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CASE REPORT

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Peritalar dislocation: three case reports and literature review

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Abstract Peritalar dislocation is an uncommon lesion, although its incidence has increased on account of the rise in motor vehicle accidents and improved radiological diagnostic techniques. In our review of the literature, we counted 312 cases described over the past 50 years. Medial dislocation represented the majority of cases (79%), lateral dislocation accounted for 22%, while poster and anterior dislocations seemed to occur rarely. We report the results of the treatment of 3 patients, one with an irreducible lateral dislocation, one with a irreducible medial dislocation, and one with a reducible medial dislocation. The obstruction to closed reduction for lateral dislocation was the interposed posterior tibial tendon. The obstruction to closed reduction for medial dislocation was an osteochondral impact-fracture of the upper medial part of the head of the talus spiking to the lateral corner of the navicular. Management consisted of immediate reduction and application of a short leg cast for 4 weeks. At long-term follow-up, all 3 patients had no complications and had returned to their pre-injury activities.

Key words Peritalar dislocation • Subtalar dislocation

Introduction

Peritalar dislocation is an uncommon lesion representing approximately 1% of all dislocations [1]. It has also been termed subtalar dislocation [2, 3], subastragalar dislocation, and luxatio pedis subtalo [4, 5]. Perital dislocation is a more appropriate designation because it involves simultaneous injury of both the talocalcanear and talonavicular joints. Classically, this dislocation has been subdivided into 4 types based on the position of the foot in relationship to the talus: medial, lateral, anterior and posterior. The medial dislocation has been termed "basketball foot" [6] and "acquired clubfoot" [7]. The lateral dislocation has been termed "acquired flatfoot" [7].

Few large series have been reported in the literature [1, 2, 8–14]. Shands [15] reported that Judcy and DauFaurest described the first 2 cases of these injuries in 1811, and in 1937, Smith analyzed 155 cases [15]. In a review of the literature in 1954, Leitner [1] found 162 cases of medial dislocation and 59 cases of lateral dislocation. In our review of the literature from 1950 to the present [1–38], we counted 315 cases, including the 3 cases we treated. The increase in descriptions of the lesions is certainly due to the increased number of road-accident traumas, although improved radiological diagnostic techniques have also played a role. Thus peritalar dislocation can no longer be considered a rare lesion, although it still remains somewhat uncommon.

Case reports

Case 1

A 22-year-old man presented to the emergency room after a motorcycle accident. His left ankle was swollen and evidently deformed with the forefoot abducted and pronated; he complained of pain when at rest and was unable to walk. A radiograph showed a lateral peritalar dislocation with parcellar fractures of the peroneal malleolus and posterior malleolus (Fig. 1). After an unsuccessful attempt at reduction, the patient was taken to the operating room where reduction under anesthesia also failed. After patients content administration of prophylactic antibiotics, a dorsimedial incision was made in correspondence to the head of the easily palpated astragalus. Displacement of the extensor retinaculum disclosed the interposition of the posterior tibial muscle tendon between the head of the astragalus and the medial aspect of the scafoid (Fig. 2). After repositioning of the tendon, the dislocation was reduced. Following irrigation, the capsule and extensor retinaculum were sutured. Postoperative radiographs were made to check the reduction. Finally a short leg cast was applied in a neutral position for 4 weeks without weight bearing. After removal of the cast, the right ankle had a good range of motion (ROM), and weight bearing was permitted. Then physical therapy was started.

At follow-up, 13 years later, the patient reported that he had no pain at rest nor during walking. Active ROM of the right ankle joint had a limit of approximately 10° in dorsiflexion (15° dorsiflexion, 35° plantar flexion) compared with the left ankle (25° dorsiflexion, 35° plantar flexion). The ROM of the injured subtalar joint, measured with the Monson method [13] evidenced a loss of 15° with respect to the right subtalar joint. Radiographs showed moderate osteoarthritis of the left subtalar joint.

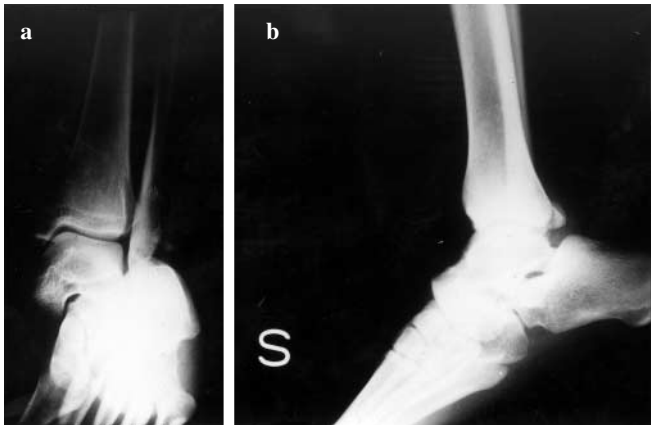

Fig. 1a, b Case 1. Anteroposterior (**a**) and lateral (**b**) radiographic views of a lateral subtalar dislocation with parcellar fracture of peroneal malleolus

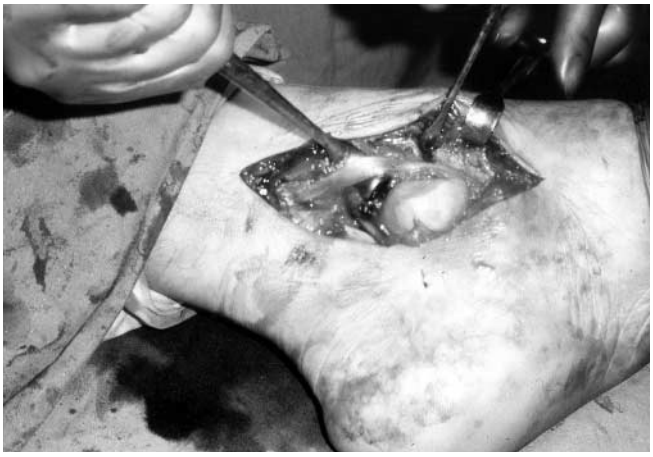

Fig. 2 Case 1. Dorsimedial exposure shows the interposition of the posterior tibial muscle tendon between the head of the astragalus and the medial aspect of the scaphoid

Case 2

A 55-year-old man was brought to the emergency room after involvement in a motorcycle accident. The right ankle was swollen, and forefoot was adducted and supinated. Pedal and tibial pulses were present. Radiographs confirmed the clinical diagnosis of medial peritalar dislocation (Fig. 3). Computed tomography (CT) was performed to exclude occult fractures involving the subtalar joint (Fig. 4). Reduction was carried out with the patient under local anesthesia: the knee was flexed, and longitudinal manual traction and eversion of the forefoot were applied. The dislocation was reduced with a snap. A short leg cast was applied in the neutral position for 4 weeks. Post-reduction radiographs were obtained to check the reduction. Walking assisted with crutches with no weight bearing was begun after 3 days. After removal of the cast, moderate swelling persisted with good ROM of the ankle. Then physical therapy was started.

Fig. 3a, b Case 2. Anteroposterior (**a**) and lateral (**b**) radiographic views of a medial subtalar dislocation

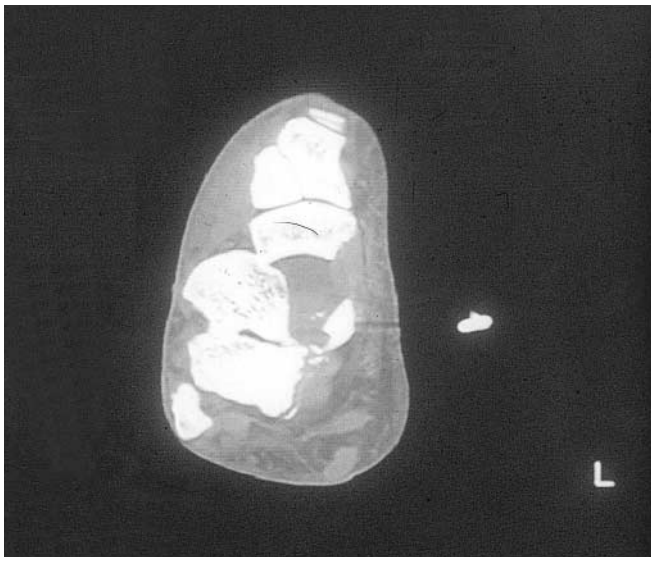

Fig. 4 Case 2. CT image

Clinical and radiographic follow-up continued for 1 year after the accident. The patient reported complete disappearance of pain and a return to his normal activities. There was no difference in ROM between the two ankle joints. The ROM of the injured subtalar joint evidenced a 10° limitation with respect to the contralateral joint. The injured joint appeared normal on radiographs with no signs of osteoarthritis or calcification.

Case 3

A 21-year-old man presented to the emergency room with an acutely painful and deformed foot after a road accident. The right foot was swollen, adducted and slightly intrarotated. There were no vascular, neurologic, or other injuries. Radiographs showed medial subtalar dislocation (Fig. 5). Closed reduction under general anesthesia, 3 hours after trauma, was unsuccessful. After informed consent and administration of prophylactic antibiotics, a dorsilateral incision was made corresponding to the head of the astragalus and a capsulotomy was done. The upper medial part of the head of the talus showed an osteochondral impact-fracture spiking to the lateral corner of the navicular bone (Fig. 6). Subtalar dislocation was reduced, followed by fixation with Kirschner's (K) wires to restore joint stability and congruity. Postoperative radiographs were obtained to check the reduction. A short leg cast was then applied in the neutral position for 4 weeks without weight bearing. After removal of the cast and K-wires, good ROM of the right ankle was confirmed, weight bearing with two crutches was permitted, and physical therapy was started.

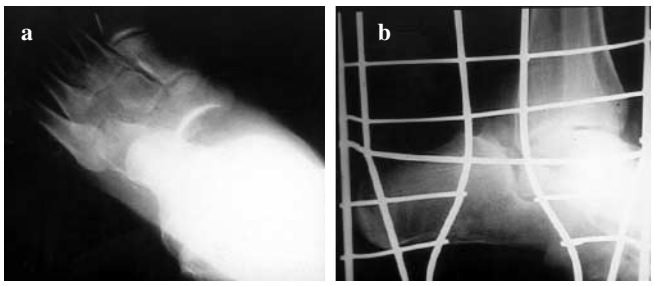

Fig. 5a, b Case 3. Anteroposterior (**a**) and lateral (*b*) radiographic views of a medial subtalar dislocation

Fig. 6 Case 3. Dorsal exposure shows the osteochondral impact-fracture of the upper medial part of the head of the talus making an obstacle to reduction

At follow-up examination 1 year later, the patient complained of occasional pain in correspondence to the left subtalar joint after prolonged deambulation. The ROMs of the two ankle joints were the same. The ROM of the injured subtalar joint had a limitation of 20° with respect to the contralateral joint. The injured joint appeared normal on radiographs with no signs of osteoarthritis or calcification.

Discussion

Peritalar dislocation that is not associated with a major fracture of the talus is an uncommon lesion [2, 3]. The injury is classified by the direction in which the distal portion of the foot is displaced on the talus. Although a number of cases of anterior or posterior dislocation have been described in the literature [8, 17, 22, 23, 35], more recently several authors have suggested that all dislocations should be classified as either medial or lateral, and that anterior and posterior should be considered as subcategories of the medial and lateral types [2, 4, 27]. Inokuchi et al. [2, 1] divided medial dislocation into two subtypes: swing and shift. The calcaneus

bone rotates medially but remains under the talus in the swing type, while the calcaneus is directly shifted medially besides the talus in the shift type [21]. A variant of medial dislocation is the medial swivel dislocation, in which the navicular bone is displaced medially on the talus, but the calcaneocuboid joint remains intact and the subtalar joint is not dislocated [37].

The rarity of peritalar dislocation without concomitant major talar fracture, as a neck fracture, appears justified by the complicated mechanism of the lesion. Medial dislocation occurs with forceful inversion of the foot, with the substentaculum tali acting as a fulcrum for the posterior part of the body of the talus. Talonavicular dislocation occurs first, with rotary subtalar subluxation. Further force produces complete medial subtalar dislocation [5, 7]. This lesion mechanism often produces two types of dislocation fractures: (i) fracture either of the lateral part of the navicular bone or of the upper medial edge of the head of the talus or both, and (ii) fracture of the posterior process of the talus. Medial dislocations are more frequent than other types of dislocations because of the tendency, in a fall from a height, to land with plantar flexion and inversion of the ankle.

Lateral dislocation occurs with forceful eversion of the foot, with the anterior calcanear process acting as a fulcrum for the anterolateral corner of the talus. This forces the head of the talus through the talonavicular capsule. The calcaneus is then dislocated laterally from the talus [5, 7].

Posterior dislocation is caused by a hyper-plantar flexion force that tears the interosseus ligament and the lateral and medial ligaments of the ankle joint, leaving the head of the talus on the back of the navicular. Inokuchi et al. [23] sustained that when the talar head is perched on the back of the navicular bone, the dislocation should be classified as posterior even if there is slight medial displacement of the foot. When the foot is displaced forward and the posterior subtalar facet of the talus is stranded on the calcanear tuber, the injury should be diagnosed as an anterior peritalar dislocation, even if there is slight lateral displacement of the foot [22].

In the review of literature [1–38] we found 312 cases of subtalar dislocation: medial dislocation represented the majority of cases described (223 cases, 76%), lateral dislocation accounted for 65 of cases (22%), and posterior (3 cases, 1%) and anterior (3 cases, 1%) dislocations were infrequent. The type of dislocation was not classified in 18 cases. Twenty-one percent of the dislocations were open. Although Janssen and Kopta [24] described bilateral recurrent subtalar dislocation in a patient with Ehler-Danlos syndrome, the leading cause of these injuries is high energy trauma such as road accidents (52%) or falls from heights (21%). However the actual forces required are not necessarily great, and the dislocation can be caused by a weight falling on the foot (8%) or a twisted ankle (3%). The fourth most frequent cause is sports trauma (7%), particularly sports in which jumping is a fundamental component, such as basketball. The term “basketball foot”, in fact, was coined by Grantham [6] after he observed 5 cases of medial dislocation in basketball players.

The usual treatment for these injuries is closed reduction in the emergency room. If this is not successful, then spinal or general anesthesia is required. Closed reduction may be successful in all types of peritalar dislocations, but obstacles to closed reduction or delayed diagnosis may require open reduction [10]. The most common obstacle to reduction in the case of medial dislocation was “buttonholing” of the head of the talus through the extensor retinaculum [2, 10, 12, 29]. Closed reduction can also be obstructed by bony fragments [2], spiking of the lateral corner of the navicular bone into the upper medial part of the head of the talus [1, 2], as occurred in our patient, cruciate ligament [1, 20], or extensor digitorum brevis muscle [1, 8, 28].

With lateral subtalar dislocation, the most common obstruction to closed reduction is the interposed posterior tibial tendon [1, 3, 8, 12, 29, 39] as occurred in our patient. Obstacles also include the flexor digitorum muscle [29] and tendons caught between the talus and the os calcis [12]. Khare et al. [25] reported a case of posterior dislocation with locking of the posterior process of the talus in the sulcus calcanei. A fragment of posterior talar process can be another obstacle to reduction [17, 19, 32].

After reduction, a below-knee plaster cast must be applied for 3–6 weeks. Immobilization for more than 4 weeks increases the risk of joint rigidity and late onset osteoarthritis [10]. Immobilization for less than 4 weeks is associated with an increased risk of instability or recurring dislocation [2, 10]. Thus Zimmer and Johnson [14] advised a 4-week period of immobilization in older patients who have fewer functional requirements, and immobilization for 6 weeks for young patients or those who practice sports. Removal of the cast must be followed by early ROM exercises.

Long-term results have been good in 75% of the cases. The most serious symptoms developed in patients who had lateral dislocation, probably because of the extensive soft tissue injury required for the dislocation to take place [12]. The most frequent late complications include pain, subtalar instability, decreased ROM, and degenerative joint disease [2, 12, 14]. Rare long-distance complications include avascular necrosis of the talus, RSD (reflex sympathetic distrophy) and recurrent dislocation [2, 14, 39]. On the other hand, in cases of open dislocation, associated injuries cause a high degree of osteonecrosis of the talus and post-traumatic osteoarthrosis [9]. Yet above all, the associated soft-tissue injuries render open subtalar dislocation a distinctly severe injury with an often poor prognosis [9].

The development of post-traumatic arthrosis can lead to chronic pain and decreased mobility. Some authors retain this may be due to associated intra-articular fractures [9, 36]. Merianos et al. [31] sustained that the arthritic changes of posterior talocalcaneal joint are probably due to fracture of the posterior facet of the talus. For this reason, some authors routinely do a CT scan to rule out associated fractures involving the subtalar joint [2, 8].

Our review of the literature has confirmed that medial peritalar dislocation occurs more frequently than lateral dislocation. This is due to the lesser frequency of an eversion trauma than an inversion trauma. Peritalar dislocation can no longer be considered a rare lesion. The increase in road accident-related traumas has led to a notable increase in the observation of this lesion. In the case of pure dislocation, early reduction and immobilization for 4–6 weeks permits complete functional recovery. In the case of associated fractures, longer periods of immobilization may be required. In any case, movement should be initiated as early as possible. The most common late-onset complication is osteoarthritis, which is probably a manifestation of occult or recognized intra-articular fractures caused by the high energy trauma responsible for the dislocation. Negative prognostic factors for late-onset complications include high energy trauma, soft-tissue damage, exposition, lateral dislocation, associated fractures and long immobilization.

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