CASE REPORT

Neglected subtalar dislocation with unstable foot; to walk away or step our foot in?

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SUMMARY

Chronic neglected subtalar dislocation associated with a non-union talar neck fracture is rare and never documented before. The lack of information from the literature on the optimal management prompted us to describe our experience in the management of this condition. We reported a case of a 57-year-old woman presented with this injury. A satisfactory outcome was obtained using a tibio-talo-calcaneal arthrodesis through a plantar approach.

BACKGROUND

Acute subtalar dislocation is a rare injury that represents 1–2% of all large joint dislocations and approximately 15% of all talar injuries.^{1 2} The incidence of this injury has been estimated to be 3–10 times more likely to occur in men than women³ and is mostly due to a high-velocity mechanism. Nearly 80% of subtalar dislocations are medial, 17% are lateral, 2.5% posterior and 1.5% anterior.³ This classification had been formulated initially by Broca and eventually expanded by Malgaingne and Beurget.³

Recently, several authors have suggested that all subtalar dislocations should be classified as either medial or lateral.^{4 5} Fahey and Murphy in fact stated that anterior and posterior dislocation is a subset of the most common medial and lateral subtalar dislocation. Subsequently, they suggested the term peritalar dislocation to describe both the subtalar and the talonavicular joints dislocation.² Closed dislocations are the most common and are seen in 75% of subtalar dislocations.²

We were unable to find prior published case reports of chronic neglected subtalar dislocation. We reported a complex case of an isolated dislocation talo-calcaneal joint associated with a non-united talar fracture and degenerative osteoarthritic talo-crural joint.

A written informed consent was obtained from the patient for publication of this case report and accompanying images.

CASE PRESENTATION

A 57-year-old woman presented with pain in her left foot and ankle, which worsen on weight bearing, that was progressively worsen for the past 3 years. She was ambulating on a wheelchair and was home bound.

She was involved in a work-related injury in 1997 where six pieces of wooden plank dropped on her left foot. She stated that she sustained a fracture of her left ankle, but she was unsure of the full

extend of the injury. She opted for conservative management. Overtime, she noticed the progressive deformity of the foot and ankle. Her mobility worsened as the result of that and eventually ends up wheelchair bound (figure 1).

On examination, the range of motion of the subtalar joint was compared to the normal contralateral right foot using the method created by Inman and Mann.⁶ Eversion was diminished; however, astonishingly there was some degree of inversion of about 15°. Plantar flexion was 35° and dorsiflexion was 45°. There was no skin necrosis, ulceration, soft tissue oedema or joint effusion. Distal pulses were slightly reduced in volume and consistency as compared to the contralateral right foot. However, perfusion was normal as evidenced by a normal foot temperature, colour and capillary refill time (figure 2).

A CT revealed generalised degenerative peri-articular osteoarthritis of the talo-crural joints as well as the talocalcaneal joint. There was no evidence of previous fractures of the medial and lateral malleolus. The mildly sclerotic dome of talus was tilted and impinged on the tibial plafond (figure 3).

Vascular supply to the foot was assessed with CT angiography and showed that the vascularity of the foot is vaguely opacified with moderate calibre. The collaterals were, however, well developed.

Evaluation by MRI showed that there were mild intrinsic and extrinsic muscles atrophy and tendinopathy of the left foot. The syndesmotic ligament was intact.

During preoperative assessment, she was found to be morbidly obese class III with history of hypertension and cardiac failure. Her ejection fraction and left ventricular function was good. She was categorised as New York Heart Association (NYHA) class II. After discussing the risks and benefits of surgical intervention, an informed consent was obtained to proceed with the procedure.

A tibio-talo-calcaneal arthrodesis with a calcaneo-talo-tibial nailing device under combined spinal epidural anaesthesia was successfully performed. Following the standard operation preparation and application of exsanguinous tourniquet, the achilles tendon was lengthened via percutaneous method. The tendon was stretched thereby ameliorating dorsiflexion of the foot. Through an anterior approach, the torn retinaculum and capsule that were interposed between the subtalar and ankle joint were resected. The degenerative ankle and subtalar joint was graded as grades 2 and 3, respectively, according to the Ankle Arthritis

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Figure 1 The patient has a striking left clubfoot. The talus can be appreciated as the distal most prominent bony structure with an underlying hyperpigmented skin laterally.

Classification System. The cartilage of the tibio-talar joint was denuded with curette and a sharp chisel. Reduction of the joint was accomplished by flexing the knee of the affected leg to relax the gastrocnemius. Gentle traction of the foot and heel with simultaneous countertraction of the lower leg was performed. Once disengaged, the foot was manipulated into a neutral position. Once reduced, we proceeded with nailing via the plantar approach.

The entry point determined is where the transverse line across the heel bisecting the medial malleolus meets the sagittal line drawn about 3 cm from the lateral border of the loaded left

Figure 3 There is a non-united fracture of the neck talus.

foot with the ankle at 90°s dorsiflexion. A Synthes nail measuring 11×20 mm of the Synthes system was inserted. There were no intraoperative complications.

Deep vein thrombosis prophylaxis with fondaparinux sodium 2.5 mg daily was immediately instituted till ambulation. Unfortunately, on postoperative day 3, patient developed nosocomial pneumonia. This resolved consequently with intravenous piperacillin sodium and β -lactamase inhibitor tazobactam sodium 4.5 g, 8 h of 10 days duration. She was discharged on a wheelchair mobilisation. She was seen in the clinic on a weekly basis for wound assessment. There was serous sterile discharge from the anterior wound. She had frequent dressing and ciprofloxacin 500 mg twice-daily coverage.

Three months postoperation, she was allowed to partial weight bear on walking frame. Alendronate plus 70 mg weekly was prescribed to her. With the aid of a walking frame, she was successfully full weight bearing on a pain-free and stable left foot and ankle at 5 months postoperation (figure 4).

Figure 2 An anteroposterior view of the right ankle roentgenogram confirmed a medial subtalar dislocation. The lateral view shows a fairly intact talonavicular and calcaneocuboid joint.

Figure 4 Postoperative calcaneo-talo-tibial nailing. Subtalar dislocation is reduced. The ankle and foot are along the mechanical axis.

DIFFERENTIAL DIAGNOSIS

- Charcot arthropathy.

OUTCOME AND FOLLOW-UP

Upon follow-up, she remains well and had achieved full union after 5 months postoperative.

Progress was slow due to her dependency on a wheelchair for mobility. However, at 9 months follow-up, she was able to ambulate without any aid and was very grateful for the good outcome of the surgery. At 18 months of follow-up, she started to complain of bilateral knee pain and diagnosis of bilateral tri-compartmental knee osteoarthritis was made. She was later given an option for bilateral knee replacement, but opted for conservative treatment.

DISCUSSION

Medial subtalar dislocation occurs acutely^{4 5} as a result of a high-energy trauma secondary to either a fall from height or a motor vehicle crash causing forced inversion of the foot. It predominantly affects young adult men.

The mechanism of medial subtalar dislocation in our case report was unknown. Based on the radiological and intraoperative findings, we postulated that, she might have sustained a neck of talus fracture that did not unite. It was possible that subluxation of the subtalar joint may occur at the same time. Continuous axial load bearing along the mechanical axis may have caused the non-united talus to pivot on the sustentaculum tali, inducing or exasperating a tear of the talocalcaneal ligament that eventually ensued to a talocalcaneal dislocation. In addition, the impingement of the neck of talus causes the posterior capsule to stretch leading to supination, intensifying the subtalar dislocation. The midfoot is displaced medially to the body of talus while the talar head is still in articulation with the navicular due to the tibialis posterior as the deforming forces.

Considering her comorbidities, she was a high-risk surgical candidate, thus a conservative treatment was initially proposed to her.

The local intrinsic factor for wound healing was impaired due to her body habitus. Poor wound healing, subsequent risk of wound breakdown, infection, failure of fusion with implant failure, osteomyelitis, below knee amputation and death were

explained as risks of the procedure. However, the vascular status of the left foot and ankle was assessed by CT angiography, showed moderate impairment with well-developed collaterals.

Other complications such as deep vein thrombosis, pulmonary embolism, atelectasis and pneumonia due to reduced functional residual capacity were explained as more pronounced in obese individuals.

In spite of emphasising these complications, she was still adamant for active surgical intervention.

She could not bear the fact on being wheelchair bound for the rest of her life and therefore was prepared to even face the worst of possible outcome. She determined to walk again, so that she can return to her normal daily chores. She wanted to lose weight, but was unable to perform any exercise due to her disability. Inspired by her expectation and motivation, we agreed to embark on the procedure. The choice of fixation without causing any significant soft tissue damage was the key.

Our choice was either to proceed with corrective arthrodesis using an ilizarov external fixator or tibio-talar-calcaneal nailing device. An ilizarov external fixator would allow a gradual soft tissue correction and provides stability for arthrodesis. The tibio-talar-calcaneal nailing system allows minimally invasive technique, but an acute correction of the deformity was needed. After discussing the options with the patient, an ilizarov external fixator was not chosen as the patient felt that she may not be able to manage with the device and the pin sites care. The MRI excluded severe posteromedial soft tissue contracture with satisfactory vascular supply on CT angiogram, thus an acute correction was possible. Based on these findings, the tibio-talar-calcaneal nailing device was chosen.

The operation was successful with upmost priority focused on meticulous soft tissue handling. The dislocation was reduced accurately. The talar and the first metatarsal angle and the talonavicular coverage angle were corrected. The foot and ankle have been aligned along the mechanical axis. The nail length and size were properly selected. Fortunately, the postoperative complication of nosocomial pneumonia was eradicated with antibiotics. As a prophylactic measure to prevent haematogenous spread of infection to the implants, oral antibiotic was continued. For her osteopenic bone, alendronate therapy was started after 3 months.

Learning points

- ▶ Chronic neglected subtalar dislocation with an associated non-united fracture of the neck of talus is rare, where its management requires extensive preoperative investigations to assess vascular status, bony deformity and soft tissue contracture to minimise risks and complications.
- ▶ Tibio-talo-calcaneal arthrodesis using a retrograde nailing device allows minimal soft tissue dissection and provides satisfactory stability to achieve union. It may prove to be the gold standard management in severe hindfoot deformity and painful degenerative arthritis.
- ▶ Patient's determination and cooperation with the treatment plan are factors contributing to the satisfactory result of this case.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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