Case Report

Point-of-care ultrasound diagnosis of acute Achilles tendon rupture in the ED

Abstract

Patients with acute Achilles tendon injuries from sport-related activities are frequently seen in the emergency department (ED). Missed or delayed diagnosis of an Achilles tendon rupture can result in significant patient morbidity. However, the diagnosis of an Achilles tendon rupture is not always clear clinically. Physical examination maneuvers to assess for a tendon injury can be limited by pain and soft tissue swelling. Ultrasound has been shown to be very sensitive in detecting an Achilles tendon rupture. We report a case of a 39-year-old woman who presented to the ED with severe left ankle and leg pain. Her physical examination was limited by pain. However, a point-of-care ultrasound examination helped in making a prompt and accurate diagnosis of acute Achilles tendon rupture. This case demonstrates that point-of-care ultrasound can be a useful diagnostic tool in the assessment of patients with suspected Achilles tendon rupture, particularly when the physical examination is limited.

Achilles tendon injury is one of the most common sport-related injuries [1]. It is most often the result of repetitive overuse, frequently seen in athletes who engage in activities such as running and jumping that involve long-term repetitive tensile forces [2]. Typically, Achilles tendon ruptures occur in men between the ages of 30 and 50 years who have no prior injury reported in the affected leg [3]. The most common reported mechanisms for Achilles tendon rupture include pushing off the weight-bearing foot with the knee extended, unexpected sudden dorsiflexion of the ankle, and violent dorsiflexion of a plantar-flexed ankle. Most Achilles tendon ruptures occur approximately 3 to 6 cm proximal to the calcaneal insertion of the tendon because of the small cross-sectional area, large eccentric loads, and hypovascularity [1]. Acute Achilles tendon rupture has been reported as missed in more than 20% of cases, most likely because of pain and swelling limiting the physical examination [4]. This report discusses the use of point-of-care ultrasound in the diagnosis of an acute Achilles tendon rupture in the emergency department (ED).

A 39-year-old woman presented to the ED with acute onset of severe left leg pain of 2-hour duration. While playing volleyball, she jumped up, came down, and stepped into a hole. Her pain was located in the posterior aspect of the left ankle and leg. She was unable to bear any weight on the left leg. She was not taking any medications. Physical examination revealed the patient to be in severe distress because of pain. A swelling was noted in the posterior aspect of the ankle along with severe tenderness. There were no open wounds in the left leg. She complained of severe pain and refused any further attempts to examine her leg; hence, her left leg and ankle assessment was very limited. After intravenous morphine administration, x-rays of left ankle and tibia/fibula were performed, which did not reveal any acute abnormalities. A point-of-care ultrasound examination was then performed by the treating emergency physicians using a 10- to 5-MHz linear array transducer. The normal right Achilles tendon was examined first for comparison (Fig. 1). The ultrasound examination of the left Achilles tendon revealed a complete disruption of the fibrillar appearance of the tendon approximately 6 cm from calcaneal insertion site with retraction of the torn ends consistent with full-thickness rupture of Achilles tendon (Fig. 2). The gap between the ruptured tendon ends was filled with hematoma and debris. With dynamic testing (slight passive dorsiflexion to plantar flexion), separation of the distal dorsiflexion was well visualized. The patient was discharged in a splint and crutches, with outpatient orthopedics follow-up.

Fig. 1  Long-axis view of the normal right Achilles tendon fibrillar echotexture with well-defined parallel bands (arrows).
Achilles tendon is the strongest tendon in the human body; however, it is the most frequently injured ankle tendon [5]. It arises from the gastrocnemius and soleus muscles and inserts into the posterior aspect of the calcaneus. The muscle fibers at the musculotendinous junction and the tendon insertion at the calcaneus appear hypoechoic and should not be confused with partial tears. The sensitivity and specificity of ultrasound for Achilles tendon rupture are 96% to 100% and 83% to 100%, respectively [4,6].

The patient is scanned in the prone position with the feet hanging over the edge of the bed using a high-frequency linear array transducer (Fig. 3). Comparison with contralateral normal side and dynamic imaging is recommended. An acute complete rupture of the Achilles tendon is characterized by complete disruption of the normal pattern of parallel fibers in the long axis, often with retracted tendon ends. Additional sonographic findings include hematoma formation at the site of rupture, posterior acoustic shadowing at the margins of the rupture, adjacent hypoechoic tendinosis, herniation of Kager’s fat into the tendon gap, and visualization of the plantaris tendon [4].

Dynamic sonography is useful to differentiate between partial- and full-thickness rupture of Achilles tendon. With slight dorsiflexion and plantar flexion at the ankle under sonographic visualization, separation of one tendon end away from the other indicates full-thickness rupture. In contrast, continuous movement of the tendon across the site of the rupture indicates partial rupture of the tendon with some intact fibers. This case illustrates the use of point-of-care musculoskeletal ultrasonography in the evaluation of patients with suspected tendon rupture, especially when the physical examination is limited or equivocal. Point-of-care ultrasound can potentially avoid misdiagnosis and direct appropriate care for these patients.

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