

Revisional Ankle Fracture Case In a High Energy Injury-Rare Intraoperative Finding to the Tibialis Posterior Tendon

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Literature Review and Purpose

Irreducible Ankle Fractures secondary to posterior tibial tendon interposition in the medial ankle gutter has been scarcely reported in literature. These type of Injuries can occur in either a low or high energy state and typically occur in an external rotation or pronation-abduction injury pattern (2). Irreducible Ankle fracture secondary to Posterior Tibial Tendon interposition has been reported in both adults and pediatric cases (1-7). These patients frequently fail closed reduction attempts. Post operatively, patients that fail surgical reduction of an ankle fracture will commonly complain of extensive swelling, continued ankle instability, pain and deformity (1-7). The purpose of this case is to emphasize the importance of Inspecting the soft tissue surrounding the ankle intraoperatively when the ankle mortise does not reduce to its anatomic alignment.

Case Study

26 year old female injured her right ankle in August of 2016. She slipped and fell and presented to the emergency same day. She suffered an ankle fracture and was placed into a posterior splint and was told to be non weight bearing with crutches. She was seen in the office in August non weight bearing in a posterior splint. Of note the patient's height and weight were 5 ft 2 in and 208 lbs, respectively. On physical exam, she was noted to have moderate edema on the right ankle without fracture blisters. There was no presence of open wounds or clinical signs of infection. In addition, her ankle was noted to be in valgus, plantar flexed position. Limited movement of her toes and right ankle. Radiographs right foot and ankle were performed and it showed a displaced fracture of the distal fibula with butterfly fragments and anterior displacement of the distal tibia as well as widening of the medial clear space (Figure 1). Patient was placed in a non weight bearing cast. The plan was to take the patient to surgery for open reduction and internal fixation of the ankle fracture with syndesmotic repair. The procedure was set for August 26 2016. The patient's first post-operative visit following ORIF right ankle fracture with syndesmotic repair was the following week. She states she's been following post-operative protocol. On physical exam, she continues to have pain in the right ankle but the edema has subsided. There was a significant improvement in ankle valgus position compared to before surgery. Initial post op x-rays of right ankle showed hardware intact and a reduction of fibula fracture. There was still an increase in medial clear space in the medial ankle. The right ankle was no longer in valgus rotation. Patient continued to be NWB in a short leg cast and was instructed to return to clinic for suture removal and for a follow up.

Case Study (continued)

During the initial post-operative course she continued to complain of mild pain and swelling. She reported her ankle turning in and noted limping on her right foot. Post-operative radiographs demonstrate increase in the medial clear space in the medial ankle gutter. Also noted that her distal tibular-fibula is widening. There is a floating osteophyte in the medial ankle joint. The fibular fracture and the posterior malleolar fracture showed adequate healing (Figure 2). It was recommended the patient have a revisional surgery to correct the mild ankle valgus, diastasis of the distal tib-fib and widening of the right media ankle gutter that developed over time. Patient was consented for a right ankle arthroscopy with partial synovectomy, removal of hardware with repair of syndesmosis, repair of the right deltoid ligament and right posterior tibial tenolysis. The revision of ORIF right ankle fracture and syndesmotic repair took place on December 15 2016.

Figure 1- Initial Radiographs from Injury



Pronation-external rotation closed fracture, dislocation of her right ankle. 1A) Lateral view shows Displaced, Comminuted Weber C fracture pattern of the fibula, Anterior displacement of the Distal Tibia. There is a mildly displaced posterior malleolus fracture. 1B) AP of an Ankle Demonstrates increased widening of the Tibia-Fibula, Increased Medial clear space and laterally displaced talus.

Figure 2- Post operative ORIF Right Ankle Fracture With Syndesmotic Repair



Surgical Procedure

The patient was brought to the operating room and placed on the table in supine position. Patient received General LMA anesthesia with a popliteal block. The first stage of the procedure was ankle arthroscopy with partial synovectomy. The medial ankle gutter was inspected through the anteromedial and anterolateral portals. It was noted that the patient had articular loss and arthritis on the anteromedial talar dome noted with articular loss noted. The patient had chronic synovitis with both the medial and lateral ankle gutter. All the synovitis was debrided utilizing a shaver and an under water chemical ablaters. The lateral side of prior surgical incision site was identified and used. The location of the tighdrop on the medial and lateral of the ankle was identified using the mini c-arm. It was successfully removed and confirmed with mini c-arm. Utilizing the same medial ankle incision the posterior ankle joint was identified and osteophytes in the posteromedial ankle gutter was removed. During the dissection on the medial side the posterior tibial tendon was identified to not be in its anatomic position and alignment. It was found to be subluxed into the medial ankle gutter. The tendon was successfully replaced back into anatomic alignment and the tendon sheath was tenolysed. At this point a periarticular clamp was used to clamp down the malleoli which reduced the medial clear space and widening of syndesmosis. Three 3.5 mm cortical screws were used to stabilize the syndesmosis (Figure 3). They were drilled through the fibula plate passing four cortices aiming parallel to the ankle joint about 2 cm above the joint. Each screw were aimed about 30 degree anterior angle. Of note the head of the second screw broke but the decision was to leave it intact. The periarticular clamp was released and the right ankle was placed in range of motion with no valgus rotation and adequate mortise alignment. Returning to the medial side the deltoid ligament was repaired utilizing an anchor and fiber wire. The anchor was inserted on the medial aspect of the talus above the sustentaculum tali. After the deltoid ligament was repaired the ankle and subtalar joint was placed in rotation and the and it appeared to be tighter. Layered closure occurred with 3-0 vicryl and 3-0 nylon. All active bleeding was successfully controlled.

Figure 3- Post operative Revisional ORIF



Anteroposterior view demonstrates restoration of the normal anatomic alignment

Post-operative Management

The patient was instructed to maintain a strict non-weight bearing protocol for 6 weeks in a short leg cast following the revision surgery to allow for adequate bone and soft tissue healing. She was then transitioned into weight bearing in a Controlled ankle motion boot for three more weeks. Approximately 9 weeks post op, patient went for a course of physical therapy and began wearing athletic shoes with an ankle brace. One year post op patient began to wear any type of footwear and returned to normal daily activities. Post-op revisional ORIF ankle and syndesmotic repair films reveal stable internal fixation, corrected valgus malalignment with the syndesmosis in anatomic position (Figure 3).

Materials

3.5 mm Cortical Screws, bioresorbable anchor system, 2-0 vicryl, 3-0 vicryl, 3-0 nylon, Cancellous Bone chips.

Discussion

- Failure to correct misalignment of the ankle results in persistent morbidity and quality of life issues (5).
- Failure to restore the anatomic alignment of the ankle mortise after an ORIF may be due to soft tissue impingement and can result in a subsequent surgery for the patient.
- Syndesmotic stabilization is an important component of ankle fracture fixation. Consider using stable screw fixation versus dynamic stabilization in obese patients.
- Advanced imaging during the initial pre-op period would be beneficial in select ankle fracture cases (4).
- The goals of our procedure were to realign the ankle joint prevent further valgus rotation, decrease pain and improve function of the foot and ankle. We believe we have successfully reached our goals for the patient.

References

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