ANKLE FRACTURES;
AN EPIDEMIOLOGICAL STUDY ON PATTERN OF ANKLE FRACTURES IN A TERTIARY HOSPITAL; A ONE YEAR PROSPECTIVE OBSERVATION

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ABSTRACT... Objectives: To evaluate the pattern of ankle fractures presented to our regional trauma and tertiary care center. **Study Design:** Prospective Study. **Place & Duration of Study:** Lady Reading Hospital, Peshawar from November 2016 to October 2017-Twelve months. **Methods:** The study group included 107 patients with ankle fractures where age, gender, mechanism of injury, presence of closed or open fracture was recorded. The fractures were classified according to Lauge-Hansen and Danis-Weber classifications. Medial malleolus comminution and presence of talar shift was recorded. The pattern of fractures was analyzed and compared with literature. **Results:** 52.3% sustained these fractures while running/walking followed by road traffic accident in 25.2%. Supination external rotation injures and Weber B were the commonest followed by supination adduction injuries and Weber A fractures. 25 % of ankle fractures were open. 27.1 % showed medial malleolus comminution and talar shift was noticed in 77% cases. **Conclusion:** We observed high proportion of open and unstable fractures along with higher rate of medial malleolus comminution in our patients. High proportion of supination adduction injuries were recorded which is associated with impaction injury of medial tibial plafond.

Key words: Ankle Fractures, Comminution, Epidemiology, Medial Malleolus.

INTRODUCTION

To our knowledge till date there are no research on epidemiological study on ankle fracture including pattern of these fractures in the national literature. Epidemiologic studies contribute to improved fracture treatment and patients care by offering important data regarding these injuries. Ankle fractures has significant adverse impact on patients quality of life causing symptomatic functional disability for numerous daily life activities. Studies have indicated that 39% of all ankle arthritis is secondary to previous malleolar fracture.[1] Lady Reading hospital in the largest tertiary care hospital of Khyber Pakhtunkhwa province and regional trauma center.

The aim of our study was to evaluate and describe the pattern of ankle injuries presented to our regional trauma center.

MATERIALS AND METHODS

All patients with ankle fractures presented to accident and emergency/orthopaedic department Lady Reading hospital Peshawar between November 2016 and October 2017 for those records were available were included. Ankle fracture was defined as fracture involving one or more malleolus. All patients with radiologically confirmed ankle fracture were included and data were obtained prospectively from these patients. Physical fractures, isolated small avulsion fractures, Pilon fractures or poly trauma patients were excluded. Age, Gender, side of injury, mechanism of injury, presence of closed or open fracture was recorded.

Radiological data was obtained from available database or hard copies of radiographs. "Possible" or "Likely" fractures were excluded unless repeat imaging confirmed presence of fracture.

The fractures were classified according to Lauge Hansen and Danis-Weber classifications. Medial malleolus comminution and presence of talar shift was recorded. Comminution was defined as two of more bony fragments whereas talar shift was defined as an increase in medial clear space of more than 4mm.[2] The pattern of fractures was analyzed and compared with the literature.

RESULTS

A total of 107 patients who sustained ankle fracture were evaluated. The age of patients ranged from 16 to 71 years, on average 36.9 years old. In gender incidence among 107 patients 87(81.3%) were male and 20 (18.6%) were females. The right ankle was affected in 59(55.1%) patients and left in 48(44.8%). 25 % of ankle fractures were open. The most frequent mechanism of injury was while running/walking in 56 (52.3%) patients followed by road traffic accident with 27(25.2%) patients and falling from height with 15(14%) cases (Table-I).

Variable	Category	n	%
Age (Years)*	36.9+- (14.9)	(16-71)	
Gender	Male	87	81.3
	Female	20	18.6
Side of fracture	Right	59	55.1
	Left	48	44.8
Mechanism of injury	Running/ Walking	56	52.3
	Falling from a height	15	14
	Road Traffic accident	27	25.2
	Unknown	9	8.4
Close/Open Injury	Open	27	25.2
	Close	80	74.7

Table-I. Provides the frequency (n) and percentage (%) of the characteristics of the 107 patients with ankle fracture in this study
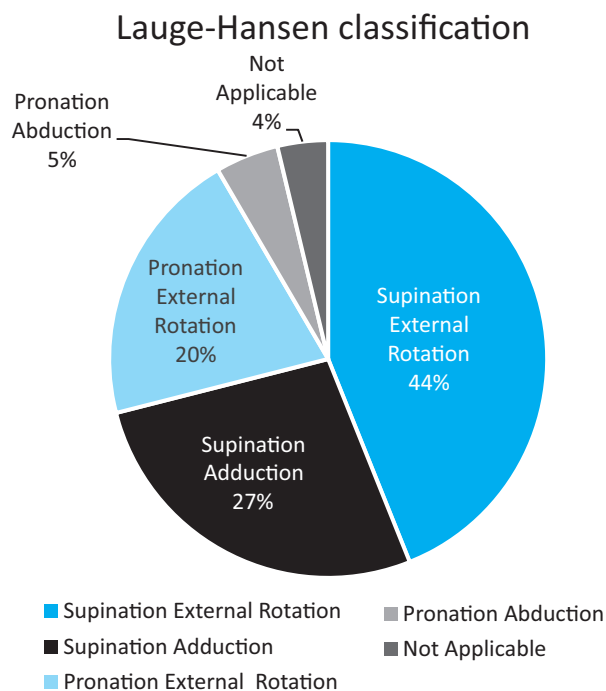**(*) Age is expressed by mean ± St. deviation (min - max)**

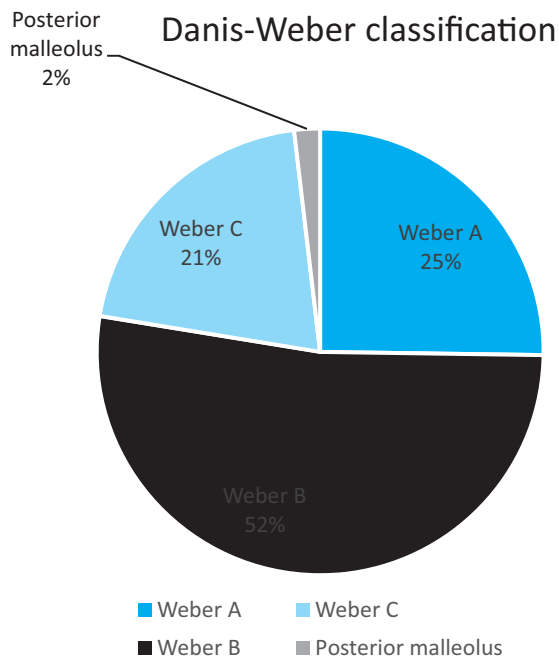Figure-1. Radiological classification of 107 patients according to Lauge-Hansen classification.

Figure-2. Figure-1. Radiological classification of 107 patients according to Danis-Weber Classification.

DISCUSSION

In our study of one-year duration in tertiary centre most affected gender was male with 81.3 % while female constitute 18.6 % that is in ratio of 4:1. There was greater predominance of male gender in our study in comparison to similar studies by Holloway et al and Sakaki et al.[3,4] In our opinion, this is probably due to higher level of physical activity among men as they are more involved in outdoor activities and occupations as compared to females as they are still the breadwinners in this part of the country.

The mean age of ankle fracture patients observed by us was 36.9 years, which is almost similar to previously documented age incidence of 39.0 and 34.5 years old from the works of Santin et al and Tucci et al.[5,6] This indicates higher incidence of ankle fractures in most productive population group.

In our study, a higher proportion of open ankle fractures (25.2 %) were reported compared to the 2%-5% reported in literature.[7] Open fractures can lead to significant soft tissue and bone loss, either from initial injury or subsequent debridement, which often can result in poor outcome in these fractures.

We found in 52.3% (56 ankles) fracture was sustained while running or walking suggestive of torsional injuries. Second most common mechanism of injury was Road traffic accident 25.2% (27 ankles) which is much higher in comparison to studies from Australia and Denmark.[3,8] This can be explained by the contribution from traffic pattern and road traffic safety issues in Peshawar.

We used both Lauge-Hansen and Danis-Weber classification system to classify these injuries.

The Lauge- Hansen classification has got the advantage that it can predict the mechanism of injury from the pattern if injury sustained. Its application to our case series suggests that most common injury was Supination external rotation injury (43.9%), which is within range of previously reported series.[9] However, this study reports higher proportion of supination adduction injury (27.1%) compared to 10-20% in the literature.[9] This is normally associated with fracture dislocation. These injuries involve low avulsion fracture of lateral malleolus with vertical shear fracture of medial malleolus and is often associated with impaction injury of medial tibial plafond with free osteochondral fragment which needs to be appropriately addressed at the time of surgical fixation.

According to Danis –Weber classification Weber B was the commonest type of injury sustained (52.3%) which is in comparison to work done by Kennedy et al.[10] Weber B can be correlated to supination external rotation injuries and are often unstable requiring surgical fixation. We have noticed Weber C fractures around 20.5% relatively higher in comparison to 13% in reported in literature.[11] Weber C injuries generally carry a worse prognosis hence that could be significant.

In our study, high proportion of fracture had talar shift (77%) indicating unstable fracture requiring operative intervention. We noted medial malleolus comminution in 27.1% cases where potential fixation of these fracture can be more difficult.

There are some limitations of this study. There can be inter observer variation while evaluating ankle fracture according to Lauge-Hansen and Danis-Weber classification systems. This study was done in an inner-city hospital with highly variable patient population. Despite every effort to trace every patient presenting with ankle fracture to our institute we might have missed some patients who have sustained ankle fracture after receiving initial management in emergency department may have self transferred themselves to other local hospitals.

CONCLUSION

The literature review supports the conclusion that there is paucity of data in national publications regarding pattern of ankle fractures. In our study, we observed high proportion of supination adduction injuries, which is normally associated with fracture dislocation, and impaction injury of medial tibial plafond. This pattern of fractures
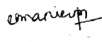
sustained by our patients differs from classical ankle fractures described in literature and will require further clarification. We observed high proportion of open and unstable fractures along with higher rate of medial malleolus comminution in our patients.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Wali Muhammad	Study design, Data collection.	
3	Abdur Rehman Qureshi	Proof Reading, Data collection	