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A Case Report on the Internal Fixation of a Complex Fracture of the Talus using a Dual-Incision Extensile Approach.

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Abstract

Fractures of the head and neck of Talus are associated with high energy trauma, as may be seen with motor vehicle collisions or fall from significant height. The complex morphology of the talus, it's multiple articulations and tenuous blood supply translate into significant challenges that must be overcome to achieve the best possible outcomes.

Keywords: Talus Fracture, Hawkins, Ankle Fracture, Avascular Necrosis (AVN)

Introduction

The talus is the second-largest tarsal bone in the human foot, and is vital to the function of the foot and ankle. Talar fractures are uncommon, usually occurring as a result of high energy trauma, with a reported incidence of less than 1% of all fractures in the body. The average patient has a talar fracture when they are between the ages of 30 and 40, and men are more likely than women to sustain one. Although the talus possesses articular cartilage covering 60% to 70% of its surface, It lacks any muscle attachments and instead articulates with other bony structures via capsuloligamentous constraints. out of which Fractures of the talar neck are the most common anatomic site for injury and account for 45% to 50% of all fractures of the talus. The Hawkins classification, which also indicates the possibility of avascular necrosis in talar neck fractures, is the most popular method of categorization.

Case Report

An 52year old male who met with an RTA came to ER with closed injury to his left ankle. On examination tenderness, crepitus with deformity present. X-rays

showed a displaced fracture through the talar neck and anterior body, extending into the ankle joint with the distal fragment displaced dorsomedial, subluxed from the tibiotalar joint. The subtalar and talonavicular joints were intact.

Figure 1: Xray Left Ankle – AP and Lateral

Preoperative workup was done and patient was taken to OT. The patient underwent internal fixation of the talus via a 2-incision technique. The first incision was medial, midway between the tibialis anterior and tibialis posterior tendons, over the medial malleolus and extending towards the navicular bone on the medial border of the foot. The second was a lateral incision made just anterior to the distal fibula and extending towards the fourth toe. Here in our case medial malleolus osteotomy was not performed as it already got fractured. Fracture reduction was achieved by skeletal traction passing a Denham pin through calcaneum. The two incisions were used in tandem to visualize, disimpact and reduce the talar body and neck fracture. Temporary fixation with K-wires was used to hold the reduction and by passing 2 screws of 4.5 mm each in anteroposterior and posteroanterior direction by keeping ankle in mild dorsiflexion. Later by fixing medial malleolus fracture by one screw. Fracture reduction achieved. below knee slab applied and advised non weight bearing for 8 weeks. The patient's postoperative course was uncomplicated. Regular follow-up was done and advised to start partial weight bearing after 8 weeks and full weight bearing after 14 weeks. At 4 months postoperatively, he was weightbearing as tolerated with radiographic evidence of fracture healing, and his ankle range of motion was from 30° of plantar flexion to 15° of dorsiflexion. At 6 months postoperatively, the patient had no complaints and was ambulating in a regular shoe.

Figure 2:Intra-Op Fluoroscopy Images

Figure 3:Intra-Op Clinical Images

Figure 4: Post Operative Xray Ankle AP and Lateral with Fixation

Discussion

In addition, the lack of muscular attachments and the absence of a secondary blood supply can lead to subsequent osteonecrosis [5]. Talar fractures are divided based on the main anatomic divisions: Head, neck, body, lateral process fractures, and posterior process fractures. Talar neck fractures constitute about 50% of talar fractures, body fractures around 20%, lateral process 10% with the talar head fractures being the least common at 5% [7.8].

The incidence of talar AVN (avascular necrosis) in non-displaced talar neck fractures can be as high as 15% with no associated joint dislocations around the talus [6] . The risk of AVN increases to 50% or more in displaced fractures of the talar neck in conjunction with dislocation of the talo-calcaneal and the tibio-talar joints[1-6]. The goal of fixation methods includes direct anatomic compression of fracture lines without comminution and maintenance of length and alignment where comminution precludes compressive forces. Ultimately, anatomic union of talar neck and body fractures, without post-traumatic arthritis or osteonecrosis, yields a satisfactory functional outcome. Post traumatic subtalar arthritis and Avascular necrosis (AVN) of the talus accounting the most common postsurgical complications For talar neck fractures, the rate of osteonecrosis increases with fracture grade In Hawkins's original description, he reported overall osteonecrosis rates of 0%, 42%, and 91% for Hawkins types I, II, and III, respectively. Similar to post-traumatic arthritis, post-traumatic talus AVN is classically managed with a hindfoot intramedullary fusion nail. However, newer therapies have emerged, such as vascularized bone grafting and total talus replacement. Dale et al.[9] indicate that 113 of their fractures were talar body fractures while 44 of them were talar neck fractures, concluding that the talar body is the most common site for a fracture on the talus.

Conclusion

Talus fractures represent a challenging and heterogeneous group of injuries. Because the talus serves as the pan-articulating keystone between the leg and foot, anatomic reduction and stable fixation are crucial to preserving lower extremity function. Fixation methods range from extensile open plate fixation to limited, percutaneous, and/or arthroscopy-assisted screw fixation depending on fracture pattern and displacement. The talus has a tenuous blood supply and has a displacement-dependent risk of avascular necrosis and/or articulation osteoarthrosis, particularly after talar neck fractures. Complications can result in a significant decline in functional status, and understanding of the bony and vascular anatomy and respect for soft tissues is crucial to maximizing the likelihood of a successful outcome.

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