noted on page 2, CT examination is the study of choice for “abdomen pain plus” where the “plus” represents inflammation (fever, elevated white count, rebound tenderness, peritoneal signs), suspected obstruction (distension with nausea/vomiting), and weight loss. Note that the “plus” does *not* include diarrhea. Abdominal pain and diarrhea, even when there is an elevated white blood cell count, typically does not require any imaging study to work up, but should rather be worked up with evaluation of a stool specimen, and, possibly (depending on those results) colonoscopy.

Establishing the diagnosis: The typical patient with pseudomembranous colitis will have not only abdominal pain and diarrhea, but also a history of antibiotic use (not the situation in this particular case). The diagnosis is established by testing a stool sample for *C. difficile* toxin.

Take-home message: Although CT examination is the study of choice for imaging “abdomen pain plus,” it is generally not performed in patients with diarrhea.

FURTHER READING

LaMont JT. Clinical manifestations and diagnosis of *Clostridium difficile* infection. UpToDate, accessed 7/14/2009

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 6 of *Symptom Based Radiology*, Symptom Based Radiology Publishing, Sturgeon Bay, WI, 2010, available for no charge at www.symptombasedradiology.com.