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Case Reports and Series

Missed Medial Malleolar Fracture Associated With Achilles Tendon Rupture: A Case Report and Literature Review

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ABSTRACT

A 45-year-old man sustained an Achilles tendon rupture while playing futsal. A concomitant medial malleolar fracture was not diagnosed until the patient underwent an operation for Achilles tendon repair. A routine postoperative radiograph showed a minimally displaced medial malleolar fracture. Conservative treatment was chosen for the fracture. The function of the Achilles tendon recovered well, and the fracture was united. A medial malleolar fracture can be missed when an Achilles tendon rupture occurs simultaneously. Thus, surgeons should consider the possibility of medial malleolar fracture associated with an Achilles tendon rupture.

A missed medial malleolar fracture carries an increased risk of the development of post-traumatic ankle arthrosis. Medial malleolar fractures and Achilles tendon ruptures, both common injuries in themselves, rarely occur concomitantly. We are aware of only 7 published reports describing injuries involving concomitant medial malleolar fractures and Achilles tendon ruptures (1–7), and only 1 previous report describing a missed medial malleolar fracture associated with an Achilles tendon rupture (3). In the present report, we describe a patient who sustained an unrecognized medial malleolar fracture in association with an Achilles tendon rupture.

Case Report

A 45-year-old male presented to the emergency department with sudden pain in his left hindfoot after collision with another player while playing futsal. He was not able to walk by himself (without assistance) after the injury. In the emergency department, an Achilles tendon rupture was diagnosed, and a temporary, short-leg, immobilizing splint was applied. The next day, he was referred to our orthopedic department for surgery. Tenderness and a palpable defect were present in the left Achilles tendon 3 cm proximal to its insertion. The results of the Thompson test (8) were positive. He had neither tenderness nor swelling around his ankle, including the medial malleolus. A questionable horizontal radiolucent line was seen in the medial malleolus on radiographs of the left ankle (Fig. 1); however, it was not recognized as a fracture. An isolated Achilles tendon rupture was diagnosed on the basis of the clinical findings, and surgical repair of the tendon was planned.

At 5 days after the injury, an Achilles tendon repair was performed. The intraoperative findings showed that the Achilles tendon had completely ruptured. The tendon was repaired using a combination of mini-half-Bunnell sutures and Tsuge sutures, as reported by Uchiyama et al (9). First, each tendon end was divided into bundles approximately 5 mm wide, with 3 proximal and 2 distal bundles. Each bundle was gathered using the Bunnell suture technique and a No. 2 nonabsorbable braided polyester suture (10). Next, the tendon was adjusted to an adequate length using the Tsuge technique, using 2-0 nonabsorbable braided polyethylene suture (11). Finally, each bundle was fixed to the other end of the tendon in a linear fashion, reapproximating the proximal bundles to the distal end and vice versa. The paratenon and gastrocnemius aponeurosis were also repaired, followed by closure of the skin. After surgery, routine radiographs demonstrated a minimally displaced medial malleolar fracture of the left ankle (Fig. 2). The fracture was deemed satisfactorily aligned, and conservative (nonoperative) treatment was chosen.

The patient's rehabilitation schedule was intentionally delayed by a 2-week period compared with the usual protocol after Achilles tendon repair. Subsequent to surgery, a short leg cast was applied and non-weightbearing rest for 3 weeks was recommended. At 3 weeks after surgery, early full weightbearing with a walking cast in slight ankle plantarflexion was permitted. Radiographs showed the medial malleolar fracture to be stable and nondisplaced at that point (Fig. 3). After cast removal, the patient was allowed full weightbearing on his

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Fig. 1. Standard radiographs of the left ankle taken 1 day after injury showing a horizontal radiolucent line in the medial malleolus. (*A*) Anteroposterior view and (*B*) lateral view.

operated foot. At 4 weeks, the patient was given a hinged ankle–foot orthosis that permitted full plantarflexion but limited full dorsiflexion, and active range of motion exercises were initiated. At 9 weeks postoperatively, the medial malleolar fracture was radiographically healed to such a degree that the orthosis was removed, and double-legged heel-raising exercises were encouraged at that point. At 12 weeks, plain radiographs showed that the fracture was nearly fully united, and the patient was able to perform single-legged heel-raising exercises, and jogging was also allowed at this point. At 5 months postoperatively, he was permitted to return to playing futsal. At 6 months postoperatively, the radiographs showed the fracture to be completely healed without displacement (Fig. 4). He was able to return to full participation in futsal games at 7 months after surgery. At 12 months postoperatively, he had been playing futsal for 5 months without repeat rupture and at his preinjury level. The patient and his family gave their consent for publication of the present case report.

Discussion

The precise mechanism involved in the association of a medial malleolar fracture with an Achilles tendon rupture remains uncertain. In 2002, Assal et al (5) published a case report and review of the published data related to ankle fractures associated with rupture of the Achilles tendon and noted that 4 case reports had been described, all with the same injury as the one in their own report: complete rupture of the Achilles tendon with a closed oblique to vertical medial malleolus fracture (with extension into the tibial plafond in 1 case). The lateral malleolus was intact in every reported case. In their report, the mechanism of injury was a sudden force applied to the forefoot

Fig. 2. Standard routine radiographs of the left ankle taken immediately after the Achilles tendon repair showing a nondisplaced fracture of the medial malleolus. (*A*) Anteroposterior view and (*B*) lateral view.