Acute Tibialis Posterior Tendon Rupture Associated With a Distal Tibial Fracture

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abstract

Full article available online at Healio.com/Orthopedics. Search: 20120327-32

Tibialis posterior tendon ruptures associated with closed medial malleolar fractures are rare. This article describes the association of tibialis posterior tendon ruptures with closed, high-energy, distal tibia fractures. Tendon ruptures are likely to be identified intraoperatively or missed if clinical evaluation at acute injury is limited. A high index of suspicion is required to diagnose this injury. The consequences of an unrecognized tibialis posterior tendon rupture include progressive, painful pes planus deformities due to the unopposed action of the peroneus brevis muscle and lack of support of the medial longitudinal arch. Secondary operative intervention may be required. This article describes an intraoperative tenodesis technique between the tibialis posterior and flexor digitorum longus tendons when direct repair is not possible.

A 48-year-old woman sustained a closed AO/Orthopaedic Trauma Association type 43A right lower-extremity distal tibia fracture and a traumatic left knee arthroscopy. Temporary stabilization with an external fixator was performed, followed by open reduction and internal fixation of the distal tibial fracture 6 days later. A perarticular nonlocking medial plate was applied, and the tibialis posterior tendon was shortened. We performed a direct tenodesis to the flexor digitorum longus tendon. At 1-year follow-up, the patient had made excellent progress, with no detectable muscle weakness, and was able to perform a single-leg toe raise.

A review of the literature suggested which features of radiological evidence of tendon rupture should be examined, which may be useful in the current era considering most high-energy distal tibia or pilon fractures undergo examination with computed tomography.

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Drs Jarvis and Cannada have no relevant financial relationships to disclose.

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doi: 10.3928/01477447-20120327-32
Tibialis posterior tendon ruptures associated with closed medial malleolar fractures are rare. This article describes a tibialis posterior tendon rupture associated with a closed distal tibial fracture. When clinical evaluation of an acute injury is limited, tendon rupture is likely to be identified intraoperatively or missed. A high index of suspicion is required to diagnose this injury. An unrecognized tibialis posterior tendon rupture may result in a progressive, painful pes planus deformity.

This article describes the potential for tibialis posterior tendon ruptures in closed distal tibial fractures and an intraoperative tenodesis technique for when direct repair is not possible. A review of the literature suggested which features of radiological evidence of tendon rupture should be examined, which may be useful in the current era when considering high-energy distal tibia or pilon fractures undergo examination with computed tomography (CT).

**CASE REPORT**

A 48-year-old woman presented following a motorcycle accident. She sustained a closed AO/Orthopaedic Trauma Association type 43A distal tibia right lower-extremity fracture (Figure 1) and a traumatic left knee arthrotomy.

The initial operative management of the fracture included temporary stabilization with an external fixator. On day 6, the patient underwent open reduction and internal fixation of the distal tibial fracture. A medial incision was made, and deeper dissection revealed that the tibialis posterior tendon was completely ruptured (Figure 2). The tendon rupture level correlated with the fracture level. The proximal portion of the tibialis posterior tendon was identified by opening its sheath. A percutaneous nonlocking medial plate was applied. The tibialis posterior tendon was shortened. Attempted direct repair would have left the tendon in direct contact with the plate and left the ankle inverted. Instead, we performed direct tenodesis to the flexor digitorum longus tendon.

For 2 months postoperatively, the patient remained nonweight bearing in a short-leg cast. After 2 months, she transitioned to a walking boot and was fully weight bearing. At 1-year follow-up, the patient had made excellent progress. On examination, her wounds were well healed, and she had 5/5 strength in ankle inversion, eversion, dorsiflexion, and plantarflexion, and flexor and extensor hallucis longus function (Figure 3). Distal neurovascular examination was normal, and no malalignment existed. Radiographs revealed a well-healed fracture with intact hardware (Figure 4). The American Orthopaedic Foot and Ankle Society Ankle-Hindfoot Scale at 1-year follow-up was 85/100. The patient had an excellent clinical outcome and returned to work.

**DISCUSSION**

High-energy distal tibial fractures are best managed via a staged approach. Attempts at early internal fixation may have disastrous consequences. Complications include wound infections, osteomyelitis, and amputation. The soft tissues are vulnerable immediately following injury, and stabilization of the tissues with fracture reduction in an external fixator results in a lower complication rate and is the current standard of care.

Few case reports have been published regarding the association of ankle fractures and tibialis posterior tendon rupture. The ankle fracture pattern is typically a pronation–external rotation injury, where the tendon is ruptured due to a direct tear over the fracture fragment medially. Due to the limited clinical evaluation possible...
at acute injury, tendon rupture is likely to be recognized intraoperatively or missed. This injury is underrepresented in the current literature. A high index of suspicion is required to identify these injuries. Our patient had no preexisting tendon rupture risk factors, such as rheumatoid arthritis or obesity. Therefore, the acute tibial fracture can be assumed to be the rupture cause.

Case reports have been published demonstrating medial bone flakes as 1 possible radiographical sign that may suggest a tibialis posterior tendon injury in ankle fractures. Medial bone flakes result from direct avulsion injuries to the medial tibial metaphysis. These case reports described looking for medial bone flakes on plain radiographs. If CT is also performed preoperatively, it may be prudent to look specifically for medial bone flakes, which may be missed on plain radiographs. Our patient had no medial bone flakes.

Giblin showed an association between distal tibial fractures and tendon rupture, reporting rupture of the tibialis posterior and flexor digitorum longus tendons with a closed distal one-third tibial fracture. The tendons were interposed in the fracture site, and the ruptures were identified intraoperatively. Primary repair was performed, and the patient had a good outcome at 6-month follow-up.

Primary tendon repair has had excellent long-term results. However, when the proximal end of the tendon had shortened and retracted to the extent where a primary end-to-end repair was not possible, we performed tenodesis to the flexor digitorum longus tendon, with an excellent clinical outcome. The substitution of the flexor digitorum longus tendon, with an excellent clinical outcome and is useful when a direct end-to-end repair is not possible.

Conclusion

Acute tibialis posterior tendon ruptures associated with distal tibial fractures are rare. However, if this injury is missed, it is likely to result in substantial disability. A high index of suspicion is required, and thorough evaluation of CT scans may reveal medial bone flakes. Direct tenodesis between the tibialis posterior and flexor digitorum longus tendons had an excellent clinical outcome and is useful when a direct end-to-end repair is not possible.

REFERENCES