OUTCOME OF SHORTENED INTERLOCKING NAIL IN DISTAL TIBIAL FRACTURES

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ABSTRACT
This study was undertaken to investigate the outcome of shortened interlocking nail in distal tibial fractures.Thirty five cases of distal tibial diaphyseal fractures were treated with shortened nail. All these cases were followed up for a peroid of nine months and data regarding, infection, union, delayed union, nonunion and malunion was recorded. In our study union occured in all patients(100%) mean union time was 4.5 months (range 3-6 months),none of the patient had nonunion after course of follow up. No patient developed any sort of infection. Malunion was recorded in2(5.7%) patients. Because of the high rate of union and low rate of infection and malunion, We consider shortened intramedullary interlocking nail as the best mode of treatment for distal tibial fractures

Keywords: Distal tibial fracture, shortened interlocking nailing, union, non-union, malunion, infection

INTRODUCTION
To treat a distal tibial fracture is still a challenging task for an orthopaedic surgeons . Considering its anatomy, it is commonly difficult to achieve and maintain reduction in these fractures. Reduction is even more difficult when a fibular fracture is also found at the same level as the tibia. This fracture pattern reflects a high-energy mechanism of trauma causing an increased angular and rotational instability, limb shortening and soft tissues injuries[1,2]Closed fractures of the tibial shaft traditionally have been treated with closed reduction and a cast. Since the late 1950s, open reduction and internal fixation (ORIF) was reserved for situations in which an adequate reduction could not be obtained or maintained by conservative means.[3]For Open reduction internal fixation extensive dissection is required which often results in tissue devitalisation, creating an environment less favourable for fracture union and more prone to bone infection and nonion.[4]Intramedullary interlocking nail is Gold standard for treatment of tibial diaphyseal fractures,as it is less invasive methods ,because of its sucess it's indications have been extended by using shortened nail developed to treat distal tibial fractures of the tibia.[5]

METHODS AND MATERIALS
This descriptive case series study was conducted at Lahore General Hospital and Surriya Azeem Hospital for the period of 2.5 years (Between 2012-2014). Through non-probability purposive sampling, 35 cases of distal tibial fractures were included. Demographic information of patients was obtained, Patients were explained about the risks and informed and written consent was taken. Through standard technique, intermedullary interlocking nailing was done by using a shortened nail(who's tip was cut to allow adequate locking in distal fragment, after tip is cut distance between tip and distal hole is 3mm and and distance between second locking hole from tip is 35mm) in all the thirty five patients, and each nail was statically locked with two screw proximally and three screws distally (two locking bolts were applied in mediolateral direction and one in Anteroposterior direction).Patients were followed regularly i.e on 1st ,15th , 30th post operative day then monthly untill uinon was achieved and data for union, Delayed union , nonunion, infection and malunion was recorded. This data was collected in a specially designed Performa. Data was analyzed by SPSS version 11.

RESULTS
The mean age of all patients was 30.82±8.87years. There were 25 (71.4%) male and 10 (28.6%) female patients. Most common mode of injury was road traffic accident 25(71.4%)fall from stairs 4 (11.4%) fall from height 4 (11.4%) sports injury2 (5,7%).

We observed that mostly cases presented with comminuted fractures 20(57.1%) and other with oblique fracture 7(20%) spiral fracture 5 (14.2%) transverse fracture 3(8.5%).Right leg was involved in 22 (62.8%) patients and left in 13 (37.2%) patients. Union union rate was 100% ,mean union time was 4.5 months (range

3-6 months) no patient developed delayed union or nonunion after course of follow-up. Infection was also observed in none of the patients. 2 (5.7%) patients had malalignment .Of the two patients, one patient had 3 degree valgus angulation and other had 5 degree valgus angulation.

DISCUSSION

Distal tibial fractures have the highest incidence of fractures second after the middle third.[6]Extra-articular fractures of the distal tibia account for 14.5% of all fractures of the distal third of thetibia.[7]As far as treatment of these fractures is concerned distal tibial metaphyseal fractures remain a significant challenge for orthopaedic surgeons.[8]

The problems associated with these fractures are due to the fact that distal third shaft and distal metaphysis of tibia are relatively less vascular. Since this area is having less soft coverage, even relatively low energy injuries can result in severe soft tissue damage and communition of the fracture. These fractures are usually associated with fractures of the lower third of fibula which need to be addressed separately to get well aligned ankle mortis.

Nearby ankle joint (being a hinged type), poses unique problem. Any malunion disturbs the normal biomechanics of the ankle and foot, thereby leading to arthritis of the ankle and foot joints. The aim of the treatment of the distal tibial fractures is to achieve union of the fracture in normal alignment and regaining the stable, mobile and painless ankle joint while avoiding the infection and other complications.[9]

This is the reason treatment of distal tibial fractures still remains controversal.some surgeon prefer minimal invasive plate osteosynthesis by using locking plate, some use external fixator whereas other prefer closed intramedullary interlocking nail by using shortened nail. interlocking nail is technically demanding in distal tibia.[10]

The small size of the distal fragment can make both maintaining the reduction and placing adequate distal locking fixation difficult, therefore Some authors have rrecomended to cut the distal tip off of traditional reamed nails to allow for more predictable placement of two locking screws in the distal fragment.[11]

In our study we also used shortened nail ,a nail whose tip was cut(distance between tip and distal hole is 3mm and and distance between second locking hole from tip is 35mm) to allow adequate locking screw for adequate stability of short distal fragment(after tip is cut distance between tip and distal hole is 3mm and and distance between second locking hole from tip is 35mm).it also had one additional locking screw hole for anteroposterior locking alongwith two holes for mediolateral locking to prevent malalignment in wide distal tibial metaphyseal region.

In this study, we included 35 patients with distal tibial fractures. The mean age of all patients was 30.82±8.87years. In one study by, Mahajan N, the mean age of patients presented with distal tibial fracture was 36years Most of the patients were in age group of 20-40 (70%) years.[12]

In our study, there were 25 (71.4%) male and 10 (28.6%) female patients. The male-to-female ration was 2.5:1. Results of one study coincide with distribution of gender in our study. Researchers found male to female ratio as 3:1.[13]

In our study we observed that mostly cases presented with comminuted fractures 20(57.1%) and other with oblique fracture 7(20%) spiral fracture 5 (14.2%) transverse fracture 3(8.5%).

In this study 33(94.2%) patient had good outcomes, whereas 2(5.7%) patient had Poor outcome due to loss of reduction. In our study, the incidence of malalignment was low, as weight bearing was restricted until radiographic union in all patients.

In this study union rate was 100% ,mean union time was 4.5 months (range 3-6 months)These results coincide to the results by Paraschou et al study, where all fractures united with a mean union time of 4.4 months(range 3-6 months)[10]

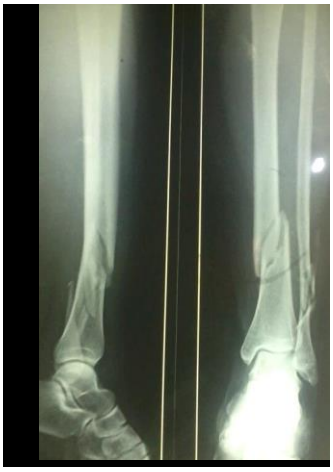
In our study 2 (5.7%) patients had malalignment. Of the two patients,one patient had 3 degree valgus angulation and other had 5 degree valgus angulation.In study by Robert et.al 2(7.4%) out of 27 patients had malalignment, one was in 6 degrees of extension and the other was in 6 degrees of valgus.

There was no single case with infection in our study group.[14]

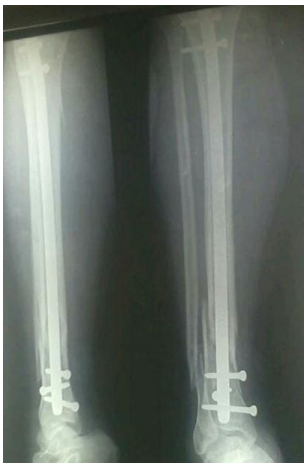
The results of our study, which are comparable to the results published in other series, reinforce our opinion that interlocking intramedullary nailing is an efficacious method of treatment for distal tibial fractures and nonunions, provided that there is no intra-articular fracture and incongruity. Good surgical technique is demanding, and close insertion of the nail, use of two distal screws gives stability and thus satisfactory functional outcome, high rate of union, and low incidence of complications.

CONCLUSION

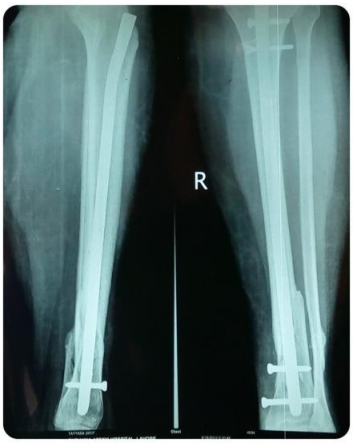
Intramedullary interlocking nailing by using a shortened nail is a reliable method of treatment for distal tibial fractures ,with a high rate of union and low complication rate.



Preoperative Radiograph



Postoperative Radiograph



Radiograph Showing union

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