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CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

A 73 year old woman comes in one day after cardiac catheterization for evaluation of chest pain (the study was normal with no significant coronary stenosis or other abnormality identified) with pain in the right inguinal area, on the same side as the arterial puncture site for the procedure. The pain is significant when she ambulates and radiates into the buttocks and thigh. The patient states that her right foot feels cool. She has had sciatic-type pain in the past, and states that this pain feels different. Her blood pressure is 138/65, her temperature is 99.7, her pulse 50, and her respiratory rate 20. Her right foot is cool to touch and capillary refill is greater than 5 seconds. No dorsalis pedis or posterior tibial pulse is palpable. There is no erythema or edema at the site of vascular puncture. The patient's straight leg raising test was negative, and she had no pain on internal or external rotation of the hip.

Which of the following studies is the best first step in evaluation of this patient's groin pain, and why?

(a) plain films of the right hip to evaluate for osteoarthritis
(b) computed tomography (CT) angiography from the diaphragm through the ankles (CT "runoff" study) to evaluate the lower extremity vascular tree for diffuse vascular disease
(c) ankle-brachial ratio to evaluate the lower extremity vascular tree
(d) ultrasound of the right groin to evaluate the femoral artery at the puncture site

RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION

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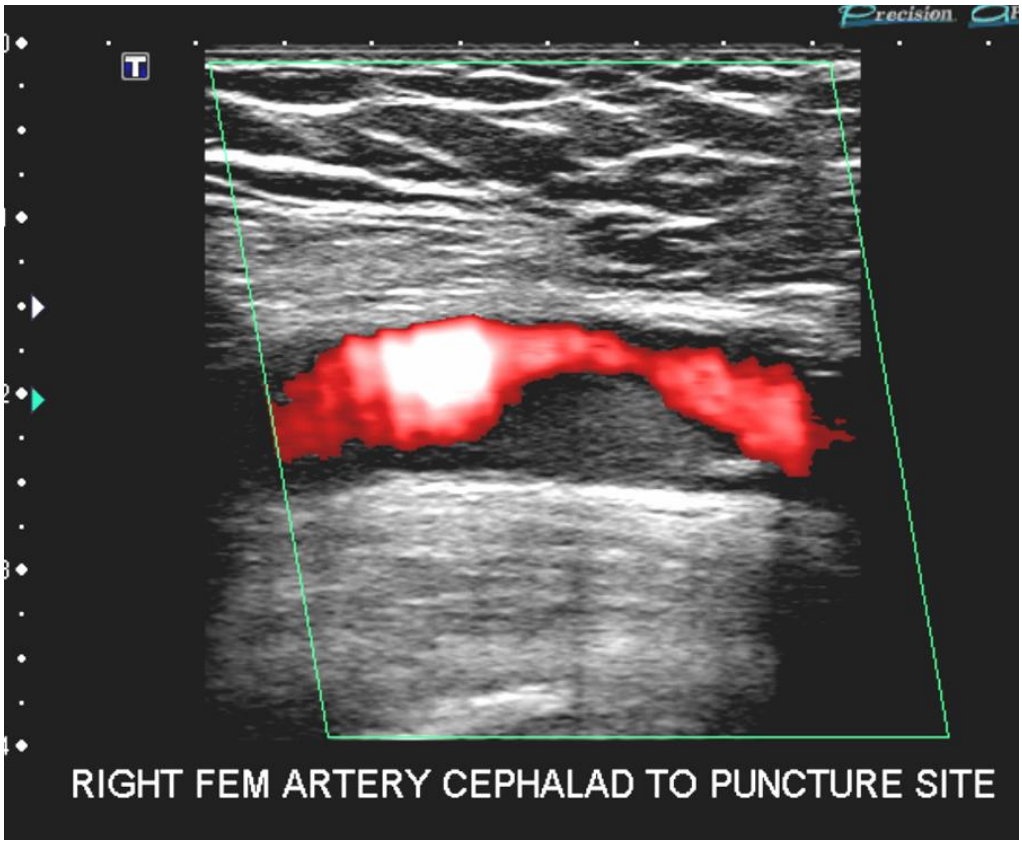
Ultrasound of the right groin to evaluate the femoral artery at the puncture side (d) is the correct answer. The onset of pain following the procedure and the abnormal lower extremity vascular findings on physical examination strongly suggest that the femoral artery may have been damaged or is being compressed as a consequence of the procedure.

Plain films of the right hip to evaluate for osteoarthritis (a) is not the best first step in evaluation of the patient's pain, particularly considering that the pain came on following arterial puncture, is associated with lower extremity vascular abnormalities on physical exam, and is specifically *not* associated with internal and external rotation of the hip; therefore (a) is not the correct answer. CT angiography of the lower extremity (b) may indeed evaluate a specific abnormality at the puncture site, but the remainder of the arterial tree is not really in question at this time and the cost, radiation dose, and contrast injection argue against CT angiography as the best first step in evaluation of the patient's groin pain; therefore, (b) is not correct. Ankle brachial ratio (c) may be helpful in screening the vascular tree from the aorta to the ankles rapidly and effectively, but, again, the patient's symptoms suggest that the cause of her symptoms is at the puncture site and whether the ankle brachial ratio was abnormal or not, this area would need to be further evaluated, so (c) is not correct.

IMAGING STUDY AND QUESTIONS

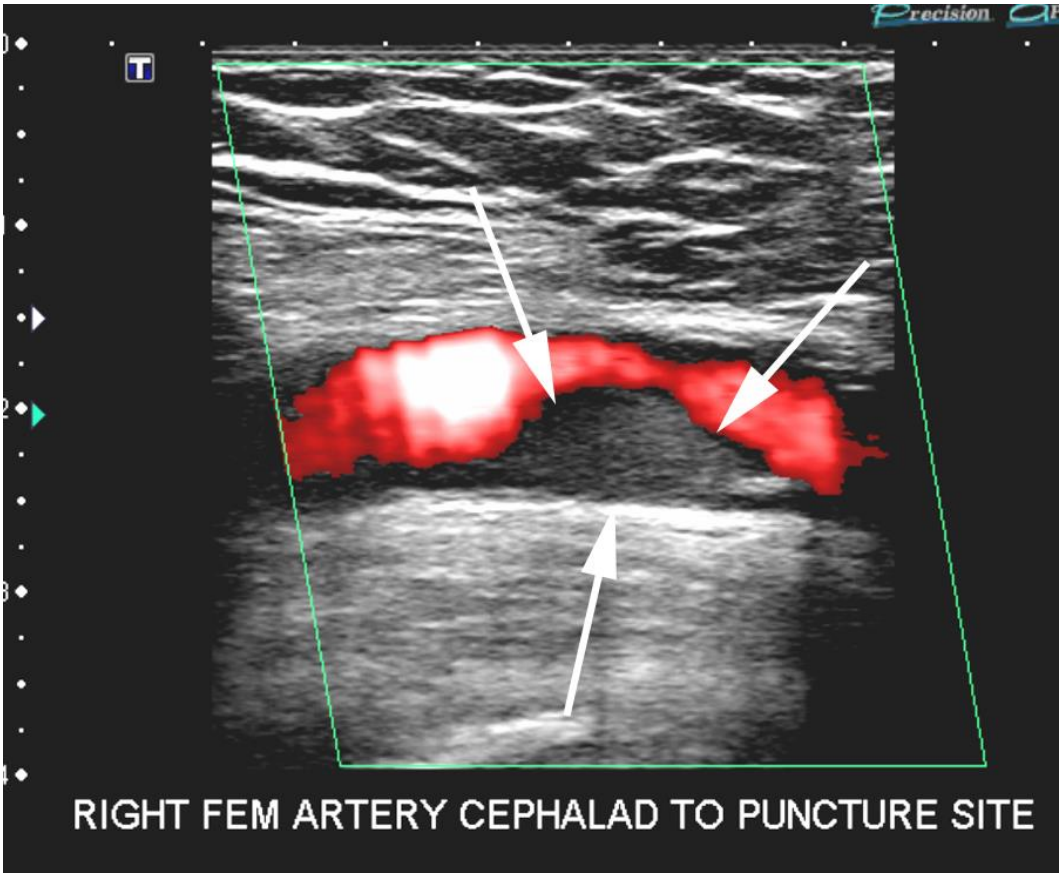
The patient underwent a diagnostic test:



Imaging questions:

1) What type of study is illustrated?
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 illustrated? An ultrasound evaluation of the right femoral artery (specifically, a color Doppler examination).
2) Are there any abnormalities? Yes. There is a focal area of absent flow which demonstrates uniform hypoechogenicity with a smooth margin (arrows).
3) What is the most likely diagnosis? The lesion appears to be more likely to represent a thrombus along the margin of the artery rather than a dissection of the vessel, given the lack of flow within the lesion on the color Doppler examination.
4) What is the next step in management? Emergency referral to a vascular surgeon.

PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP

The patient was referred to a vascular surgeon. The patient underwent a common femoral artery exploration, endarterectomy, and patch angioplasty for an intimal flap along the posterior artery that was nearly occluding the vessel. Her lower extremity regained the same temperature as the other side, capillary refill returned to normal, and the dorsalis pedis and tibialis anterior pulses were once more palpable.

SUMMARY

Presenting symptoms: Unilateral groin pain may have a wide variety of causes including musculoskeletal processes such as: osteoarthritis (and other arthropathies) of the hip; muscle strains; stress fracture secondary to abnormal stress of a normal bone (a fatigue fracture) or normal stress through an abnormal bone (an insufficiency fracture); acute fractures from trauma; and pathologic fractures secondary to bone destruction by tumor. Vascular causes of hip and groin pain are rare, but in the setting of new pain and recent prior arterial catheterization, arterial damage should be strongly considered as a cause.

Imaging work-up: In this case, ultrasound of the area was performed. Other imaging studies (e.g., catheter, CT, or MR angiography) may have shown the abnormality as well but ultrasound was chosen on the basis of availability, cost, and lack of the need for contrast injection.

Establishing the diagnosis: The diagnosis of arterial injury may be suspected on the basis of an abnormal appearance on the ultrasound study.

Take-home message: In patients with a suspected complication of recent arterial puncture, ultrasound with color Doppler examination is a good first step in evaluation.

FURTHER READING

Mohler ER. Noninvasive vascular diagnosis in lower extremity peripheral arterial disease. UpToDate, accessed 11/23/09.

Paulson EK, Kliewer MA, Hertzberg BS et al. Color Doppler sonography of groin complications following femoral artery catheterization. AJR 1995;165:439-444.