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Outcome following operative treatment of ankle fractures in Indian population

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Abstract
Ankle fractures are among the most common injuries treated by orthopaedic surgeons. These fractures are a significant source of morbidity for the population of both young and elderly. Improper treatment and inadequate reduction of these fracture can lead to significant disability in the form of pain, instability and early onset of arthritic changes.
Operative treatment of ankle fracture includes open reduction and internal fixation and has been the gold standard of treatment. However, there are very few studies in literature examining the functional outcome of ankle fractures following operative treatment. The aim of this study was to analyse the pattern of ankle fractures and the outcome following surgical treatment of these fractures.

Keywords: Ankle fractures, operative fixation, functional outcome

Introduction
Fractures involving the ankle are increasing and are among the most common injuries of the lower extremity with an incidence of 107 fractures per 100000 person- years [1]. Up to 12% of emergency presentations involve an ankle injury. Ankle radiographs make up 10% of all radiographs obtained on emergency patients resulting in a significant expenditure of resources [2].

Treatment of ankle fractures has come a long way from conservative treatment to an era of open reduction and internal fixation. The aim of treatment is to re- establish the anatomy, which is achieved better by operative as compared to non-operative interventions [3, 4]. Operative fixation has been recommended mostly but outcome can be variable. Residual pain, stiffness, swelling and subjective functional instability may still remain during the long term follow up, thus leading to poorer long term results than expected [1]. The objectives of this study were to analyze the pattern of ankle fractures as well as functional outcomes of surgically treated ankle fractures and the problems in Indian population.

Material and Methods
This prospective observational was carried on 43 patients who fulfilled the inclusion criteria but for final analysis 37 patients with complete records and follow up were taken. The remaining 6 patients could not be included because of incomplete follow up. Skeletally immature patients, associated pilon fractures, ipsilateral tibial fractures and foot fractures were excluded from the study group. These patients were followed up for 2 years after fracture union. Outcome measurements were determined using the Performance Index by GUY *et al*, 1985 [5] with modifications considering the socioeconomic factors of Indian population.

Observation and Results
Demographic analysis
There were 30 male (81.1%) and 07(18.9%) female patients with an age range from 17 to 70 years (mean age, 37.7yrs). Motor vehicle (two wheeler) accident was the major cause seen in 20(54.1%) patients followed by sixteen patients (43.2%) who sustained the injury following fall. Right lower extremity was involved in 22(59.5%) patients and 15(40.5%) patients suffered injury to left lower limb. Majority of patients (59.4%) belonged to 21 to 40 years age group, predominantly males and motor vehicle accident being the commonest cause.

Pattern of ankle fractures

18(48.6%) patients had bimalleolar fracture, 13(35.2%) had monomalleolar and 6(16.2%) had trimalleolar fracture. Based on the Dennis- Weber classification, type-B was the most common (37.8%) fracture pattern. Based on Lauge and Hansen classification (29.7%) patients had supination external rotation injury, abduction injury (27%), pronation external rotation (24.3%), and least being adduction injuries (18.9%).

Types of fixation

The most common implants used in medial malleolus fractures were 4 mm cannulated lag screws (40.5%), whereas for lateral malleolus fractures, plates were the common choice (45.9%). Only six cases had posterior malleolus fracture. Posterior malleolar fragment involving more than or equal to 25% of articular surface were fixed and was seen in six patients. Cannulated screw was used in three cases (8.1%) and rests three were not fixed.

Complications

Out of 37 patients 32 patients had no complication (86.5%). 4 had malunion (10.8%), 1 patient had superficial infection which resolved with dressings and antibiotics. 6 patients had hardware related pain and irritation of which 4 patients had on medial side and 2 on lateral side.

Patient Outcomes

Using the Performance Index by GUY *et al*, 1985 (maximum 100 points), we note that 28(75.7%) patients had good outcome, followed by fair outcome in 5(13.5%), and in 4(10.8%) patients outcome being poor.

Effect of ankle fracture on squatting

Although in the present study poor outcome was seen only in 10.8% of the patients but there was inability to squat in all the cases at 6 months follow up. At the end of 1 year 15(40.5%) patients preferably avoided squatting due to incomplete dorsiflexion and discomfort; only 22(59.5%) patients had comfortable squatting. At final follow up 9(24.3%) patients were not able to squat; 10(27.1%) were able to squat but with discomfort and 18(48.7%) patients had returned to preinjury level of comfort with squatting.

Discussion

Ankle fractures commonly affect both the general as well as sports population of the community. Danis advocated accurate and rigid fixation to restore early joint motion; which allows cartilage regeneration and prevents early osteoarthrosis [7, 8]. Operative treatment for ankle fractures restores sufficient stability to allow full mobility at the ankle joint [4]. In this study almost 75% of patients achieved a 'good' outcome. This compares favourably with other studies reviewed, which reported 'good' to 'excellent' results in 53-87% of cases. These studies used different ankle scoring systems, so the results may not be directly comparable.

Beyond doubt operative fixation has been recommended as compared to non-operative intervention but problems faced following operative fixation have been less talked [16]. Day *et al.* showed that 36% of the operated patients had fair or poor outcome 10 years after injury [10] and Lash *et al.* concluded that patients can be expected to experience functional difficulties two years post-treatment [15]. Pain, stiffness and swelling were reported and 40% had problem when using stairs both one and three years after injury [1].

In the present study 19(51.4%) patients were not able to squat comfortably; only 18(48.7%) patients had returned to preinjury level of comfort with squatting at 2 years. Lim *et al* reported difficulty in squatting as the most common complaint in their study of 67 operatively treated ankle fractures [16].

In conclusion, operative treatment for ankle fractures results in overall good functional outcome post operatively but still haunts the patient in terms of physical limitations especially squatting which may have an social, occupational and emotional bearing on the affected Indian population. Increasing awareness of road safety measures among two wheelers may prevent ankle fractures among them.

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