Journal of Medical Research and Health Sciences
Received 15 Feb 2022 | Revised 08 march 2022 | Accepted 10 April 2022 | Published Online 26 Apr 2022

DOI: https://doi.org/10.52845/JMRHS/2022-5-4-18

JMRHS 5 (4), 1973–1979 (2022)

ISSN (O) 2589-9031 | (P) 2589-9023

Case Report **Open Access Journal**

Talus Fracture in a 24-Year-Old Patient: A Case Report

I Gde Made Satya Wangsa[1], Agus Eka Wiradiputra[2], Gusti Ngurah Paramartha Wijaya Putra[3], Made Deker[4]

Corresponding Author: I Gde Made Satya Wangsa

[1]Medical Doctor in Bhayangkara Hospital, Denpasar, Bali, Indonesia
[2]Departement Orthopaedic and Traumatology, Bhayangkara Hospital, Denpasar, Bali, Indonesia
[3]Departement Orthopaedic and Traumatology, Bhayangkara Hospital, Denpasar, Bali, Indonesia
[4]Departement Orthopaedic and Traumatology, Bhayangkara Hospital, Denpasar, Bali, Indonesia

Abstract: Talus fracture is a type of fracture with a rare prevalence. We report a case of a fracture of the talus of the neck (Hawkins II) that occurred in a male patient aged 24 years. We report the results of the physical examination, therapy, radiological findings, follow-up, and clinical outcomes of the patient.

Keywords: Talus fracture, radiology, follow up, clinical outcome

Introduction

Talus fracture is one type of fracture that is quite rare, with a prevalence of incidence of about 0.008% in children, and 0.3% incidence in adults. The low prevalence of talus fractures in children compared to adults is thought to be due to the flexibility of the anatomical structure of the feet of children compared to adults which are better and more elastic so that it has the ability to maintain their condition before fractures occur.[1,2] Talus fracture that occurs in the neck part of the talus is the most common location, followed by the body or body. Treatments that can be done in cases of talus fractures include cast immobilization for non-displaced fractures, while fractures that have a displacement of the bone require surgical intervention to minimize the risk of avascular necrosis due to impaired blood supply.[3]

Case Presentation

Patient AB, a man 24 years, domiciled in Gianyar with a height of 180 cm and a weight of 98 kg. The patient complained of pain in his right leg since 7 days ago after falling into a 1-meter-deep sewer with his feet on the ground. Complaints of pain that is felt like a stabbing and continuously does not go away at rest. The complaint is also accompanied by swelling in the right leg. These complaints made the patient unable to work because of difficulty walking and had to use a cane as a tool. The patient denied complaints of tingling and numbness.

Based on the medical history, the patient did not have a history of disease and only took painkillers but only relieves pain. On physical examination,

the GCS score was E4V5M6, blood pressure 110/80 mmHg, pulse 80 beats/minute, respiratory rate 20 breaths/minute, temperature 36.5°C, and VAS score of 6/10. On examination of the ankle dextra, found edema, tenderness, crepitus, a warm sensation, and limited range of movement (ROM). Absence of deformity and false movement. As for distal pulsations, sensory and motor nerves were found to be within normal limits.

During the follow-up examination on 4/01/2022, the results were as shown in the following table.

Table 1. Results of patient hemogram

Parameter	Result	Reference (normal)
WBC	$12,3x10^9$/L	5 – 10
NEU%	62,6%	40 – 75
NEU#	$7,69x10^9$/L	1,8 – 6,3
LYM%	28,1%	20 – 50
LYM#	$3,46x10^9$/L	1,1 – 3,2
MON%	7,4%	3 – 10
MON#	$0,91x10^9$/L	0,1 – 0,6
EOS%	1,2%	0,4 – 8
EOS#	$0,15x10^9$/L	0,02 – 0,52
BAS%	0,7%	0 – 1
BAS#	$0,09x10^9$/L	0 – 0,06
RBC	$5,33x10^{12}$/L	4,3 – 5,8
RDW-CV	12,2%	11 – 16
RDW-SD	44,1 fL	35 – 56
HGB	16,1 g/dL	13 – 17,5
HCT	47,2%	40 – 50
MCV	88,7 fL	82 – 100
MSH	30,2 pg	27 – 34
MCHC	341 g/L	316 – 354
PLT	$387x10^9$/L	150 – 400
P-LCR	22%	11 – 45
P-LCC	$85x10^9$/L	30 – 90
MPV	8,1 fL	6,5 – 12
PDW	9,6 fL	9 – 17
PCT	0,312	0,11 – 0,28
BT	2’00’’	1 – 3
CT	8’45’’	0 – 15

On radiological examination, AP/lateral ankle dextra photos were taken on 01/07/2022 with findings in the form of ballotement, 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 ankle dextra.

Figure1. Result of Ankle X-ray

Preoperatively, the patient was given intravenous fluid drip (IVFD) frutolite 20 tpm, cefuroxim 2x1 gr IV. The patient was also fasted for 8 hours and the 3.5 and 2.0 screws were placed. Based on the results of the examination, the patient was diagnosed with a talus fracture (Hawkins II).

Subsequently, surgery was performed on 07/01/2022. 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 thalonavicular 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 thallus ectent 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. In the evaluation phase, it was found that reduction was achieved, washing, bleeding control, hecting the surgical wound, the operation was completed.

Figure 2. X-ray results after screw installation

Subsequently, a postoperative follow-up was carried out on 7/1/2022 with findings in the form of post-op pain, GCS compost mentis, blood pressure 110/70 mmHg, pulse 80 beats/minute, and respiration rate 20 breaths/minute. On the left ankle, a post-op wound was found with minimal swelling and tenderness. The distal AVN status was within normal limits. ROM was found to be limited with pain.

In the follow-up room on 8/1/2021, it was found that there was post-op pain, GCS compost mentis, blood pressure 120/80 mmHg, pulse 78 times/minute, and respiration rate 18 times/minute. On the left ankle, a post-op wound was found with minimal swelling and tenderness. The distal AVN status was within normal limits. ROM was found to be limited with pain.

In the follow-up room on 9/1/2021, no post-op pain was found. GCS compost mentis with blood pressure 120/80 mmHg, pulse 79 times/minute, and respiration rate 20 times/minute. On the left ankle, a post-op wound was found without swelling and tenderness. The distal AVN status was within normal limits. ROM found limited.

Treatment

The main therapy given to the patient was ORIF screw (3.5 screw, 2.0 screw, and X screw) and PRP injection. The postoperative therapy was in the form of giving frutolite 20 tpm, cefuroxime 2x1 gr IV, dexketoprofen 2x50 mg IV, onogate 2x1 tab, onoiwa 2x1 tab, analgesic and anesthetic (drip fentanyl). The postoperative plan is in the form of distal ROM exercises and post-op ankle x-rays. In addition, the patient was given home medicine in the form of cefixime 2x200mg, gabapentin 2x100mg, and onogate 2x1 tab.

Outcome

The talus fracture is an uncommon fracture that accounts for 3-6 percent of all fractures in males

and less than 1% of all fractures in the human body.[4] Because of its particular position, pattern, anatomical, and vascular configuration, a talus fracture is considered one of the most difficult fractures to cure.[5] In this case, an open reduction and internal fixation (ORIF) screw and platelet rich plasma (PRP) injection were used to treat a 24-year-old male patient. This treatment has a positive and helpful consequence (outcome of therapy). The results of this 24-year-old patient's follow-up showed that he had improved after surgery. This is consistent with the research, which suggests that most talus fractures, particularly those with subtalar dislocations, should be treated with open reduction and internal fixation (ORIF).[6]

Figure 3. **Patient Outcome during Post-Operation Follow Up**

These findings are consistent with those of Biz et al (2019), who looked at the long-term radiological and clinical outcomes of talus fracture patients. The study used 31 patients who were treated with ORIF screws (open reduction and internal fixation). Hawkins' sign was present in 9 of the cases studied, but no necrosis developed. In the 0-11 day operation time range, more than 60% of patients reported satisfactory results, with 18 (66.7%) stating that they were entirely satisfied (VAS: 9-10).[7]

These findings are also consistent with Mao et al's (2020) research, which intends to evaluate the outcome of posterior talus fractures treated with open reduction and internal fixation (ORIF) with a posteromedial approach and percutaneous screw fixation. The Visual Analog Scale (VAS) and American Orthopedic Foot and Ankle Society (AOFAS) ratings were used to assess radiological and clinical results four and twelve months after surgery. Wound infection, nerve damage, malunion, nonunion, and loose screws were not documented in the study. Both procedures had favorable VAS and AofAS values at 4 and 12 months postoperatively, according to clinical evaluation. Furthermore, both treatments have positive functional results in patients.[8]

Bastos et al (2010) in the Foot and Ankle Surgery Group of Santa Casa de Sao Paulo looked at functional, clinical, and radiological outcomes in patients with talus fractures. A total of 16 patients were treated with open reduction and internal fixation from a total of 20 research samples (ORIF). The findings revealed that up to 6 patients reported modest pain and that 62 percent of patients had no major radiological injury to the ankle joint.[9]

Discussion

Talus is the second largest tarsal bone that has characteristic imaging and injury patterns. Fractures of the talus are rare fractures with a percentage of about 1% of all fractures that can occur and 3-6% of all fractures of the foot.[4] An age predilection for these fractures is not thought to exist, but suggests an increased incidence in younger patients. It was also found that the incidence of talus fractures in the male sex was significant, reaching 73% of the total cases.[10]

Based on the anatomical region, fractures of the talus can be divided into fractures of the head, neck, and body of the talus.[4] Fractures of the head of the talus are the rarest types of fractures of the talus with a percentage of about 5-10% of all cases of talus fractures. Fractures of the neck of

the talus are considered to be the most common type of fracture, but recent studies have shown that fractures of the neck of the talus tend to be less common than fractures of the body of the talus.[10] The difference in incidence that was found was probably due to differences in the definition of the anatomical boundary between the neck and the talus body. In talus body fractures, the incidence varies between 13%-61% of all cases of talus fractures.[10,11]

Diagnosis

In establishing the diagnosis of a talus fracture, no laboratory tests are involved. Initially, the diagnosis is made by means of a radiographic evaluation that includes a series of views of the ankle with anteroposterior, lateral, and mortise projections, and a series of views of the foot with anteroposterior, lateral, and oblique projections. This view allows for a good view of the medial aspect of the neck of the talus. Lateral views of the subtalar joint and oblique views of the talus can also provide additional information about the fracture.[10,12,13]

Computed tomography (CT) has an important role to assist in the diagnosis of talus fractures. CT is capable of detecting fractures that are difficult to see on plain radiographs. CT also provides a good view of the congruence of the talus joint, detects additional fractures, and contributes to the planning of possible surgery. In addition, magnetic resonance imaging (MRI) also plays an important role in viewing talus osteonecrosis as one of the most common and most feared complications of this fracture.[14]

Classification

Classification of talus fractures based on their location can be classified into fractures of the body, neck, and head of the talus. Hawkins classification is the most commonly used classification for categorizing talus neck fractures. The Hawkins classification consists of four types, namely Hawkins type I, type II, type III, and type IV.[5]

Type I fractures are non-displaced fractures. Types II and III are fractures involving subluxation or dislocation of the subtalar and tibiotalar joints. Type IV fracture is a type of fracture accompanied by dislocation of the talonavicular joint. Hawkins fracture type II has been reclassified into type IIa fracture which shows subluxation of the subtalar joint and type IIb which indicates complete dislocation.[15]

Type I fractures are vertical fractures of the neck of the talus with minimally displaced fracture line entering the subtalar joint between the middle and posterior facets. The talus can maintain its anatomical position at the ankle with one of the three blood vessels to the talus disrupted. Type II fractures are vertical, displaced fractures, accompanied by subluxation or dislocation of the subtalar joint. The talus remains were found to be reduced at ankle mortise. This type of fracture generally extends to the body of the talus and posterior facet and can result in posterior dislocation of the subtalar joint in 10 of 24 fractures. In this type of fracture, there may be interference with two of the three main sources of perfusion to the talus.[16,17]

Type III fractures have similar characteristics to type II fractures, but are accompanied by ankle dislocation. In this type of fracture there is a generalized posteromedial dislocation pattern with the extruded body lying between the tibialis posterior and the Achilles tendon. In this fracture also found disruption of the three main blood vessels to the talus.[16,17] Type IV fracture is a fracture of the neck of the talus associated with a dislocation of the body from the ankle or subtalar joint accompanied by a dislocation or subluxation of the head of the talus from the talonavicular joint.[17,18]

Management

In general, management should aim at rapidly rebuilding joint congruence and achieving anatomic reduction of the fracture given the high incidence of osteonecrosis and associated fractures. Fractures that are not deviated and without joint incongruence can be treated without surgery. However, deviated fractures generally require open reduction. Closed reduction can also be tried and may be very useful as a first step.[19]

Hawkins type I fractures should be treated with open reduction and internal fixation (ORIF), type II fractures with excision, and type III fractures with immobilization and no load.[20] For fractures of the head of the talus without displacement, conservative treatment can be carried out, while for fractures of the head of the talus that are displaced, surgery is necessary to reduce malalignment of the talonavicular joint, thereby reducing the possibility of osteoarthrosis and osteonecrosis. Type I talus neck fracture may be

treated nonoperatively. However, the slightest displacement of a fracture of the neck of the talus may require ORIF and CT play a role in the evaluation of this fracture. Type II talus neck fractures require treatment in the form of surgical reduction and fixation. Initially, type III and IV talus neck fractures can be treated by closed reduction in the emergency department to relieve skin tension and reduce soft tissue injury with subsequent surgical management of ORIF.[21]

If there is no displacement, fractures of the talus can be treated conservatively. However, most fractures of the talus body are displaced and require operative management to restore fragment and joint alignment. Fractures of the posterior process can be managed nonoperatively, although excision of the fracture fragment may be necessary if pain persists after appropriate conservative management. Undisplaced lateral process fractures are treated conservatively. Treatment in the form of ORIF is required if the fracture fragment is displaced >2 mm or >1 cm. Severe comminuted fractures and associated articular injuries may require excision of the fracture fragment.[20]

Complication

Persistent pain is one of the most common complaints after a patient has a talus fracture. Arthritis is also often experienced by patients, especially patients with Hawkins III or IV fractures. Due to the seven different articulations that make up the talus, it is nearly impossible to reconstruct the articulation surface according to its anatomical position after a complex fracture.[22]

If the reduction process in the fracture of the displaced head or neck of the talus fails, it can lead to secondary osteoarthrosis or necrosis. Even with proper surgical management, fractures of the neck of the talus type III and IV carry a high risk of developing osteonecrosis. Osteonecrosis and secondary osteoarthritis are also common complications of talus body fractures. Fractures of the head or neck of the talus also increase the likelihood of complications in fractures of the talus body. Fractures of the severely crushed body of the comminuted talus have a high rate of bone loss and nonanatomic reduction, with consequent high rates of avascular necrosis.[11,21]

Conclusion

Talus fracture is a type of bone fracture that has rare prevalence. Treatment that can be given to the patients with talus fracture such as cast immobilization for non-displaced fractures and surgical intervention for the displacement cases to minimize the risk of avascular necrosis. We presented a case of a 24 years old male patients with primary diagnosis talus fracture of the neck. Patient was treated with surgical treatment and post-operative follow up was carried out and good clinical outcome was achieved on this patient. Further case reports and case series are needed to make more definitive conclusion regarding the treatment and clinical outcome in talus fracture cases.

References

1. Michel-Traverso A, Ngo THN, Bruyere C, Saglini M. Talus fracture in a 4-year-old child. BMJ Case Rep. 2017;2017:2016–8.
2. Eberl R, Singer G, Schalamon J, Hausbrandt P, Hoellwarth ME. Fractures of the talus-differences between children and adolescents. J Trauma - Inj Infect Crit Care. 2010;68(1):126–30.
3. Byrne AM, Stephens M. Paediatric talus fracture. BMJ Case Rep. 2012;2011–3.
4. Melenevsky Y, Mackey RA, Brad Abrahams R, Thomson NB. Talar fractures and dislocations: A radiologist's guide to timely diagnosis and classification. Radiographics. 2015;35(3):765–79.
5. Whitaker C, Turvey B, Illical EM. Current Concepts in Talar Neck Fracture Management. Curr Rev Musculoskelet Med. 2018;11(3):456–74.
6. Mao H, Wang H, Wang L, Yao L. Definition of a safe zone for screw fixation of posterior talar process fracture by 3-dimensional technology. Med (United States). 2018;97(49).
7. Biz C, Golin N, Cicco M De, Maschio N, Fantoni I, Frizziero A, et al. Long-term radiographic and clinical- functional outcomes of isolated , displaced , closed talar neck and body fractures treated by ORIF : the timing of surgical management. 2019;1–11.
8. Mao H, Wang H, Zhao J, Wang L, Yao L, Wei K. Initial assessment of treatment of talar posterior process fractures with open reduction and percutaneous fixation. Sci Rep. 2020;10(1):1–10. Available from: https://doi.org/10.1038/s41598-020-77151-6
9. Bastos LR, Ferreira RC, Mercadante MT.

Analysis of Clinical and Functional Outcome and Complications of Talar Neck Fractures. Rev Bras Ortop (English Ed. 2010;45(4):362–74. Available from: http://dx.doi.org/10.1016/S2255-4971(15)30382-7

10. Dale JD, Ha AS, Chew FS. Update on talar fracture patterns: a large level I trauma center study. AJR Am J Roentgenol. 2013;201(5):1087–92.
11. Early JS. Management of fractures of the talus: body and head regions. Foot Ankle Clin. 2004;9(4):709–22.
12. Ebraheim NA, Patil V, Frisch NC, Liu X. Diagnosis of medial tubercle fractures of the talar posterior process using oblique views. Injury. 2007;38(11):1313–7.
13. Vallier HA, Nork SE, Benirschke SK, Sangeorzan BJ. Surgical treatment of talar body fractures. J Bone Joint Surg Am. 2003;85(9):1716–24.
14. Chan G, Sanders DW, Yuan X, Jenkinson RJ, Willits K. Clinical accuracy of imaging techniques for talar neck malunion. J Orthop Trauma. 2008;22(6):415–8.
15. Vallier HA, Reichard SG, Boyd AJ, Moore TA. A new look at the Hawkins classification for talar neck fractures: which features of injury and treatment are predictive of osteonecrosis? J Bone Joint Surg Am. 2014;96(3):192–7.
16. Hawkins LG. Fractures of the neck of the talus. J Bone Joint Surg Am. 1970;52(5):991–1002.
17. Alton T, Patton DJ, Gee AO. Classifications in Brief: The Hawkins Classification for Talus Fractures. Clin Orthop Relat Res. 2015;473(9):3046–9.
18. Canale ST, Kelly FBJ. Fractures of the neck of the talus. Long-term evaluation of seventy-one cases. J Bone Joint Surg Am. 1978;60(2):143–56.
19. Sakaki MH, Saito GH, de Oliveira RG, Ortiz RT, Silva JDS, Fernandes TD, et al. Epidemiological study on talus fractures. Rev Bras Ortop. 2014;49(4):334–9.
20. Perera A, Baker JF, Lui DF, Stephens MM. The management and outcome of lateral process fracture of the talus. Foot ankle Surg Off J Eur Soc Foot Ankle Surg. 2010;16(1):15–20.
21. Russell TG, Byerly DW. Talus Fracture. In Treasure Island (FL); 2022.
22. Sanders DW, Busam M, Hattwick E, Edwards JR, McAndrew MP, Johnson KD. Functional outcomes following displaced talar neck fractures. J Orthop Trauma. 2004;18(5):265–70.

How to cite this article: I Gde Made Satya Wangsa, Wiradiputra, A. E. ., Putra , G. N. P. W. ., & Deker, M. . (2022). TALUS FRACTURE IN A 24-YEAR-OLD PATIENT. Journal of Medical Research and Health Sciences, 5(4), 1973–1979. https://doi.org/10.52845/JMRHS/2022-5-4-18