

CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

An 84 year old woman presents to the clinic with pain along the anterior aspect of the ankle. She has had no particular single incident of trauma, but states that her ankle does “pop” on occasion and that she feels a “lump” along the anterior ankle. On physical examination, the patient has a 1.5 cm mobile indurated mass along the anterior ankle which is mobile. The palpable abnormality appears to be associated with the tibialis anterior tendon. There is no skin discoloration over the lesion. AP, lateral, and oblique foot films were obtained, with the lateral study shown here:



Which of the following imaging studies would be *most* helpful in further evaluation of this patient?

- (a) magnetic resonance (MR) imaging of the ankle
- (b) nuclear medicine bone scan of the whole body
- (c) computed tomography (CT) of the ankle
- (d) ultrasound of the deep venous system of the lower extremity

RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION

The plain film demonstrates ankle joint space narrowing but no obvious calcified or ossified lesion to account for the anterior ankle pain or palpable lesion. The patient did have degenerative changes of the midfoot and forefoot, better seen on the anteroposterior and oblique views of the foot (not shown), which are not relevant to the ankle pain and palpable lesion. The exact nature of the palpable lesion is not known, but it likely represents a soft tissue mass of some sort given the lack of calcification or ossification on plain film examination. Therefore MR imaging of the ankle (a) would be the most helpful imaging study in further evaluation, and (a) is correct.

Nuclear medicine bone scan of the whole body (b) may be used for evaluation of metastatic malignancy, and shows increased radiotracer localization at the site of increased bone turnover, such as areas of infection, stress or post-traumatic fracture, tumor, and active erosion from inflammation. However, a bone scan is not typically the most helpful study to characterize a suspected soft tissue mass, and (b) is incorrect. CT of the ankle is helpful in further characterization of complex intra-articular fractures, but is not as good a study as MR in evaluation of soft tissue masses, and (c) is incorrect. Ultrasound of the deep venous system of the lower extremity is useful in the setting of suspected deep venous thrombus, but the patient did not have any leg swelling or warmth, so (d) is incorrect. Note that ultrasound *of the lesion* is a reasonable alternative to MR in situations where there is the necessary expertise on the part of the ultrasonography and radiologist performing the examination, but (as a generalization) such expertise is not as widely available as MR examination.

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? An ankle magnetic resonance (MR) imaging study. A is an axial proton density MR image, B is an axial fat suppressed T2 weighted MR image, C is a sagittal T1 weighted MR image, and D is a sagittal T2 fat suppressed MR image. A marker has been placed at the location of the palpable abnormality along the anterior ankle.
- 2) Are there any abnormalities? Yes. All four images demonstrate swelling and abnormal signal intensity in the anterior tibial tendon (arrows), indicative of a partial thickness tear and tendinopathy. No retraction of tendon margins to indicate a full thickness tear is seen.
- 3) What is the most likely diagnosis? Partial thickness tear of the tibialis anterior tendon.
- 4) What is the next step in management? Counsel the patient regarding potential treatment for partial thickness tibialis tendon tear; consult with podiatry or orthopedic surgery.

PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP
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The patient was being seen by a podiatrist for mycotic nail care. At a follow-up visit after the MR was performed, the patient's pain had decreased and her function was good, and therefore no surgery or other specific therapy was recommended.

SUMMARY

Presenting symptoms: The patient presented with non-traumatic ankle pain and a palpable lesion. Possible causes of such pain include partial thickness anterior tibial tendon tear, a ganglion of the tendon, soft tissue tophus, or a primary or metastatic soft tissue tumor. The first step in evaluation is, of course, a history and physical examination. The lesion appeared to be located along the course of the tibialis anterior tendon, which favored a partial thickness tendon tear with associated swelling of the tendon.

Imaging work-up: The initial imaging examination in patients with nontraumatic ankle pain is typically a plain film study including a lateral, anteroposterior (AP) and oblique plain film of the ankle. In this case, the patient had plain films of the foot rather than the ankle. Additional imaging is usually done only after the ankle or foot plain films, and is predicated on the history, physical examination, laboratory results, and the results of the plain film. MR is usually the next imaging study of choice given the ability to depict a wide range of bone and soft tissue abnormalities which may cause ankle pain or palpable abnormalities of the ankle joint.

Establishing the diagnosis: The reference standard for tendon tears is the result of surgical exploration, but the MR features in classic cases (such as this one) are characteristic enough to establish the diagnosis with certainty.

Take-home message: The initial imaging study of choice for virtually all patients with nontraumatic ankle pain (with or without a palpable abnormality) is a plain film examination. Additional studies are based on the history and physical examination, laboratory results, and the results of the plain film study. MR of the ankle is generally the next imaging study performed given the ability of MR to depict a wide variety of bone and soft tissue abnormalities that may cause ankle pain and/or a palpable mass.

FURTHER READING

ACR appropriateness criteria for chronic ankle pain. www-acr.org accessed 6/7/12.

Renfrew DL. Single joint pain. Chapter 14 in *Symptom Based Radiology*, Symptom Based Radiology Publishing, Sturgeon Bay, WI, 2010, available for no charge at www.symptombasedradiology.com.