The Complex and Staged Operative Course for the Treatment of an Ankle Fracture in an Uncontrolled Diabetic

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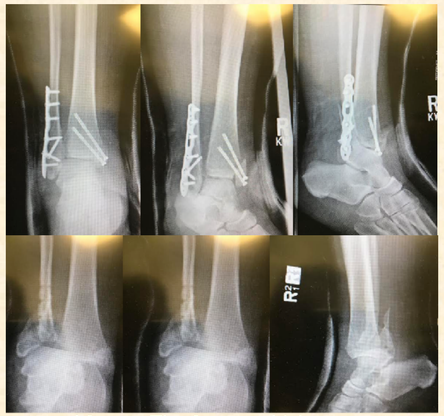
Background and Purpose

Diabetic patients who suffer ankle fractures are at higher risk for complications such as wounds, infection, Charcot neuroarthropathy, and amputation. There has been a debate in the literature as to whether surgical or conservative measures are more appropriate when treating diabetic ankle fractures. Reducing and stabilizing the fracture while also preserving the soft tissue envelope are vital to avoiding complications. This case describes the complicated and staged operative and post-operative course of a diabetic patient status post ORIF of a trimalleolar fracture.

Case Study & Procedure

A 43-year-old female patient presented to the ED with pain and deformity to right ankle status post fall. The patient recalled having a “dizzy spell” prior to the fall. Past medical history was significant for diabetes mellitus and obesity, The patient’s blood glucose was over 500 mg/dL in the ED. X-rays revealed a supination-external rotation stage IV fracture pattern. Complete disruption of the tibiotalar joint was observed with posterior dislocation of the talus. Closed reduction was achieved in the ED and patient was placed in a posterior splint. The patient was admitted for medical management of hyperglycemia and medical clearance for ORIF. Although there was tenting of the skin medially, soft tissue envelope was deemed amenable for surgery. The patient underwent ORIF the following day. An interfragmentary screw was placed through the fibular fracture with a neutralization plate. Percutaneous fixation was achieved medially. Patient was placed in a below knee cast and instructed to be non-weightbearing. Two weeks after ORIF, patient presented with wound dehiscence and plate exposure laterally. Surgical debridement was performed and patient was treated with a 6-week course of IV antibiotics. Four months later, hardware was removed. Patient was instructed to remain non-weight bearing. Soon thereafter, patient presented to the ED with recurrent deformity after walking on the affected extremity. X-rays revealed re-fracture and dislocation of the tibiotalar joint. Closed reduction under conscious sedation was attempted, but unsuccessful. Patient was admitted and booked for surgery on the following day.

Procedure



In the OR, the patient was placed under general anesthesia and another closed reduction was attempted, but unsuccessful. A percutaneous tendo-Achilles lengthening was carried out to relieve equinus contracture. At least 15 degrees of dorsiflexion was obtained and closed reduction was attempted once again with only partial success in relocating the talus under the tibia. A transcortical pin was placed through the calcaneus in order to hold correction during application of a Stryker circular external frame. The frame, which was not pre-assembled, was applied. With the frame secured to the extremity and telescopic struts unlocked, the talus was successfully relocated under the tibia. Acceptable reduction was confirmed on C-arm. All wires were tensioned and tightened appropriately and struts were locked in place. Patient was made non-weight bearing upon discharge from the hospital. Ten weeks after frame application, bone biopsies were obtained from several sites along the distal fibula. Pathology was positive for acute osteomyelitis, however cultures demonstrated no growth. Per Infectious Disease, patient did not receive any additional IV antibiotic therapy.

Results

At 16 weeks, some consolidation was noted radiographically and frame was removed. Patient underwent additional bone biopsies, demonstrating no presence of osteomyelitis. She remained non-weight bearing in a below knee cast with a bone stimulator. Complete fracture consolidation was noted nearly a year after original injury occurred. Patient is now weight-bearing as tolerated in a CROW boot.

Discussion

This case study details the complicated and staged operative course after primary ankle ORIF in an uncontrolled diabetic patient. Our goal was to maintain a solid construct, despite the presence of wound complications and infection. The data is mixed in terms of comparison of operative versus non-operative treatment for diabetic ankle fractures. A complication rate as high as 71% has been reported in in both operative and nonoperative groups. Patients with uncontrolled diabetes and existing complications are at greater risk. A recent review of the Department of Veterans Affairs database examined over 20,000 diabetic patients undergoing elective surgery. It was found that for each 1% increase in hemoglobin A1c, the odds of developing a post-operative complication increased by 5%. Liu et al looked at the pre-operative HbA1c of 21 diabetics prior to undergoing ankle ORIF. Higher HbA1c levels were associated with delayed and non-union and poor radiological outcomes. This suggests that HbA1c may be predictive of complication rates. Taking that into consideration, it may be reasonable to delay or stage operative treatment in the unstable diabetic patient.

References

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