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Posterior subtalar joint dislocation with associated fracture of talus and soft tissue injury: A case report

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Abstract

Posterior subtalar joint dislocation is rare type entity of peritalar dislocations or more accurately called Talocalcaneal-navicular (TCN) dislocations. As far as the previous literature and our search is concerned, very little data is available. Only few cases of posterior subtalar dislocation have been reported in detail till the date.

This article presents a case of posterior subtalar joint dislocation in a 40-year-old male, a laborer by occupation presented to us in emergency department with pain, swelling and deformity in his left ankle due to fall from height. Patient landed on the floor with body upright, left foot inverted, and plantar flexed. Radiographs and CT scan demonstrated talocalcaneal-navicular dislocation associated with fracture posterior process of talus. In MR imaging TCN joint effusion, partial tear of talofibular, deep fibers of deltoid ligament and marrow edema of subtalar joint were found. Immediate post injury closed reduction and immobilization in plaster slab or cast is the recommended treatment for such kind of ankle injuries. But when closed reduction is not possible as in our case it was a 15 days old neglected case of posterior subtalar joint dislocation, closed reduction and internal fixation followed by immobilization in plaster slab or cast is the treatment of choice.

Keywords: Posterior subtalar joint dislocation, talocalcaneal-navicular (TCN) dislocation, peritalar

1. Introduction

Posterior subtalar joint dislocation is a rare kind of foot injury which is also known as talocalcaneal navicular (TCN) dislocation or peritalar dislocation. Subtalar joint dislocations were first described in 1811 by Judey and Dufaurets^[1, 2]. The injury is characterized by a simultaneous dislocation of talocalcaneal and talonavicular joints while tibiotalar and calcaneocuboid articulations remain intact^[3, 4, 5, 6, 7]. The incidence of posterior subtalar joint dislocation was first described by Luxembourg in 1907^[8]. These types of dislocations mainly sustained following a high energy trauma such as a fall from height or road traffic accident. Early diagnosis immediately followed by closed reduction and immobilization in plaster cast is the recommended treatment but when closed reduction is failed or in neglected old dislocations open reduction and internal fixation should be done as soon as possible in order to minimize further soft tissue and neurovascular compromise. In this article we are reporting a 15 days old posterior subtalar joint dislocation with associated fracture of posterior process of talus which was managed by open reduction with k-wire fixation followed by immobilization in plaster slab for 6 weeks.

2. Case report

A 40-year male laborer injured his left ankle due to fall from 8 feet height staircase while painting over roof. talocalcaneal-navicular joint dislocation after patient landed on the floor in upright position with inversion and plantar-flexion of foot during strike on floor. Immediately patient went to local quack for treatment where ankle dislocation was tried to reduce by manipulation and massage. Patient went back to home without splinting and re-dislocation occurred. Patient presented to trauma center, Orthopaedic unit of Hamidia hospital, Gandhi medical college, Bhopal for further management 15 days after the injury.

On physical examination in emergency room, the foot was in plantar flexion with deformity

over anterior aspect and swelling over ankle and foot. Sensation and active toe movement were intact. O2 saturation of toes was 98%. The ankle joint was painful with associated stiffness and decreased range of dorsiflexion and plantarflexion when attempted passive movements. Anterior and lateral radiographs (fig.2) demonstrated talocalcaneonavicular joint dislocation. As the dislocation was 15 days old, any attempt of closed reduction was unsuccessful. Then patient investigated with 3D CT Reconstruction (fig.3) and magnetic resonance imaging (fig.4) study.



Fig 2: Anterior and lateral radiographs demonstrating talocalcaneonavicular joint dislocation tibiotalar subluxation.



Fig 1: Clinical picture of the injured foot and ankle showing foot in plantar flexion with diffuse swelling and less marked deformity over anterior aspect of ankle.

Radiographs and CT scan demonstrated talocalcaneonavicular dislocation in which the calcaneus displaced posteriorly, perching of the head of the talus on the dorsal margin of the navicular, and the impingement of the posterior process of talus on the posterior subtalar facet of calcaneus and multiple fragments of posterior process of talus on the top of calcaneus (Fig. 1).

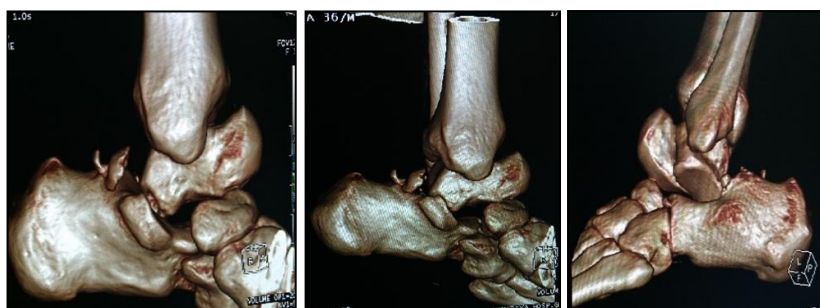


Fig 3: 3D reconstruction of CT Scan of ankle joint of a 40-year-old male showing the talocalcaneonavicular dislocation associated with fracture of posterior process of talus with chip fracture of the calcaneum and subluxation of tibiotalar joint.



Fig 4: Plain MR image of left ankle showing fracture of talus and chip fracture of anterior process of calcaneum associated with surrounding marrow edema, subtalar, talonavicular and talo-calcaneal joint dislocation with tibiotalar subluxation.

MRI left ankle (Figure 4) demonstrated the same findings as the CT scan with additional joint effusion in talocalcaneonavicular joint, partial tear in talo-fibular and deep fibers of deltoid ligament and marrow edema in subtalar articular

surfaces. Then patient was planned for elective procedure in operation theatre. After preanesthetic checkup, initial attempt of closed reduction was made with a calcaneal pin inserted from medial

to lateral and another stainless-steel pin inserted in talus posterior to anterior to lift the body of talus from posterior facet. Longitudinal manual traction applied by holding calcaneal pin and a countertraction applied to the leg with digital pressure over head of talus anteriorly. The attempt of reduction was failed resulting in open reduction with dorsal approach. Talus was explored through an incision of approx. 1.5 cm made over anterior aspect of left ankle and a blunt long instrument passed under talus to lift the impacted body

of talus from posterior facet of calcaneum.

The reduction was done by lifting the body of talus, longitudinal manual traction by holding calcaneal pin and countertraction from the leg. Reduction was confirmed under C-arm and fixed in position by inserting a 2.5mm Kirschner wire from the navicular bone into the talus to hold the reduction (Figure 5). After primary closure and sterile dressing below knee slab was applied. Post reduction x ray was done.

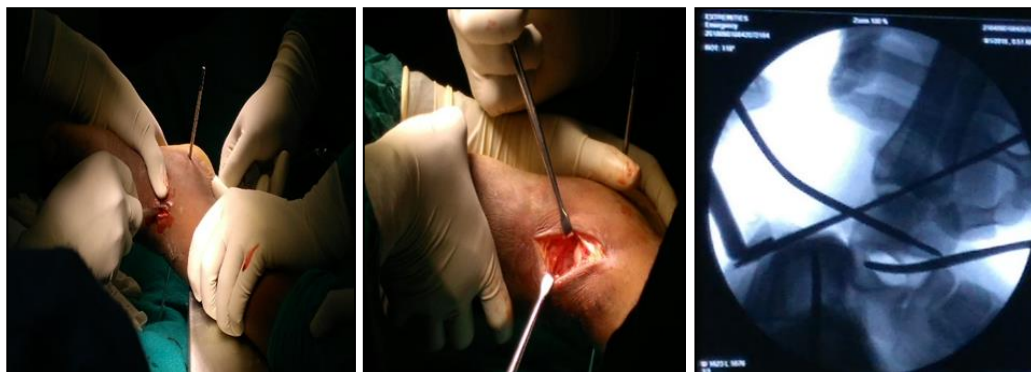


Fig 5: Intra operative pictures: (i, ii) tibialis anterior tendon retracted and joint capsule opened to expose the talus head (iii) C-Arm image with talus levered back into anatomical position.

After ankle immobilization of about 6 weeks, slab and k- wire were removed. Ankle stiffness and limited dorsiflexion and plantar flexion were found. Patient allowed for partial weight bearing on crutches.



Fig 6: Post-operative picture showing k wire fixation and post reduction plain radiographs of foot in AP and oblique view



Fig 7: Clinical photographs showing operated left ankle Dorsiflexion, plantar flexion and patient in squatting position.



Fig 8: Plain radiograph of operated left ankle at 1 year follow up

After 1 year of follow up, patient was able to walk without support and able to sit in squatting position. On examination of affected ankle and foot, swelling was completely subsided. Ankle range of motion like dorsiflexion and plantar flexion was painless and almost within range (Figure 7). Patient was able to do routine daily activities except some limitations in doing vigorous activities like running, lifting heavy weight.

Finally, the 1 year follow up evaluation shows the successful results of open reduction and k wire fixation in the treatment of delayed unreduced posterior subtalar joint dislocation.

3. Discussion

Subtalar dislocations are a rare form of dislocation and according to Leitner, accounting for no more than 1% of all

traumatic dislocations [2]. Posterior dislocations, in particular, is extremely rare, they amount to a mere 0.8% of all subtalar dislocations. Subtalar joint dislocations were first described in 1811 by Judey and Dufaurets [2, 3]. Broca, in 1853, classified subtalar joint dislocations in to three types according to the direction of displacement of the foot in relation to the talus: medial, lateral, and posterior. Later, in 1855, Malgaine and Burger added anterior subtalar dislocation. According to available literature, medial dislocation is the most common type accounting for 72%-80% followed by lateral dislocation (17%-22%), anterior dislocation (1%), whereas posterior dislocation accounts for 1%-2.5% [4, 5]. Suguru Inokuchi et. All in 1997, reported 2 cases of posterior subtalar dislocation with review of 7 cases of posterior subtalar dislocation cited from previous reports without details and radiographs. References were provided for 7 cases of posterior subtalar dislocations. Luxembourg in 1907 first time reported the incidence of posterior subtalar joint dislocation [8].

The diagnosis of the posterior subtalar joint dislocation is made with anterior-posterior and lateral radiographs. Inokuchi *et al*, defined the posterior subtalar dislocation on a lateral radiograph as, when the head of the talus is seen perched on the posterior margin of the navicular and the posterior portion of the talus resting in the posterior subtalar facet of the calcaneum in the absence of any significant displacement or rotation of the foot in frontal view radiograph [5]. As the various reports have been hypothesized, the posterior subtalar joint dislocation occurs when the foot is forced in to hyper-plantar flexion which leads to a progressive subtalar ligament weakening that may result in a complete tear of ligament if the plantar flexion force is prolonged [9]. Subtalar dislocations mostly occur in young adults after a high energy trauma such as a fall from height or road traffic accidents. In our case the patient was an active middle aged 40-year male with no comorbid condition and previous injury or joint dislocation. Patient reported to us 15 days after sustaining the ankle injury with typical clinical and radiographic features of posterior subtalar joint dislocation.

It has been recommended by many previous reports that closed reduction of these dislocations should be performed as soon as possible to avoid further damage to skin, soft tissue, neurovascular structures and to reduce the chances of avascular necrosis of the talus [1, 3, 6, 7]. Early diagnosis, anatomical reduction, stable fixation of peritalar joint fractures, and the resection of small, free osteochondral fragments are decisive factors for the prevention of early posttraumatic arthrosis which, in turn, may cause pain, joint stiffness, and an unsatisfactory result [10]. A delay in the treatment renders the reduction difficult, due to capsuloligamentous retraction and soft tissue interposition. In our patient, closed reduction failed due to neglect on the part of the patient and due to the initial mismanagement of the injury by the quack [10, 11]. In around 10% to 20% of cases, open reduction becomes necessary when subtalar joint dislocation has become irreducible due to soft tissue interposition, interposed bony fragments or due to severe swelling created by the diagnostic delay [12].

Closed reduction is done under sedation or general anesthesia. During this maneuver, the knee should be kept flexed so the gastrocnemius muscle is relaxed and constant counter-traction to the maneuvers should be maintained. In a first, the force is applied in the same direction as the existing deformity, then traction is applied, and at the same time a force in opposite direction of the dislocation is applied by a firm digital pressure over the head of the talus from anterior to posterior,

passing through plantar flexion to dorsiflexion. The reduction is usually associated with an audible clunk [3, 4, 6]. Post reduction immobilization in a non-weight bearing cast is required in subtalar joint dislocations but the period of immobilization is controversial.

4. Conclusion

In case of failed attempt of closed reduction, neglected or delayed presentation of posterior subtalar joint dislocation as in our case, open reduction, intra-articular inspection for any loose fragment of bone or interposed soft tissue which is to be cleared and finally the k wire fixation is warranted for such cases.

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