



Visual Case Discussion

Achilles tendon rupture on bedside ultrasound

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A 33-year-old man with no past medical history presents to the emergency department with acute right ankle pain after pushing off of the affected ankle while playing tennis. The pain is localized to the posterior ankle and calf, is worse with weight-bearing, and improves with rest. He has exquisite tenderness over the right posterior ankle, which limits his exam. Squeezing of his calf results in some plantar flexion at the ankle. Point-of-care ultrasound (POCUS) performed with a 7.5 MHz linear probe over both Achilles tendons. [Figs. 1–3. Video 1.]



Fig. 1. POCUS of the Achilles tendon is performed with the patient lying in a prone position with his/her foot hanging over the edge of the bed. A high-frequency linear transducer is used to scan the tendon in transverse and longitudinal orientations.

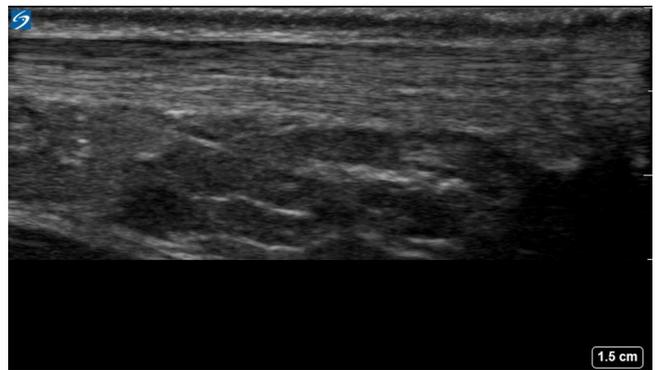


Fig. 2. Normal ultrasound appearance of the Achilles tendon. Fibers are arranged in parallel and have uniform echogenicity.

The patient is diagnosed with a partial, right-sided Achilles tendon rupture. He is discharged in a splint and referred to physical therapy and orthopedics.

A partial or complete Achilles tendon rupture most commonly occurs during sports, when a person forcefully pushes off a weight-bearing foot with his/her knee extended.^{1,2} Most ruptures occur 3–6 cm proximal to the tendon's insertion on the calcaneus.^{1,3} Patients may present with ankle pain, a palpable tendon defect, or weakness with plantar flexion.² However, physical exam may be limited by pain or soft tissue swelling; in addition, 1/3 of patients do not report pain.³ As a result, Achilles tendon rupture, especially partial rupture, is missed in 20% of patients at initial presentation, which can result in delayed treatment and permanent weakness in plantar flexion or limp.³

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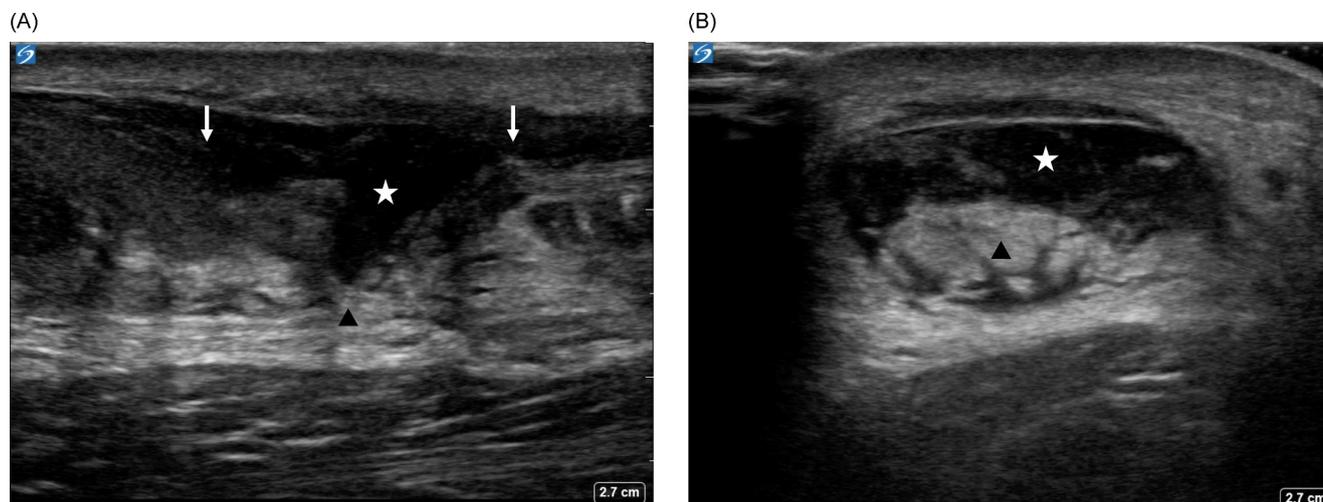


Fig. 3. A–B. (A) Longitudinal and (B) transverse ultrasounds of the affected ankle reveal disruption of the Achilles tendon fibers (white arrows) and hematoma (star). Some fibers are intact (black arrowhead), consistent with a partial tendon rupture.

Ultrasound is a bedside tool that is 96–100% sensitive and 83–100% specific for Achilles tendon rupture.¹ Normally, the Achilles tendon appears as well-organized fibers with uniform echogenicity. In cases of Achilles tendon rupture, ultrasound may reveal disrupted fibers, retracted tendon ends, posterior shadowing at the rupture margins, or hematoma.¹ In patients with suspected partial Achilles tendon rupture, dynamic sonography, in which the patient flexes and extends his/her ankle during the ultrasound, demonstrates some continuous movement across the tendon.¹ By including POCUS in the assessment of patients presenting with ankle pain, emergency providers can more accurately diagnose partial and complete Achilles tendon ruptures, avoid unnecessary imaging, reassure patients, and provide appropriate outpatient referrals.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.visj.2018.11.005](https://doi.org/10.1016/j.visj.2018.11.005).

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Questions

- A 24-year-old man presents with right ankle pain after jumping suddenly while playing basketball. He has tenderness of his posterior ankle and weakness with plantar flexion. Which of the following is true regarding point-of-care ultrasound?
 - Ultrasound can be used to visualize complete Achilles tendon ruptures but not partial ones.
 - Ultrasound has high sensitivity and specificity for Achilles tendon rupture.
 - Ultrasound should not be performed in cases of suspected partial Achilles tendon rupture, as applying pressure to the tendon may cause further injury.

d. Ultrasound can be used to visualize defects in bone and joint effusions, but not tendon injuries.

- A 30-year-old woman presents with ankle pain and weakness with plantar flexion after playing volleyball. You suspect that she has a partial Achilles tendon rupture. Which of the following is true about point-of-care ultrasound?
 - The Achilles tendon is best assessed with a low-frequency curvilinear probe.
 - Ultrasound is performed with the patient standing on his/her tiptoes.
 - Ultrasound most commonly identifies Achilles tendon ruptures proximal in the calf, where the tendon originates from the soleus and gastrocnemius muscles.
 - Ultrasound is useful to diagnose Achilles tendon ruptures in patients who cannot tolerate flexion and extension at the ankle secondary to pain.

Answers

- Ultrasound has high sensitivity and specificity for Achilles tendon rupture. Explanation: Ultrasound is 96–100% sensitive and 83–100% specific for Achilles tendon rupture. Ultrasound can be used to visualize partial and complete Achilles tendon ruptures and has not been associated with further injury to tendon. In addition to tendon injuries, POCUS can be used to diagnose fractures, dislocations, and joint effusions of the ankle.
- Ultrasound is useful to diagnose Achilles tendon ruptures in patients who cannot tolerate flexion and extension at the ankle secondary to pain. Explanation: Ultrasound of the Achilles tendon is performed with a high-frequency linear probe. The patient lies prone in the bed with his/her foot hanging off the side of the bed. Most Achilles tendon ruptures occur distal in the lower extremity, approximately 3–6 cm from the tendon's insertion on the calcaneus. Ultrasound is especially useful to identify Achilles tendon ruptures in patients with significant pain who cannot tolerate a thorough physical exam.