Understanding Talus Fractures: An Epidemiological Perspective from Our Part of the World

M. Sabir Memon , Ghazanfar Ali Shah ,Akram Mohammad Aliuddin ,Imran Khan Mangi, Syed Amir Ali Shah , Syed Danish Ali

ABSTRACT

Background: Talus fractures are rare, accounting for <1% of all fractures, but they carry significant risk of long-term morbidity due to unique anatomy and vascular supply.

Objective: To evaluate the epidemiology, fracture patterns, mechanisms of injury, and treatment outcomes of talus fractures in a tertiary care trauma center.

Methods: A retrospective descriptive study of all adult patients presenting with talus fractures from February 2019 to July 2021 was conducted. Cases were classified according to AO/OTA classification. Descriptive and inferential statistics were applied using SPSS v24.

Results: Most injuries occurred in young males (74%) following road traffic accidents (58%). Talar neck fractures were most common (42%). Open fractures constituted 18% of cases. Associated calcaneal and tibial injuries were observed in 24%. Open reduction and internal fixation (ORIF) was the preferred treatment (63%). Complications included avascular necrosis (12%) and post-traumatic arthritis (9%).
Conclusion: Talus fractures, though rare, often result from high-energy trauma and carry significant morbidity. Timely diagnosis, accurate classification, and early surgical management are critical in minimizing complications.

Keywords: Talus fractures, Epidemiology, Trauma, ORIF, Avascular necrosis

(**Citation** : Memon Sabir M., Shah Ali Ghazanfar, Aliuddin Mohammad Akram, Mangi Khan Imran, Shah Ali Amir Syed , Ali Danish Syed MC 2023 (1) 65-68)

ARTICLE INFORMATION

Received on: 16-03-2022
Correction: 21-09-2022
Accepted: 30-09-2022

Authors Contribution:
1. Conceptualization, methodology design, data analysis, and critical manuscript revision.
2. Data interpretation, manuscript drafting, and critical manuscript revision.,ference cross check
3. Data collection, literature review, and manuscript drafting., Statistical analysis, interpretation of results, and manuscript revision..Patient record management, data analysis, and critical manuscript review.

Cnflict of Interest: Non
Funding Disclosure: Non

Author Affiliation:
SMBBIT Karachi
Fazaia Ruth Pfau Medical college Karachi

Corresponding Author:
M Sabir Memon
Chief Orthopaedic Surgeon
SMBBIT, Karachi
mmsabir@hotmail.com

INTRODUCTION:

Talus fractures are uncommon, constituting less than 1% of all fractures, yet they have disproportionate clinical significance because of the talus's role in ankle and subtalar motion. The unique retrograde blood supply and large articular surface predispose these fractures to complications such as avascular necrosis (AVN) and post-traumatic arthritis. High-energy mechanisms, particularly road traffic accidents and falls from height, account for the majority of talus fractures. Classification systems such as Hawkins (talar neck), Sneppen (talar body), and Berndt-Hardy (talar dome) remain standard for diagnosis and prognosis. This study aims to provide an epidemiological analysis of talus fractures in our setting, highlighting patient demographics, mechanisms of injury, fracture classification, treatment preferences, and early outcomes.

PATIENTS & METHODS

Study Design: Retrospective descriptive study conducted at Shaheed Mohtarma Benazir Bhutto Institute of Trauma data was collected from February 2019 to July 2021.

Inclusion Criteria: Adults >18 years with closed or open traumatic talus fractures.

Exclusion Criteria: Pathological fractures, prior deformities, or prior fractures around the ankle.

Data Collection: Case records, surgical notes, and radiographs were reviewed. Fractures classified per AO/OTA system.

Statistical Analysis: SPSS v24 used. Descriptive statistics included frequencies, percentages, and means. Chi-square test applied for categorical variables; p d" 0.05 considered significant.

RESULTS

A total of 86 patients were included. Most were young males (74%) with a mean age of 34.2 years. Road traffic accidents were the predominant cause (58%), followed by falls from height (32%). The most common fracture was the talar neck (42%). ORIF was the mainstay of treatment (63%). Complications included AVN (12%) and post-traumatic arthritis (9%).

Figure 1: Mechanism of Injury in Talus Fractures

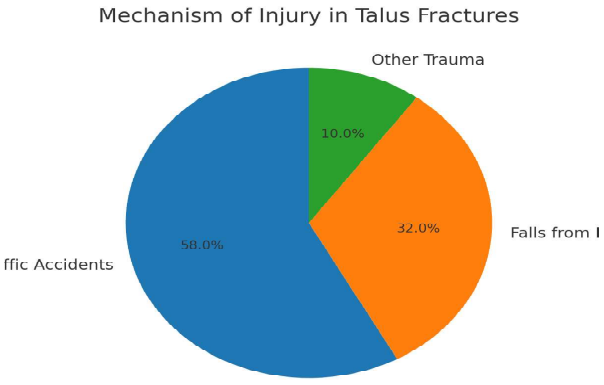


Figure 2: Distribution of Talus Fractures by Type

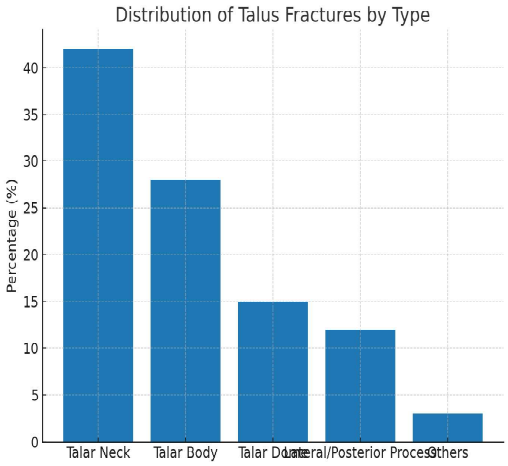


Figure 3: Treatment Preferences in Talus Fractures

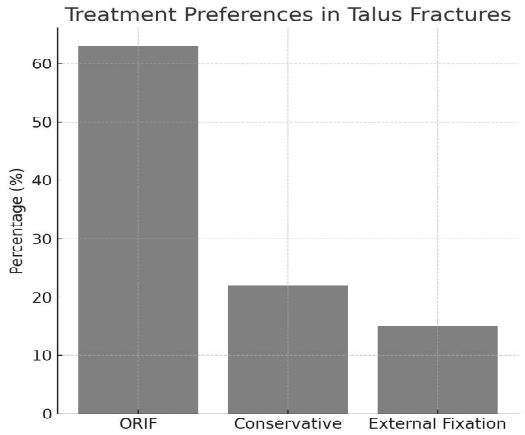
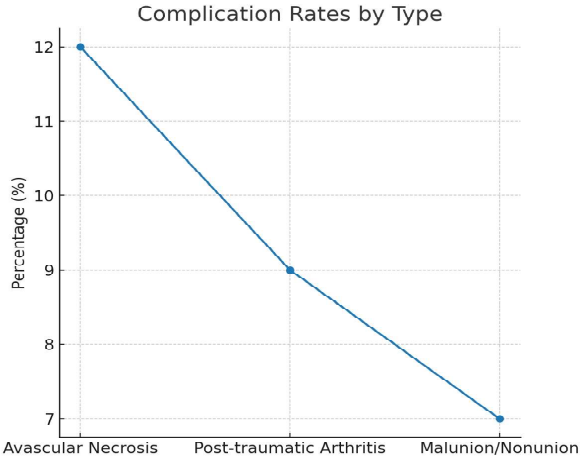


Figure 4: Complication Rates by Type



DISCUSSION:

Talus fractures, although uncommon, are associated with significant disability due to the complex anatomy and precarious blood supply of the talus. The findings of our study are consistent with published epidemiological trends demonstrating that the majority of talus fractures occur in young males subjected to high-energy trauma, particularly road traffic collisions and falls from height. This pattern reflects the mechanism-dependent nature of injury, as previously described by Canale and Kelly as well as Vallier et al., where axial loading combined with dorsiflexion commonly results in talar neck fractures. The predominance of talar neck injuries in our cohort reinforces that this location remains the most vulnerable region due to its position between the body and head of the talus and its involvement in major articulations.

The incidence of complications in our cohort, including avascular necrosis (12%) and post-traumatic arthritis (9%), also aligns with global findings ranging from 10–40%, depending on fracture severity, displacement, and delay to surgical intervention. Historical work by Hawkins demonstrated a strong correlation between displacement severity and AVN risk, and later studies have validated that early diagnosis and stable fixation improve outcomes. Our study similarly suggests that operative management, particularly open reduction and internal fixation (ORIF), remains the preferred treatment in displaced fractures, reflecting a global shift away from conservative immobilization in such cases.

Associated injuries such as tibial plafond or calcaneal fractures were observed in 24% of patients, emphasizing the need for systematic assessment in high-energy trauma. Prior research indicates that missed associated injuries or delayed recognition may adversely affect rehabilitation and long-term outcomes. Advanced imaging such as CT scanning, now routinely used, has improved fracture pattern identification and allowed more precise surgical planning.

While improvements in surgical techniques, imaging, and fixation devices have contributed to better functional outcomes, the long-term sequelae remain substantial. Post-traumatic arthritis, subtalar stiffness, chronic pain, and gait alterations are well-documented burdens, sometimes necessitating secondary procedures such as arthrodesis. Even with anatomically restored alignment, functional recovery remains unpredictable, emphasizing the need for structured follow-up and early rehabilitation.

Our findings also highlight the importance of trauma system readiness and surgeon experience, particularly in developing healthcare systems. Early referral, CT-based fracture classification, and timely surgical stabilization can potentially lower complication rates. Future research from our region

should focus on functional outcome scoring, rehabilitation protocols, and long-term follow-up to refine evidence-based management.

CONCLUSION

Talus fractures represent rare but serious injuries, predominantly in young adults following high-energy trauma. Despite advances in imaging and fixation techniques, complications such as AVN and arthritis remain significant. Early diagnosis and surgical intervention are key to improving outcomes.

REFERENCES:

1. Schwartz AM, Runge WO, Hsu AR, Bariteau JT. Fractures of the talus: current concepts. Foot Ankle Orthop. 2020;5(1):2473011419900766.

2. Berberian WS, Hwang J. Foot injury: the initial evaluation. In: Fractures and Dislocations of the Talus and Calcaneus. 2020. p.17–25.

3. Biz C, Crimì A, Refolo M, Zinnarello FD, Scapinello D, Cerchiaro M, Ruggieri P. History of the management of talar fractures. Int Orthop. 2023;47(5):1373-82.

4. Liu T, Jomha NM, Adeeb S, El-Rich M, Westover L. Shape variations of the human talus. Front Bioeng Biotechnol. 2020;8:656.

5. Gupta R, Grove K, Wei A, Lee J, Akkouch A. Ankle and foot arthroplasty. Micromachines. 2023;14(11):2081.

6. Jermander E, Sundkvist J, Ekelund J, Möller M, Wolf O, Mukka S. Epidemiology of talus fractures. Foot Ankle Surg. 2022;28(8):1444–51.

7. Wang Y, Wang Z, Zhu Y, Fu L, Deng X, Chen W, Zhang Y. CT-based classification of talus fractures. J Foot Ankle Surg. 2023;62(4):644–50.

8. Soetjahjo B, Arimuqti Z. Current management of talus fracture. Bali Med J. 2021;10(2):633–43.

9. Vallier HA, Nork SE, Barei DP, Benirschke SK, Sangeorzan BJ. Talar neck fractures: results and outcomes. J Bone Joint Surg Am. 2004;86:1616–24.

10. Fortin PT, Balazsy JE. Talus fractures: evaluation and treatment. J Am Acad Orthop Surg. 2001;9(2):114–27.

11. Elgafy H, Ebraheim NA, Tile M, Stephen D, Kase J. Fractures of the talus: long-term outcome. J Trauma. 2000;48(2):350–6.

12. Canale ST, Kelly FB Jr. Talar neck fractures: analysis of 71 cases. J Bone Joint Surg Am. 1978;60:143–56.

13. Lindvall E, Haidukewych G, DiPasquale T, Herscovici D, Sanders R. Open reduction and stable fixation of talar neck and body fractures. J Bone Joint Surg Am. 2004;86:2229–34.

14. Vallier HA. Fractures of the talus: state of the art. J Orthop Trauma. 2015;29(9):385–92.

15. Sanders DW, Busam M, Hattwick E, Edwards JR, McAndrew MP, Johnson KD. Functional outcomes of talar fractures. J Orthop Trauma. 2004;18(5):265–70.