Case Report

Closed isolated subtalar dislocation: A rare clinical entity with a combined rehabilitation approach

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Introduction

Isolated subtalar dislocation is an infrequent injury of the foot. There are scarce reports about this entity in the literature and its prevalence has been reported as 1% of all leg trauma cases. The majority of these injuries can be reduced in a closed fashion, under anesthesia, in the operating room setting. The reduced subtalar joint is subsequently immobilized and protected from weight bearing using post-traumatic protocols for several weeks.

We report a case of an isolated closed subtalar dislocation and lay out our treatment and rehabilitation pathway. Simultaneously we commit on the variability of the post reduction immobilization period and weight bearing patterns reported in the literature and compare them to our balanced approach.

Case presentation

A 43 year-old man was blue lighted to A&E after sustaining a severe right foot sprain while playing basketball, which resulted in him not being able to weight bear on the injured leg. After removal of the athletic shoe wear and the protective bandaging that the aforementioned patient had implemented prior to the injury, clinical inspection revealed a grossly disfigured right ankle joint with no compromise of the integrity of the overlying skin but evident skin blanching (Fig. 1). The dorsalis pedis pulse was palpable but the posterior tibial pulse was not. Capillary refill time was less than 2 s. There was no neurological deficit in the foot and the patient was reluctant to perform any voluntary movements of the toes due to pain. He was not a smoker and did not have any co-morbidities. An X-ray of the ankle joint showed an isolated medial closed subtalar dislocation. He subsequently had a CT-scan of the injured foot to confirm the absence of any concomitant fractures (Fig. 2) and was taken to theatre. Two unsuccessful tries to reduce the subtalar joint under spinal anesthesia were attempted by application of eversion of the hindfoot with the knee joint held in flexion and plantar...
flexion of the midfoot and forefoot initially and dorsiflexion finally. A decision was made to pass a transcalcaneal pin and greater skeletal traction was applied, resulting in successful closed reduction. This was confirmed intraoperatively with the use of an image intensifier. The subtalar joint was grossly unstable and thus a spanning external fixator construct was applied, connecting the transcalcaneal pin with two tibial pins and a pin at the base of the first metatarsal so as to avoid any equinus deformity in the foot, for the remainder of the rehabilitation (Fig. 3). We disclosed the option of removing the pin and putting a below knee backslab or cylinder cast as the former would not adequately address the instability and the latter could theoretically lead to compartment syndrome due to the excessive post traumatic swelling anticipated. He had a post reduction CT-scan which confirmed the absence of any subtalar debris (Fig. 4).

He was discharged the next day with instructions not to weight bear for three weeks and receive fondaparinux 2,5 mg/0,5 ml subcutaneous injections once daily for six weeks. He was seen at two weeks post-op, where the first metatarsal pin was removed. He was asked to start dorsiflexion and plantar flexion exercises as pain allowed. Three weeks following his injury, the external fixator was removed at the out-patient clinic setting and he was put on a below knee walking boot that allowed dorsiflexion and plantar flexion movements, within a total range of 40°. Then, he was allowed to progressively weight bear with both crutches. At six weeks post-op, he was able to fully weight bear without the use of any walking aid. The swelling had completely subsided and on clinical examination, there was no instability or pain around the right subtalar joint. Range of motion in both ankle joints was almost identical and the patient was asked to continue physiotherapy sessions mainly for proprioception training and muscle strengthening, for another four weeks. He returned to low intensity sports training three months after his initial injury.
Fig. 3. Reduced dislocation and fixator construct.

Fig. 4. Post-reduction CT-scan.
Discussion

Isolated subtalar dislocations have been reported in the literature as early as 1811 by Judey and Defaurest [1] and still to this day, remain a rare trauma case, representing about 1% of all acute traumatic dislocations. It is predominant in the male population and the mechanism of injury usually involves a fall from height, high energy motor vehicle accident or awkward landing after jumps in basketball, as was the case in our patient [2–4].

This traumatic event involves frank dislocation of the talonavicular and talocalcaneal joint. The talus maintains its place in the tibiofibular mortise and the calcaneocuboid joint remains undisrupted. The calcaneus with the rest of the foot may dislocate medially, laterally, posteriorly or anteriorly in relation to the talus, with medial dislocation being the commonest pattern and the lateral one being more often associated with poorer prognosis [2–6]. Associated fractures are invariably reported in the literature within a range of 47–88% [1,2,4] and Bibbo et al. [2] suggested that nearly all such like dislocations bear concomitant fractures if CT-scan were to be performed routinely. This however, was not the case in our patient, as CT scans did not highlight any fractures. Bony involvement tends to have a less favourable functional outcome, as opposed to isolated dislocations [1,2].

Neurovascular examination should be performed and documented prior to any reduction attempt. Prompt closed reduction under general or spinal anesthesia is the method of choice and it has a reported high success rate as well. The reduction technique has been extensively described in the literature and it is of importance to avoid overzealous maneuvers and multiple tries so as to prevent iatrogenic injury [1,3]. If manual manipulation is unsuccessful in reducing the dislocation, skeletal traction through a transcalcaneal Steinmann pin has been reported. If the subtalar joint is grossly unstable, some sort of fixation is advocated [3,4], or else, immobilization with a below knee cast or splint is applied [1,3,5]. The immobilization period is somewhat obfuscated by the variable reports and the rarity of this particular injury. A period of three to six weeks immobilization has been implemented [1,3,5,6]. There appears to be some general consensus that the longer the immobilization period, the more likely the patients exhibit some form of subtalar or ankle joint stiffness, highlighting the importance of early range of motion reacquisition. The weight bearing status after reduction seems to have a more equivocal approach, with the majority of the literature reporting progressive weight bearing and physiotherapy after six weeks, building up to full weight bearing at ten weeks.

In our case, we opted for the least amount of time in full immobilization and allowed some protected movement early on, two weeks after the initial injury. Full range of motion in a walking boot that provided stability in the sagittal plane at three weeks was allowed with partial weight bearing, for an added three weeks. To our knowledge, there have been reports of the benefits of early mobilization, but none so far that incorporated a somewhat aggressive simultaneous weight bearing pattern. We report the preliminary satisfactory outcome of this balanced approach for future consideration in selective cases, though further follow up is needed so as to assess the development of post-traumatic osteoarthritis.

CRediT authorship contribution statement

Vasileios Tzimas: Writing - original draft, Supervision
Konstantinos Konidaris: Data curation
Vasileios Panagiotopoulos: Visualization
Paraskevas Georgoulas: Conceptualization.

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