



TO EVALUATE THE FUNCTIONAL & RADIOLOGICAL OUTCOME OF DISTAL THIRD TIBIA FRACTURES TREATED WITH INTRAMEDULLARY NAILING

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ABSTRACT

Distal tibial fractures are common fractures, representing 7-9% of lower extremity fractures. These fractures occur by high energy mechanism like road traffic accidents or by low energy mechanism such as rotational strain. Intramedullary nailing provides consistent union & early return to work. We performed this study to evaluate the functional outcome of distal tibia fractures managed with intramedullary nailing.

Type of study- Prospective & observational study.

Material & Methods: 30 cases of distal 1/3rd tibial fractures of OTA type A1,A2,A3 were treated using locked intramedullary nailing and were assessed for functional & radiological outcome by Johner & Wruhs criteria. studied from Jan. 2019 to April 2021 in Department of Orthopaedics, Sri Aurobindo Medical College & PGI, Indore.

Results: A Total of 30 patients with mean age of 40.90 ± 13.51 were included in the study in which male predominated females with high incidence due to RTA. Union was seen in all patients in a mean duration of 13.50 weeks (range 9 to 18 weeks). 24 patients (80%) had excellent and 6 patients (20%) had good & none of patient had poor outcome.

Conclusion: Distal 1/3rd tibia fractures managed with intramedullary nailing provides satisfactory fracture reduction, less damage to soft tissue integrity & allows early mobilisation & excellent to good functional outcome

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INTRODUCTION

The distal tibia diaphyseal & metaphyseal fractures are very common resulting of road traffic accidents. The tibial diaphyseal fractures are remarkably common fractures. They are also prone to complications specifically the extra articular distal tibial fractures. The distal tibia part lacks any muscle attachment and has not enough soft tissue coverage. The wide medullary canal predisposes the malalignment in the coronal plane^[1]. The contiguity of ankle joint causes the rotational malalignment at the time of fracture fixation. The tibia fracture osteosynthesis is recommended by many authors due to higher union and low infection rates. However the most suitable method to fix the distal tibial fracture is still in debate.^[2] The aim was to evaluate the functional & radiological outcome of distal tibial fractures with Intramedullary Nailing.

MATERIAL & METHODS

The study was conducted at our centre from January 2019 to April 2021 in 30 patients distal 1/3rd tibia fracture treated by intramedullary nailing. The study was approved by the institutional ethical review committee & written informed consent was obtained from all the participants. All the patients with extraarticular distal tibia fractures from 4 cm to 12 cm above the tibial plafond, both close and open fractures were included in the study.

Paediatric patients & distal tibia intra articular Fractures, fracture associated with neurovascular injury, pathological fracture were excluded from the study.

Standard AP and lateral views were taken after stabilizing the patient haemo-dynamically and primary care, patients were assessed radiologically. The fractured leg was initially immobilized with above-knee slab and elevated over Bohler-Braun splint to reduce or prevent the swelling. Preoperative investigations were done and fitness for surgery was obtained. All patients were operated over a tibial post under spinal anesthesia under the guidance of the image intensifier, closed reduction was done & centralisation of guide wire distally was achieved by using k-wire or polar screw. fracture reduction done and nail interlocked with screws.

Post-operatively, the patients were mobilized with knee range of motion from day one. Initially, partial weight-bearing was started which gradually progressed to full weight-bearing as per the pain tolerance. Functional outcome was assessed by Johner & Wruhs criteria^[3] and pain, walking capacity, The Chi-Square test was used to calculate the statistical significance and a probability value of <0.05 was considered significant.

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Pre op x ray



Immediate post op x ray



1 months follow up



3 months follow up



6 months follow up



12 months follow up



RESULT

30 patients with distal 1/3rd tibia fracture treated with intramedullary nailing were included in the study. None of patient were lost to follow-up & all the 30 patients were available for assessment at final follow-up. The mean age of the patients was 40.90 ± 13.51 (range 24 to 65 years). 23 were male and 7 were female. 17 patients sustained an injury on the right side whereas 13 patients had an injury on the left side. The most common mode of injury was road traffic accident as seen in 25 patients whereas 5 had an injury due to fall of heavy object. OTA type A1,A2,A3 was seen in 18, 8, and 4 patients respectively in which 25 patients had closed & 5 had open fracture.

Union was seen in all patients in a mean duration of 13.50 weeks (range 9 to 18 weeks). At the final follow-up, 24 (80%)

patients had excellent outcomes, 6 (20%) patients had a good outcome and none of the patients in our series had poor outcome.

Complications seen were ankle stiffness in one case and anterior knee pain in one case, & superficial wound infection in 2 patients. Which were managed by physiotherapy and conservative treatment by regular dressing, respectively.

DISCUSSION

This study included 30 patients who were admitted to the orthopedic ward of Sri Aurobindo Medical College. This group of 30 patients consists of male and females patients in the age group of 24-65 years were included in the study. In our study; the fractures were metadiaphyseal and diaphyseal fractures of distal tibial region treated with intramedullary interlocking nail

Age incidence

In the series, the average age of the patients was 40.90 ± 13.51 years (range 24-65 years). Ravishankar j have reported mean age 36.7 (range 31-40 years)^[4]. George CB *et al* also reported similar mean age (range 17-85 years)^[5]. Haydar AJ *et al* and Vallier *et al* both reported the mean age of 38 years in their series^[6,7]. In the study of Krishna *et al* mean age was 35 years^[8], Tibial fractures in the distal third region were seen in the younger population as they are active physically and were engaged in various outdoor activities resulting in high velocity injuries.

Sex Incidence

In our series males predominated females. There were 23 male patients (76.7%) and 7 female patients (23.3%). The incidence of males is higher due to more outdoor activities; while women majorly confine themselves to domestic activities. Court Brown *et al.* (1990) observed the male incidences to be around 81.3 % while the female incidence to be around 18.7%^[9].

Mode of Injury

In our study we have found that majority of distal tibial fractures caused due to road traffic accidents (25 patients). In majority of patients they involved patients who were the moderest while remaining patients tended to be pedestrians or motor vehicle occupants. The incidence of fracture due to road traffic accident seemed to be higher in our series (83.3%), followed by fall of heavy object. Our series results can be attributed to poor road traffic sense and poor qualities of roads leading to higher accidents.

Type of fracture

In our series sub type type A1 fractures were the commonest according to O.T.A classification. They constituted (60%) 18 patients in which 16 were closed and 2 were open .8 patients had type A2 fracture (5 closed & 3 open) and 4 cases of type A3 fracture in which all are of closed type. type A fractures are unifocal fractures which is comparable to the series of Court Brown *et al.* (1995)^[10] who found the type A accounted for 54% of all tibial fractures.

Associated fibula involvement

In our series fibula fracture was involved in 20 (66.7%) cases in which 12 patients with type A1 OTA, 5 patients with type

A2 OTA and 3 patients in type A3 has associated fibula involvement.

Fracture union

In our study the mean fracture union time was 15 weeks which is comparable to the study of johan APAC (2012) with 18.5 weeks^[11], Mohhamed AA (2016) with 15.74 weeks^[12].

Functional Outcome

Final assessment in our series was done at 12 months using johner & wruhs criteria taking into account the presence of varus / valgus, anteverision/ recurvatum, rotation, shortening over affected leg, range of motion at the knee, ankle and subtalar joints, radiographic alignment, any other deformity, shortening and presence of radiological union, any post operative neurovascular disturbances and complications like non union, osteomyelitis were evaluated . Functional outcome was graded into excellent, good, fair and poor. In our study 24 cases (80%) were graded as excellent and 6 cases (20%) as good cases with no fair and no poor cases. Klemm *et al.*^[13] (1986) reported in a study 62.50% excellent, 31.8% good, 4.5% fair and 1.2% poor result. Arne Ekeland *et al.*^[14] (1988) reported 64.4% excellent, 28.8% good and 4.4% cases as fair. The study shows that tibia intramedullary nailing gives good results in distal third tibial fractures. Acceptable alignment and range of motion can be achieved. Fibular fixation needs to be done only in patients with syndesmotic disruption. Other patients can be treated with interlocking nailing alone. Some cases because of associated injuries and comorbid condition ended with complications like ankle stiffness and infection. But still, we were able to achieve union in all the cases.

CONCLUSION

Distal tibial fractures are common seen in young population majorly due to road traffic accidents. The intramedullary nailing combines control of length, alignment and rotation and preserves periosteal vascularity which lowers the rate of infection and malunion. Patients operated with this technique can be ambulated early and they can resume work as early as tolerated and this procedure reduces hospital stay and boosts up the morale of the patient. The method of intramedullary interlocking nail is ideal for fractures of the distal tibia.

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