

## CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

A 27 woman presents with left lower quadrant pain which awakened her from sleep. She has had similar episodes of pain in the past which have spontaneously relented after several hours. She denies dysuria, hematuria, constipation, diarrhea, melena, hematochesia, nausea, vomiting, fevers, chills, trauma or any missed menstrual period. She is not sexually active. She has no CVA tenderness and has moderate tenderness pelvic region tenderness with abdominal palpation. A pelvic ultrasound (shown below) shows an apparent retrouterine pelvic mass, but exact relationship of the mass to the uterus, as well as the cause of the mass, are indeterminate.



Which imaging study would be most helpful in further evaluation of this mass?

- (a) plain films of the abdomen
- (b) hysterosalpingography
- (c) barium enema
- (d) magnetic resonance imaging of the pelvis

<b>RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION</b>
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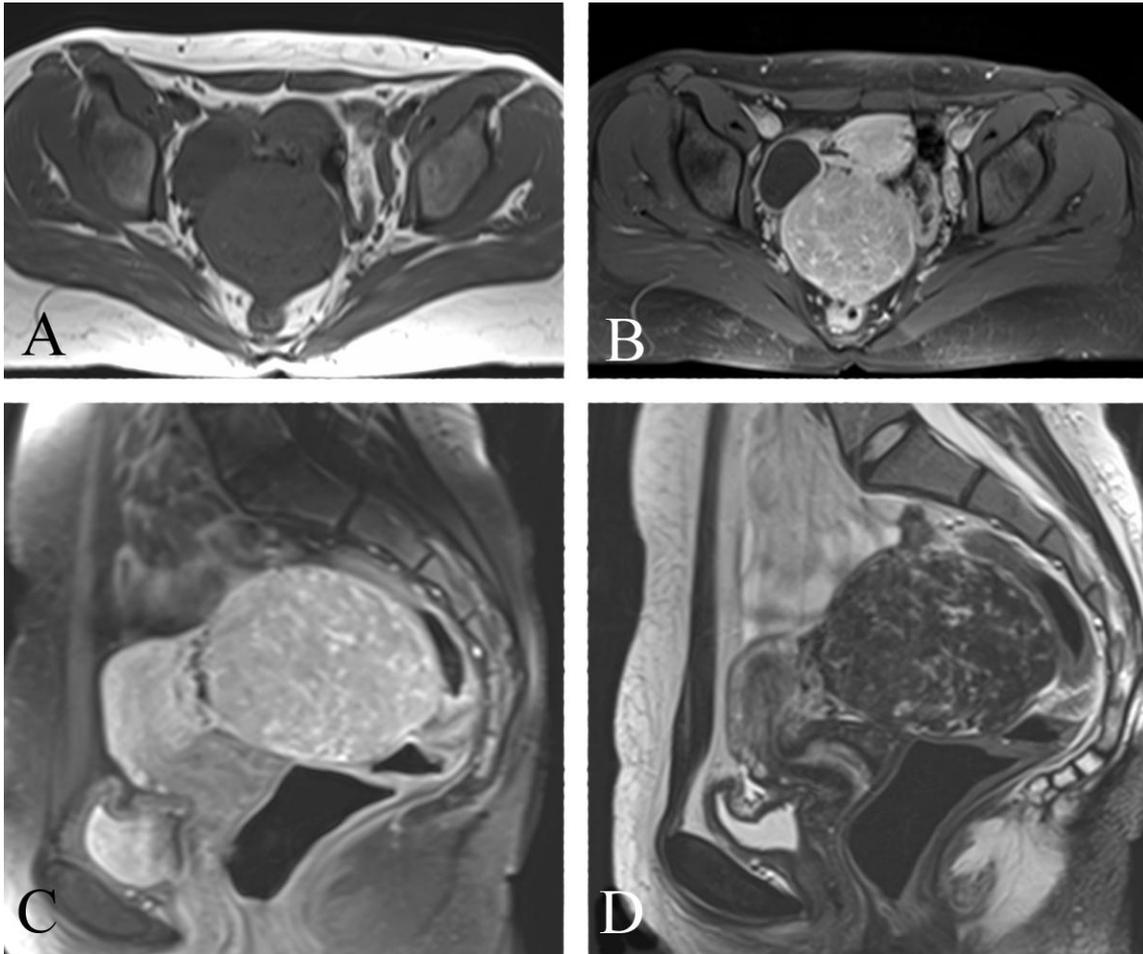
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Answer: (d), magnetic resonance imaging of the pelvis. Pelvic mass lesions have multiple causes, and when ultrasound is indeterminate (as in this case), then further imaging evaluation may help to determine the cause of the abnormality or, even if the specific cause is not found at further imaging, at least allow a reasonable plan for further evaluation to be determined. Reasonable additional imaging includes MR examination (which generally allows differentiation of cystic and solid lesions, determination of endometriosis by identification of blood breakdown products, and excellent soft tissue differentiation of pelvic tissues without the use of ionizing radiation) and CT examination (which generally allows excellent depiction of bowel, ovary, and uterus but may not be as helpful in determining intrauterine abnormalities or demonstrating blood breakdown products, and which requires ionizing radiation).

Plain films of the abdomen are generally of little utility in the evaluation abnormalities initially seen on an ultrasound study, with the exception of when a dermoid tumor (containing dense calcification or even teeth) is suspected. In this case, there was no such obvious density on the ultrasound study. Therefore, (a) is incorrect. Hysterosalpingography is generally used to determine the patency (or lack thereof) of the fallopian tubes (either for fertility workups or when Essure coils have been placed), and to evaluate the anatomy of the endometrial canal in cases of congenital uterine anomalies, and (c) is incorrect. Barium enemas were once used to diagnose abnormalities of the colon (e.g. polyps and adenocarcinoma), but have been largely supplanted by optical and virtual colonoscopy, and (d) is incorrect.

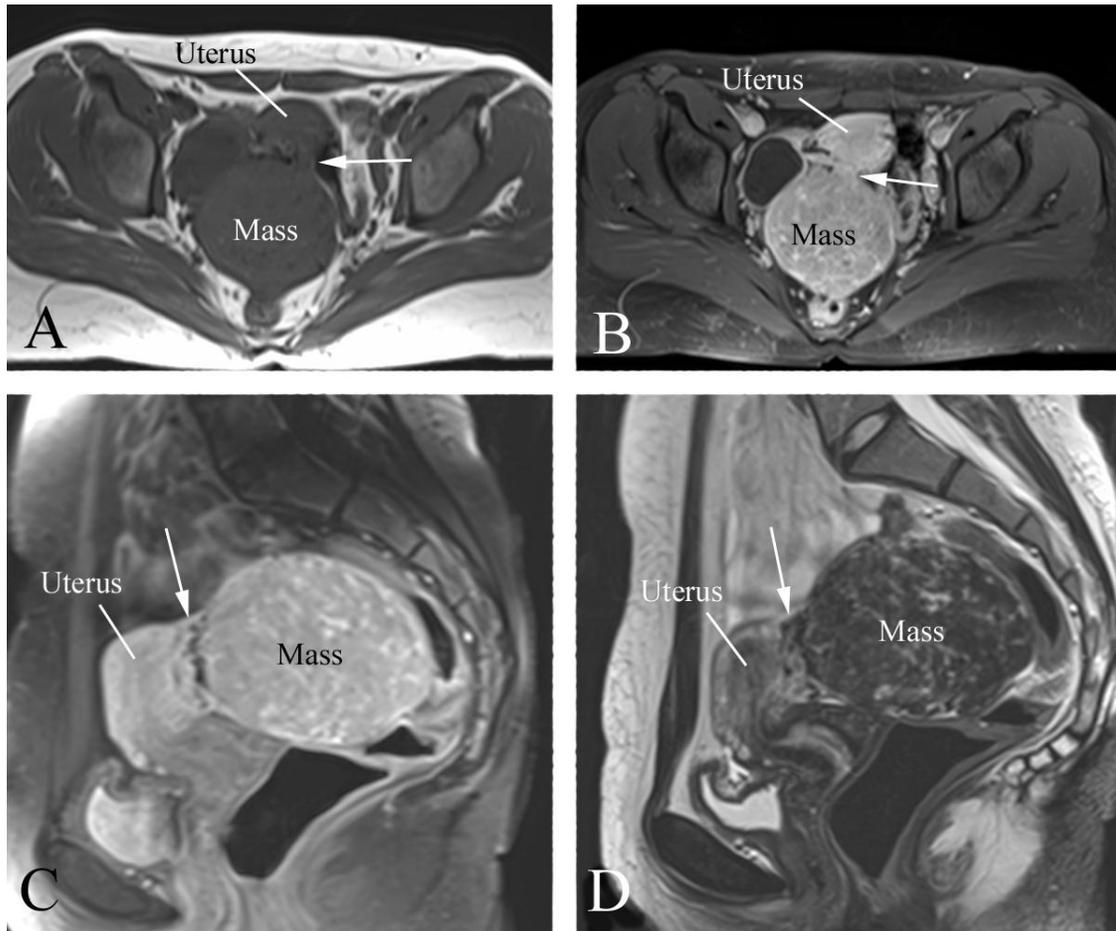
## IMAGING STUDY AND QUESTIONS



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



### Imaging questions:

- 1) What type of study is shown? A pelvic magnetic resonance (MR) imaging study. A is an axial exam with T1 weighting prior to injection of contrast material, B is an axial exam with T1 weighting (and fat suppression) done after injection of contrast material, C is a sagittal T1 exam with T1 weighting (and fat suppression) also done after injection of contrast material, and D is a sagittal T2 exam prior to injection of contrast material.
- 2) Are there any abnormalities? Yes. The uterus (labeled) is displaced anteriorly by a large mass (labeled). Along the superior margin of the uterus, there appears to be a small isthmus of tissue connecting the mass to the uterus (arrow).
- 3) What is the most likely diagnosis? Large, pedunculated fibroid (leiomyoma). The relatively uniform enhancement of the mass argues against hemorrhage or infarction at this time.
- 4) What is the next step in management? Referral to a gynecologist for evaluation and possible resection of the lesion.

<b>PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP</b>
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The patient was seen by a gynecologist and advised that she appeared most likely to have a pedunculated uterine fibroid. While this lesion did not appear frankly malignant, it was felt to be the cause of the patient's intermittent pain. The patient was counseled regarding the risks and benefits of tumor removal. The patient decided that she would like the tumor removed.

At surgery, a pedunculated fibroid was found. The resected tissue was sent for pathologic examination, and the specimen was interpreted as a benign fibroid.

## SUMMARY

**Presenting symptom:** The patient's left lower quadrant pain and abdominal pain and pelvic fullness suggest possible gynecologic disease, particularly given the absence of gastrointestinal symptoms. Because of this, a pelvic ultrasound study was performed.

**Imaging work-up:** The finding of a pelvic mass was somewhat surprising on the ultrasound examination. On the ultrasound examination, the origin and tissue type of the mass could not be determined, but the mass was definitely *not* a simple cyst. Both CT and ultrasound were considered for further evaluation. CT is generally more readily available, usually somewhat less costly, and demonstrates the bony pelvis, bowel, ovaries, uterus, bladder, and ureters. Most CT studies are performed with oral and intravenous contrast material. Unfortunately, CT studies use ionizing radiation and do not do a very good job of evaluating intrinsic uterine lesions or blood breakdown products. MR does a better job of evaluating intrinsic uterine lesions and blood breakdown products and uses no ionizing radiation, although most pelvic MR examinations done for suspected pelvic tumors require intravenous contrast.

**Establishing the diagnosis:** Uterine fibroids are ubiquitous lesions which may be associated with both pelvic masses and pelvic pain. Most uterine fibroids are myometrial (located within the uterine myometrium). Submucosal fibroids may displace and distort the endometrial stripe and be associated with abnormal uterine bleeding. Subserosal fibroids may become pedunculated and, when torsed, infarct with associated pelvic pain. Most myometrial lesions are found within the uterus at ultrasound examination are assumed to be fibroids and often do not require specific treatment. In cases of pedunculated fibroids, particularly when (as in this case) the attachment with the uterus is difficult to demonstrate at imaging, surgical exploration and pathologic analysis of resected tissue may be necessary to establish the diagnosis.

**Take-home message:** Either MR, or CT, or both may be used to further evaluate abnormalities found on pelvic ultrasound.

### FURTHER READING

Hoffman MS. Differential diagnosis of the adnexal mass. UpToDate, accessed 6/3/2011.

Renfrew, DL. Female pelvis and male scrotum. Chapter 2 of *Symptom Based Radiology*, Symptom Based Radiology Publishing, Sturgeon Bay, WI, 2010.

Renfrew, DL. "Second 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).