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An Uncommon Mechanism for Work-Related Total Achilles Tendon Rupture

Urgent message: An uncommon mechanism of injury should not distract from an otherwise fairly common presentation—in this case, one that warranted referral and, ultimately, surgery.

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Introduction

Achilles tendon (AT) ruptures account for approximately 40% of all operative tendon repairs.[1,2] With 18 ruptures per 100,000 people, it is the most frequently ruptured tendon—and the incidence of AT ruptures has been steadily increasing over the past few decades.[1–4] Typical patients include athletic males between the ages of 30 and 50.[3] Because the AT is the strongest, yet most frequently ruptured tendon in the body, the pathophysiology of these ruptures has been studied at length. Some classes of drugs, such as fluoroquinolones or anabolic steroids, are well understood to disrupt tendon strength and increase the likelihood of rupture.

Case Description

The patient, a 30-year-old male who works for a local parks and recreation department, presented to the occupational medicine clinic for evaluation of a left ankle injury sustained when he was hit on the posterior left ankle by a basketball while he was planting his left foot and preparing to push off. He reports feeling a "pop," accompanied by severe pain and numbness on the back of his ankle and foot. Pre-evaluation treatment included icing his left ankle, which relieved some pain and numbness. The patient presented to clinic on the day of injury with significant posterior left ankle swelling without ecchymosis. The left posterior ankle was tender to palpation, and a palpable defect was noted in comparison with the right. Limited, painful plantar and dorsiflexion were noted, as well, along with no Achilles reflex of the left ankle, and decreased strength. Sensation and circulation were intact. A Thompson test was positive on the left. After being evaluated at the clinic, the patient was referred to an orthopedist and a magnetic resonance imaging (MRI) study was ordered; this confirmed a complete Achilles tendon rupture.

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Discussion

Pathophysiology

A recent review of AT ruptures by Longo, et al proposes both degenerative and mechanical theories as the causes of nondrug AT ruptures.[4] The degenerative theory states that asymptomatic and chronic degeneration of the AT associated with age predisposes the AT to rupture, even without severe force applied to the tendon. The mechanical theory suggests that AT rupture can occur due to nondegenerative acute and subacute microtrauma and microruptures of the tendon, causing failure under a high degree of stress. The proposed mechanical theory is consistent with the most common mechanism of an AT rupture, which occurs when the muscle is maximally contracted and the tendon is obliquely loaded at a short initial length.[4]

Urgent Care Evaluation

The urgent care evaluation of a suspected Achilles tendon rupture should incorporate a history including recent ankle injury with either trauma to the ankle or a "pushing off" mechanism of extreme plantarflexion where the patient felt or heard a "pop" in the back of the ankle. The provider should also assess any recent fluoroquinolone use. The physical exam should include assessment of both ankles, checking for a visual or palpable defect of the ankle such as swelling, ecchymosis, and/or a lack of tension over the Achilles tendon. The exam should also include a Thompson test, which is performed by squeezing the gastrocnemius of the affected limb and observing for plantarflexion. Lack of plantarflexion is a positive Thompson test, as the tear in the Achilles tendon prevents the mechanism of the tendon from pulling on the flexor tendons in the foot. Sensitivity and specificity for this test are 0.96 and 0.93, respectively, such that it is an effective tool to evaluate for an AT rupture.[1]

Management

Management of an AT includes a short leg splint placed posterior to the ankle, extending from the upper calf to the toes. The angle of the splint should be at 135° so that the ends of the Achilles tendon tear are closer together when immobilized, as this can aid in the healing process. The patient should also be given crutches with instructions on non-weight-bearing ambulation of the affected foot. NSAIDs or, less preferably, narcotic pain medication may be prescribed for about 3 days, with urgent orthopedic surgeon referral given for further evaluation and treatment within 3 days.

Supplemental imaging with ultrasound by trained personnel or with MRI can be helpful in determining a partial thickness vs a full thickness tear. Orthopedic referral is necessary in all AT ruptures for management and evaluation for surgery.

After surgery, 6-8 weeks of casting followed by up to 6 months of therapy is usually necessary.

Case Discussion

While Achilles tendons tears are not particularly uncommon as a work- or sports-related injury, the reported mechanism of injury for this case, specifically that the tendon rupture was caused by direct impact of a basketball to a planted and isometrically contracted ankle, is a previously unreported mechanism for this injury. With nearly 53% of AT ruptures occurring during a weight-bearing planted foot pushing off from the ground, this case presents an unusual combination of the planted food bearing weight in combination with a direct trauma to the posterior AT.[5]

The MRI was used as an additional diagnostic tool in this case to ensure this uncommon mechanism of injury had indeed led to a total AT rupture. However, Garras et al showed that an MRI of the AT is not necessary or more sensitive than physical examination tests, which include an abnormal Thompson test, decreased resting tension, and a palpable defect.[1]

Conclusion and Teaching Points

- The typical presentation of an Achilles tendon rupture is a male, aged 30-50, who is intermittently active with high intense physical activity, or a patient who recently had fluoroquinolone use or a corticosteroid injection of the ankle.
- A recent ankle injury with either trauma to the ankle or a "pushing off" mechanism where the patient felt or heard a "pop" in the back of the ankle should raise suspicion for an Achilles tendon rupture.
- Diagnostic examination findings include a positive Thompson test, decreased resting tension of the ankle, and a palpable defect on the posterior ankle.
- Imaging studies can be deferred prior to orthopedic evaluation if the history and clinical examination are suggestive of an Achilles tendon rupture. ■

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