MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.11.240.243

OPEN ACCESS

Key Words
Posterior malleolar fracture, ankle fractures, clinical profile, prognosis, injuries

Corresponding Author
N. Preetham,
Department of Orthopaedics, BMCRI, Bangalore, Karnataka, India

Author Designation
[1,3,4]Assistant Professor
[2]Post Graduate

Received: 20 August 2024
Accepted: 20 October 2024
Published: 22 October 2024

Citation: H.R. Deepak, N. Naga Bhushan, C.Y.G. Keerthi and N. Preetham, 2024. A Study on Clinical Profile of Patients with Posterior Malleolar Fracture Admitted at a Tertiary Care Hospital. Res. J. Med. Sci., 18: 240-243, doi: 10.36478/makrjms.2024.11.240.243

A Study on Clinical Profile of Patients with Posterior Malleolar Fracture Admitted at a Tertiary Care Hospital

[1]H.R. Deepak, [2]N. Naga Bhushan, [3]C.Y.G. Keerthi and [4]N. Preetham

[1,2,4]Department of Orthopaedics, BMCRI, Bangalore, Karnataka, India
[3]Department of Orthopaedics, SABVMCRI, Bangalore, Karnataka, India

ABSTRACT
Ankle fractures, occurring at a rate of approximately 100 per 100,000 people annually, often involve the posterior malleolus in 7-44% of cases, which can negatively impact prognosis. These fractures typically result from rotational injuries to the ankle, affecting one or both malleoli. After obtaining approval and clearance from the institutional ethics committee of Bangalore Medical College and Research Institute, the patients fulfilling the inclusion/exclusion criteria were enrolled for the study after obtaining written informed consent. Demographic data, History, Clinical examination and details of investigations was recorded in study pro-forma after admission. Out of 28 patients after getting CT scan patients were grouped based on the Fracture pattern of the posterior malleolus. In our study, type 2 of Haraguchi had more incidence of 67.86% (19) and type 3 of 25% (7) and type 1 of 7.14% (2) were found. Out of 28 patients, after getting CT scan patients were grouped based on the Fracture pattern of the posterior malleolus using bartonicek classification. In our study, type 3 pattern of injury was more common 67.86% (19) and type 2 pattern had incidence of 17.86% (5) and type 2 and type 4 had incidence of 10.71% and 3.57% respectively.

INTRODUCTION

The ankle joint, or talocrural articulation, is a hinge-type synovial joint located between the distal ends of the tibia and fibula and the superior part of the talus[1]. The distal ends of the tibia and fibula, along with the inferior transverse part of the posterior tibiofibular ligament, form a mortise that accommodates the pulley-shaped trochlea of the talus. The medial surface of the lateral malleolus articulates with the lateral surface of the talus[2]. The ankle joint capsule is a thin, yet robust structure, reinforced by strong lateral and medial ligaments. Its fibrous layer attaches superiorly to the articular surfaces of the tibia and malleoli and inferiorly to the talus. The synovial membrane, a loose lining, covers the fibrous layer and extends superiorly between the tibia and fibula, reaching the interests tibiofibular ligament[3]. Ankle fractures, occurring at a rate of approximately 100 per 100,000 people annually, often involve the posterior malleolus in 7-44% of cases, which can negatively impact prognosis[1]. These fractures typically result from rotational injuries to the ankle, affecting one or both malleoli. The rotational mechanism may cause the posterior inferior tibiofibular ligament (PITFL) to tear or create an avulsion fracture of the posterior tibial margin, also known as a posterior malleolus or Volkmann's fracture[4]. Posterior malleoli fractures are generally neglected due to the spontaneous reduction of these fragments after open reduction of the lateral malleolus through ligamentotaxis done by the posterior-inferior tibiofibular ligament (PITFL)[5]. Recent literature shows a changing tendency towards the anatomical correction of the joint, based on the presence of intra-articular step-off rather than the size of the posterior fragment. Still, fixation of the posterior malleolus fractures remains an area of controversy in orthopedic surgery. No consensus has provided the best methodology for reduction and stabilisation the posterior tibial malleolus[6]. These fractures are frequently overlooked due to spontaneous reduction of the fragments following open reduction of the lateral malleolus, facilitated by the PITFL. Recent research suggests that anatomical correction of the joint is more important than the size of the posterior fragment, yet the optimal method for reduction and stabilization of the posterior tibial malleolus remains debated. Inadequate reduction can lead to early osteoarthritis, resulting in pain and impaired function of the ankle joint.

MATERIALS AND METHODS

Patients of either sex with fracture of posterior malleolus of tibia satisfying inclusion criteria admitted in Department of Orthopaedics in Bangalore Medical College and Research Institute and its attached hospitals.

Methods of Collection of Data:

Study Design: Prospective cohort study.

Place of Study: Department of Orthopaedics in Bangalore Medical College and Research Institute, Bangalore and its affiliated hospitals.

Inclusion Criteria:

- Age more than 18 years.
- Patients willing to give informed consent.
- Patient who had trimalleolar ankle fractures. In which
- The presence of a posterior malleolar fracture fragment.
- the presence of a posterior malleolar fracture associated with tibiotalar dislocation.
- non-reduced syndesmosis or the posterior inferior tibiofibular ligament (PITFL) which is connected to the posterior malleolar fragment.
- Minimum follow-up of at least 6 months.

Exclusion Criteria:

- Evidence of an active infection.
- Previous surgeries on ankle.
- Proximal tibia and fibula fractures with mid shaft extensions.
- Pilon fracture of the distal tibia.
- Patients with other comorbidities like head injury which affects the rehabilitation.
- Patients with cognitive disorders, on steroids or immunosuppressant.

After obtaining approval and clearance from the institutional ethics committee of Bangalore Medical College and Research Institute, the patients fulfilling the. inclusion/exclusion criteria were enrolled for the study after obtaining written informed consent. Demographic data, History, Clinical examination and details of investigations was recorded in study pro-forma after admission. At the initial presentation, the patients are assessed for local skin condition and distal neurovascular status. Special note is made of any swelling, edema, blisters, or poor skin condition. Standard anteroposterior {AP), lateral and mortise views of the ankle are obtained. The injuries to medial, lateral, and posterior malleolus are defined and any frank dislocation or subtle subluxation identified. A possible mechanism of injury based on Lauge-Hansen classification is identified, as this gives an idea of injury severity and fracture distracting forces.

RESULTS AND DISCUSSIONS

The incidence of ankle injury was more in 30-50 and more than 50 years of age group with 35.7% and 18-30 years age group had incidence of 28.6% (Table 1).

Table 1: Distribution of Patients Based on Age

Age group (in yrs)	Number of patients	Percentage (in %)
18-30	8	28.6
30-50	10	35.7
More than 50	10	35.7

Table 2: Distribution of Patients Based on Gender

Gender	Number of patients	Percentage (in %)
Female	9	32.14
Male	19	67.86

Out of 28 patients, 19 male and 9 female patients had ankle injury. Incidence of ankle injury was more common in male with 67.86 percent and female with 32.14 percent (Table 2). In our study, right limb was more injured than the left with percentage of incidence of 71.43% and 28.57% respectively (Table 3).

Table 3: Distribution of Patients Based on Side of Limb Injured

Side of Limb Injured	Number of Patients	Percentage (IN %)
Left	8	28.57
Right	20	71.43

In our study, we have classified the patients using CT based classification of posterior malleoli based on Haraguchi[11] and Bartonicek[4] classification.

Table 4: Distribution of Patients Based on Haraguchi Classification

Haraguchi classification	Number of patients	Percentage (In %)
Type 1	19	67.86
Type 2	7	25
Type 3	2	7.14

Out of 28 patients, after getting CT scan patients were grouped based on the Fracture pattern of the posterior malleolus. In our study, type 2 of Haraguchi had more incidence of 67.86% (19) and type 3 of 25% (7) and type 1 of 7.14% (2) were found. Out of 28 patients, after getting CT scan patients were grouped based on the Fracture pattern of the posterior malleolus using bartonicek[4] classification (Table 4). In our study, type 3 pattern of injury was more common 67.86% (19) and type 2 pattern had incidence of 17.86% (5) and type 2 and type 4 had incidence of 10.71% and 3.57% respectively (Table 5).

Table 5: Distribution of Patients Based on Bartonicek Classification

Bartonicek classification	Number of patients	Percentage (in %)
Type 1	1	3.57
Type 2	5	17.86
Type 3	19	67.86
Type 4	3	10.71

Ankle fracture are commonly encountered in our daily practice, Even then posterior malleoli fractures are rarely seen. Our study was to analysed the incidence in posterior malleolus fracture at tertiary care center. Several studies have emphasized the need of posterior malleoli fracture fixation for ankle stability and pain free ankle movements. Nicholas concluded Posterior malleolus fracture is a complex fracture to operate. Fixation is needed for articular congruity and ankle stability. Fixation of posterior malleolar fracture will restore the competence of posterior inferior tibiofibular ligament[7,8]. In our study, we found that the ankle injury was most commonly seen in the age group of 30-50 years and more than 50 years had more incidence (35.7%) each and more common in males (67.86%) than females and right limb was injured than the left (71.43%). Our study included 28 patients who fulfilled the inclusion criteria and routine x rays of the ankle in anteroposterior, lateral and mortise views were assessed and later examined with CT scan and classified the fracture pattern according to Haraguchi[11] and Bartoneick[4]. We found that type 1 and type 2 Haraguchi are common and type 3 Bartonicek was commonly seen in our study. Haraguchi[11] found that the type 1 (the posterolateral oblique type) and type 2 (the medial extension type) fracture pattern as more common. Contrarily to the Bartonicek[4] we found type 3 fractures more common (67.86%) but according to the original article, they found that type 2 fracture pattern as more common[9,10].

CONCLUSION

In our study, we found that the ankle injury was most commonly seen in the age group of 30-50 years and more than 50 years had more incidence (35.7%) each and more common in males (67.86%) than females and right limb was injured than the left. (71.43%) We found that type 1 and type 2 Haraguchi are common and type 3 Bartonicek was commonly seen in our study.

REFERENCES

1. Nelson, M.C. and N.K. Jensen., 1940. The treatment of trimalleolar fractures of the ankle. Surg Gynecol. Obstet., 71: 509-514.
2. de Vries, J.S., A.J. Wijgman, I.N. Sierevelt and G.R. Schaap, 2005. Long-Term Results of Ankle Fractures With a Posterior Malleolar Fragment. The J. Foot Ankle Surg., 44: 211-217.
3. Bartonícek, J., S. Rammelt and M. Tucek, 2017. Posterior Malleolar Fractures. Foot Ankle Clin., 22: 125-145.
4. Bartonícek, J., S. Rammelt, K. Kostlivý, V. Vanecek, D. Klika and I. Trešl, 2015. Anatomy and classification of the posterior tibial fragment in ankle fractures. Arch. Orthop. Trauma Surg., 135: 505-515.
5. Evers, J., L. Barz, D. Wähnert, N. Grüneweller, M.J. Raschke and S. Ochman, 2015. Size matters: The influence of the posterior fragment on patient outcomes in trimalleolar ankle fractures. Injury, 46: 109-113.
6. Mason, L.W., W.J. Marlow, J. Widnall and A.P. Molloy, 2017. Pathoanatomy and Associated Injuries of Posterior Malleolus Fracture of the Ankle. Foot and Ankle Int., 38: 1229-1235.

7. Zwipp, H. and T. Randt T., 1994. Ankle joint biomechanics. Foot Ankle Surg. 1: 21-27.
8. Hicks, J.. 1953. The mechanics of the foot: I. The joints. J Anat., 87: 345-357.
9. Barnett, C.and J. Napier., 1952. The axis of rotation at the ankle joint in man. Its influence upon the form of the talus and the mobility of the fibula. 1 J Anat., 86: 1-8.
10. Lundberg, A., O. Svensson, G. Nemeth and G. Selvik, 1989. The axis of rotation of the ankle joint. British Editorial Society of Bone and Joint Surgery, The J. Bone Joint Surg.. Br. volume, 71: 94-99.
11. Haraguchi, N., H. Haruyama, H. Toga and F. Kato, 2006. Pathoanatomy of Posterior Malleolar Fractures of the Ankle. The J. Bone and Joint Surg., 88: 1085-1092