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Clinical Case Report of Long-Term Follow-Up in a Rare Neck Talus Fracture and Talonavicular Dislocation

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ABSTRACT

Introduction: Talus fracture is one type of fracture that is quite rare with a prevalence of about 0.008% in children and 0.3% in adults. It was known that avascular necrosis, malunion, and osteoarthritis are the most prevalent complications in talus fracture. However, these complications may not occur in short period.
Objective: We want to present a case of a 24 years old man with neck talus fracture accompanied by talonavicular dislocation that we have been followed for a year.
Case Presentation: A 24 years old man complained pain in his right leg since 7 days ago after falling into a 1-meter-deep sewer with his feet on the ground. These complaints made the patient unable to work because of difficulty walking and had to use a cane as a tool. Right ankle examination showed edema, tenderness, crepitus, warm sensation, and limited range of movement (ROM). Radiographic imaging showed ruptured synovium right ankle. He was diagnosed with talus fracture (Hawkins II) and planned to undergo open reduction internal fixation with K-wire joystick incised from lateral approach. After a year follow up, radiographic examination did not show any decreased joint space, juxta-articular osteophytes, subchondral sclerosis and/or subchondral cysts, and osteonecrosis.
Conclusion: It is recommended that patient with talus fracture must be followed until a year post-surgery since complications may happen in long term period. Besides, serial functional assessments, serial radiographic also need to be assessed to eliminate avascular necrosis.

Keywords: talus fracture, avascular necrosis, Hawkin sign, long term follow up

INTRODUCTION

Talus fractures are the second most common tarsal bone injury, with talar neck fractures accounting for nearly 50% of all talus fractures. Despite being the most common site of talus injury, talar neck fractures are a rare injury pattern accounting for fewer than 1% of all bone injuries of the foot and ankle.[1] Avascular necrosis (AVN), post-traumatic osteoarthritis (OA), malunion, non-union, infection, joint stiffness, and post-traumatic osteoarthritis are complications of talus fractures which may result in persistent discomfort, difficulty completing daily activities, and limited mobility. The dorsalis pedis artery (superomedial) and the artery of the tarsal sinus (inferolateral) provide the talus with intraosseous blood supply, whereas the three main lower limb arteries

provide extraosseous blood supply with associated 'watershed' areas of variable contribution to the talus. The existence of 'watershed' areas might contribute to poor healing following fixation, which can lead to problems such as AVN. However, these complications may not occur in short period. We want to present a case of a 24 years old man with neck talus fracture accompanied by talonavicular dislocation that we have been followed for a year.[2]

CASE PRESENTATION

A 24 years old man complained of continuous stabbing pain in his right leg since 7 days ago after falling into a 1-meter-deep sewer with his feet on the ground. His right leg was also swollen. Patient was unable to work because of difficulty walking and had to use a cane as a tool. Tingling and numbness were denied by the patient. Patient did not have any history of disease and only took painkillers but only relieves pain.

On physical examination, his vital was within normal limit. His initial pain score with Numerical Rating Scale (NRS) was six out of ten. Examination on his right ankle found edema tenderness, crepitus, warm sensation, and limited range of movement (ROM). There was no deformity and false movement. Radialis artery was palpable and sensory nerves were found to be within normal limits. Laboratory test showed high white blood cell ($12,3x10^9$/L) and neutrophile ($7,69x10^9$/L). Other parameters were within normal limit. Radiological examination, on right ankle showed ballottement, soft tissue swelling, joint space narrowing, and positive joint effusion. No articular cartilage damage was found. The impression of the results of the examination is a ruptured synovium of right ankle.

Figure 1. X-ray of pre operative. Right ankle showed ballottement, soft tissue swelling, joint space narrowing, and positive joint effusion.

Patient was diagnosed with a talus fracture (Hawkins II). Subsequently, surgery was performed. First of all, the patient is in a supine position while under anesthesia, the surgical area is disinfected and the medial approach incision is deepened layer by layer to identify the thallus area so that a thallus fracture is found in the neck of the thallus accompanied by talonavicular dislocation. Then, it was reduced using a K-wire joystick. Lateral approach incision was made again which was deepened layer by layer so that a neck fracture of the talus extent lateral process was found. Then, reduction was performed using a Steinman pin on the calcaneus followed by calcaneal traction, reduction of the medial thallus, and lateral thallus. Fixation is also performed using three canulated screws (3.5 screw, 2.0 screw, and X screw). In the evaluation phase, it was found that reduction was achieved, washing, bleeding control, suture the surgical wound,

the operation was completed. Post operative x-ray was done. Wound was found without swelling and tenderness. Patient was discharged after 3 days. Patient was scheduled for rehabilitation program for the next 3 months and evaluated periodically.

Figure 2. X-ray of post-operative. Screw installation was in good position

Patient was monitored every other 3 months. After a year being followed, patient did not complain any restriction of movements and improved functional outcome. Patient was able to walk without any walking device. Patient did not feel any significant pain while at rest nor doing activity. Serial x-ray on one year follow up was done to see whether further complications.

Figure 3. Clinical picture from 1 year post operative. There were scars from the lateral and medial approach. However, there was no sign of infection nor complications

Figure 4. X-ray from one-year post-operative. It was shown anatomical reduction and no sign of osteoarthritis. X-ray did not show decreased joint space, juxta-articular osteophytes, subchondral sclerosis and/or subchondral cysts, and osteonecrosis.

DISCUSSION

Talus fractures are painful injuries with uncertain prognoses. Based on the displacement and subsequent degree of subluxation or dislocation in the subtalar and tibiotalar joints, Leland Hawkins divided talar neck fractures into three groups. A nondisplaced fracture in Hawkins class I has a 0–15% probability of developing AVN and free of subluxation or dislocation. Hawkins class II fracture was displaced vertical talar neck fracture with a subluxation or dislocation of the subtalar joint and had 20–50% risk of AVN. Hawkins class III fracture was displaced fracture that extends through the talar neck, dislocates the subtalar and tibiotalar joints, and carries a 69–100% risk of AVN. An unusual class IV category was introduced by Canale and Kelly in which the talar neck fracture was accompanied by an ankle and subtalar joint dislocation as well as a further dislocation or subluxation of the talus head at the talonavicular joint. The reported AVN rate for class IV fractures was 100%. In this case, patient had 20-50% chance of AVN.[3]

When the talus head is fractured without displacement, conservative treatment is an option. However, when the talus head is fractured with displacement, surgery is required to correct the talonavicular joint's misalignment and lower the risk of osteoarthrosis and osteonecrosis. Nonoperative treatment is an option for Type I talus neck fractures. However, a fracture of the talus's neck that has even the tiniest displacement may be managed with ORIF and a CT scan used in the examination of the fracture. Treatment for type II talus neck fractures involves surgical reduction and stabilization. To relieve skin pressure and lessen soft tissue injury, type III and IV talus neck fractures can first be close reduced in the emergency room and followed by surgical care of ORIF. Conservative care is used to treat undisplaced lateral process fractures. If the fracture fragment is more than 2 mm or more than 1 cm from its original position, ORIF treatment is necessary. Excision of the fracture fragment may be necessary in cases of severe comminuted fractures and related articular damage.[4]

The artery of the tarsal canal is the major artery giving blood to the talus body. The arteries of the tarsal canal and the tarsal sinus form an anastomotic ring around the inferior neck of the talus, but the body of the talus has limited intraosseous anastomosis so interruption of any vessel may result in areas of bone necrosis in the distribution of that vessel. The dorsalis pedis artery supplies the majority of the blood to the talus's head and neck. The intraosseous blood supply is a

network of three or four anastomoses that extends throughout the talus body. The arteries of the tarsal canal supply the majority of the branches for these anastomoses. Avascular necrosis (AVN), post-traumatic osteoarthritis (OA), malunion, non-union, infection, joint stiffness, and post-traumatic osteoarthritis are complications of talus fractures which may result in persistent discomfort, difficulty completing daily activities, and limited mobility.[5]

According to the standards outlined by Lindvall et al., we can assess the quality of reduction in the anteroposterior and lateral views on postoperative radiographs. Anatomical reduction indicated that there was no frontal angulation, step-off at the neck, or body. A 1- to 3-mm step-off of any fracture fragment or slight varus angulation (5°) was considered to be a nearly anatomical reduction. An articular or neck mismatch, a step-off or gap of more than 3 mm, or a neck angulation of more than 5° were all signs of a poor reduction. The quality of the reduction was evaluated by an examination of the subtalar joint.

Following surgery, radiographs of the foot and ankle were taken at about 6-week, 12-week, 6-month, and 12-month intervals to check for secondary displacement, delay to union, and avascular necrosis. On plain radiographs, osteonecrosis was identified as any region of elevated talar dome density in comparison to surrounding structures (Hawkins sign). It was not possible to diagnose avascular necrosis using magnetic resonance imaging (MRI).

Anteroposterior, lateral, and mortise radiographs were taken at the last check-up. Measurements of the hindfoot alignment were taken into account where normal limit was between 4° and 8° of valgus. A varus malunion if the angle was inferior to 4° of valgus. A valgus malunion if the angle was superior to 8° of valgus. In patients who underwent tibiotalar or tibiotalocalcaneal arthrodesis, the hindfoot alignment was not assessed.

Any reduction in joint space, the growth of osteophytes, or the emergence of cysts or subchondral sclerosis were considered to be signs of post-traumatic osteoarthritis. We made a note of which joint—the subtalar, tibiotalar, or talonavicular joint—was impacted by osteoarthritis.[6]

Moreover, Hawkins sign is the line of subchondral lucency which becomes apparent between 6 and 8 weeks after the fracture and represents disuse osteopenia in vascularized bone. A negative Hawkins sign suggests a high likelihood of acquiring AVN and has been used as a reflector of AVN development in talus fracture instances. The Hawkins sign's predictive importance has been explored by numerous authors. Tezval et al. noticed that a positive Hawkins sign eliminates future AVN (100% sensitivity, 57.7% specificity), and they came to the conclusion that the Hawkins sign is a good indication of talus vascularity after fracture.[7]

CONCLUSION

It is recommended that patient with talus fracture must be followed until a year post-surgery since complications may happen in long term period. Besides, serial functional assessments, serial radiographic also need to be assessed to eliminate avascular necrosis.

Declaration by Authors

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REFERENCES

1. Pradhan A, Najefi A, Patel A, et al. Complications after talus fractures: A trauma centre experience. Injury 2023; 54: 772–777.
2. Shamrock AG, Byerly DW. Talar Neck Fractures. 2023.
3. Tehranzadeh J, Stuffman E, Ross SDK. Partial Hawkins Sign in Fractures of the Talus: A Report of Three Cases. American Journal of Roentgenology 2003; 181: 1559–1563.
4. Wangsa IGMS. Talus Fracture in a 24-Year-Old Patient: A Case Report. JMRHS. 2022. 5(4). DOI: 10.52845/JMRHS/2022-5-4-18.

5. Gelberman RH, Mortensen WW. The Arterial Anatomy of the Talus. Foot Ankle 1983; 4: 64–72.
6. Ohl X, Harisboure A, Hemery X, et al. Long-term follow-up after surgical treatment of talar fractures. Int Orthop 2011; 35: 93–99.
7. Dhillon MS, Rana B, Panda I, et al. Management Options in Avascular Necrosis of Talus. Indian J Orthop 2018; 52: 284–296.

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