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Analysis of cases of distal tibial fracture managed with MIPPO technique

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Abstract
Background: Fracture of this bone is challenge for orthopedic surgeon as there is less muscular covering the bone. This leads to complications such as non- union, delayed union or dehiscence. The present study was conducted to assess the cases of distal tibial fractures in study population.
Materials & Methods: The present study was conducted on 128 cases of both genders reported to the department. All cases were managed with minimally invasive percutaneous plate osteosynthesis (MIPPO). All were recalled regularly. Routine X-rays were taken such as AP view and lateral view to see outcome of the treatment. American orthopedics foot and ankle score (AOFAS) ankle-hind foot scale was used for assessing the results. Scores such as excellent (90-100), good (75-89), fair (50-74) and poor <50 was considered.
Results: Out of 128 cases, males were 68 and females were 60. The difference was non- significant (P-1). The mean value of movements such as dorsiflexion was 18.2°, plantar flexion was 48.6°, inversion was 17.2°, eversion was 16.8°. Mean union time of fractures was 18.4 weeks and follow up period was 10.4 months. Among various causes, road side accident (RSA) was seen in 112, fall from height in 30 and sports injury in 26 cases. The difference was significant (P<0.05). AOFA score was excellent in 60 males and 52 females, good in 4 males and 6 females, fair in 4 males and 1 female and poor in 1 females. The difference was significant (P<0.05).
Conclusion: MIPPO is one of the effective and efficient management for distal tibial fracture. Road side accident was the main reason for fracture.

Keywords: Distal tibial fracture, MIPPO, road side accident

Introduction
Tibia is a long bone present in leg. Fracture of this bone is challenge for orthopedic surgeon as there is less muscular covering the bone. This leads to complications such as non- union, delayed union or dehiscence. Among various reasons for fracture of tibia, road side accident (RSA) is common one. Other causes are sports or falls from height. In today's fast growing life, the living standard has changed. In young adults, fracture which is common in this age group, soft tissue injury is quite common as there are chances of open fracture [1].
AO Muller [2] classified distal tibia fractures as distal tibial metaphyseal injuries without intra-articular extension which can be simple, wedge and complex fracture. It can be partial articular fractures which are further classified as puresplit split with depression, depression with multiple fragments. Fracture involves the entire joint surface which involves simple split in the articular surface and the metaphysic, articular split that is simple with a metaphysis split that is multi fragmentary, fracture with multiple fragments of the articular surface and the metaphysic.
There are different treatment modalities for distal tibial fractures. External fixation, intramedullary (IM) nailing and plate osteosynthesis are commonly employed for distal tibial fractures. Minimally invasive percutaneous plate osteosynthesis (MIPPO), applied by indirect reduction has been a successful treatment method in cases of lower extremity complex fracture.
Minimally invasive percutaneous plate osteosynthesis is a surgical technique in which percutaneously inserted plate is fixed at a distance proximal and distal to the fracture site through minimal exposure and also blood supply to the fractured fragments is maximally preserved. It aims at flexible elastic fixation to initiate spontaneous healing including induction of callus formation [3]. The present study was conducted to assess the cases of distal tibial fractures in study population.

Materials & Methods

The present study was conducted in the department of Orthopedics. It comprised of 128 cases of both genders reported to the department. All cases were managed with minimally invasive percutaneous plate osteosynthesis (MIPPO). All patients were informed regarding the study and written consent was obtained. Ethical clearance was taken prior to the study.

General information such as name, age, gender etc. was recorded. Patients were treated with MIPPO technique and all were recalled regularly. Routine X- rays were taken such as AP view and lateral view to see outcome of the treatment.

American orthopedics foot and ankle score (AOFAS) ankle-hind foot scale was used for assessing the results. Scores such as excellent (90-100), good (75-89), fair (50-74) and poor <50 was considered. Results thus obtained were subjected to statistical analysis using chi-square test. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of cases

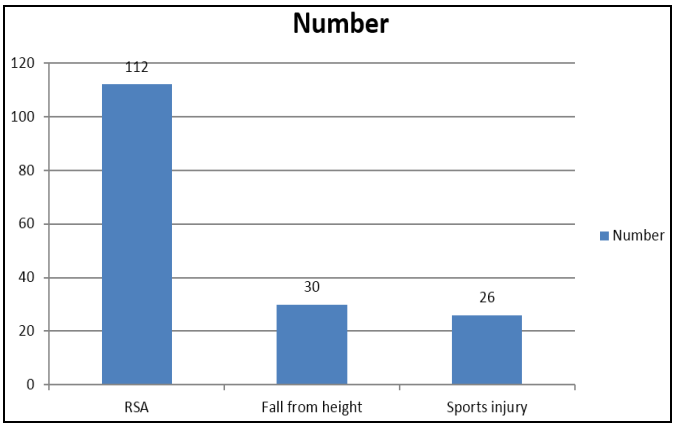
Total- 128		
Males	**Females**	**P value**
68	60	1

Table I shows that out of 128 cases, males were 68 and females were 60. The difference was non- significant (P-1).

Table 2: Parameters in the study

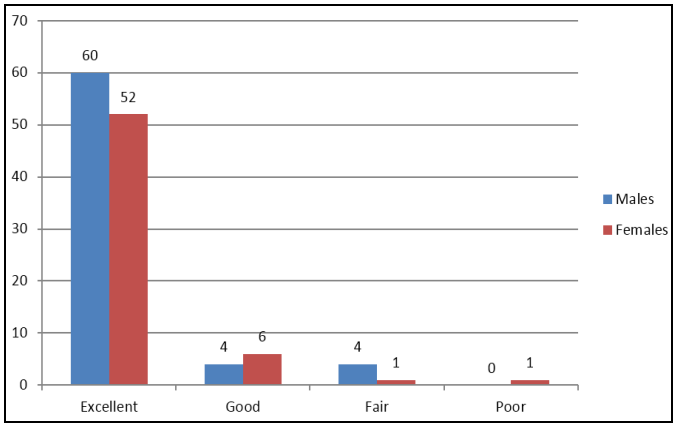
Parameters	Value (Mean)
Dorsiflexion	18.2°
Plantar flexion	48.6°
Inversion	17.2°
Eversion	16.8°
Union time	18.4 weeks
Follow up	10.4 months

Table II shows that mean value of movements such as dorsiflexion was 18.2°, plantar flexion was 48.6°, inversion was 17.2°, eversion was 16.8°. Mean union time of fractures was 18.4 weeks and follow up period was 10.4 months.



Graph 1: Reason of fracture

Graph I shows that among various causes, road side accident (RSA) was seen in 112, fall from height in 30 and sports injury in 26 cases. The difference was significant (P<0.05).



Graph 2: American orthopedics foot and ankle score (AOFAS)

Graph II shows that AOFA score was excellent in 60 males and 52 females, good in 4 males and 6 females, fair in 4 males and 1 female and poor in 1 females. The difference was significant (P<0.05).

Discussion

Distal tibial fractures are common in young adults. The reason is the less muscular coverage of the bone along with poor vascularity. Various treatment modalities have been suggested. Biological plate osteosynthesis is important in bone vascularization. It also aids in decrease infection rate and to improve consolidation [4].

In present study, the cases of distal tibial fractures were analyzed. We out of 128 cases, males were 68 and females were 60. All the patients were recalled to see the treatment outcome. Movements were recorded. The mean value of dorsiflexion was 18.2°, plantar flexion was 48.6°, inversion was 17.2°, eversion was 16.8°. Mean union time of fractures was 18.4 weeks and follow up period was 10.4 months. This is in agreement with Ravindran *et al.* [5]

MIPPO technique avoids direct exposure of the fracture site and transforms the implants in an internal extramedullary splint. Furthermore, MIPPO was successfully extended to complex tibial fractures, being actually indicated in all long bones complex fractures that are not suitable for intramedullary osteosynthesis [6]. In present study we observed that among various causes, road side accident (RSA) was seen in 112, fall from height in 30 and sports injury in 26 cases.

We also assessed the AOFA score in all patients. It was excellent in 60 males and 52 females, good in 4 males and 6 females, fair in 4 males and 1 female and poor in 1 females. This is in agreement with Sirbu *et al.* [7] Chandrakant *et al.* [8], in their study operated 32 patients of distal tibia fractures with MIPPO technique. These fractures were classified according to AO classification. AOFA score was 94.4. There were complications like infection in 2 cases, plate bending in 1 and plate irritation in 1patient.

The preconditions for internal fixation by MIPPO are indirect closed reduction without exposure of the fracture, small incision for inserting the implants, self-drilling and self-tapping locking head screws for mono or bicortical insertion. Anil Taskesen *et al.* [9] in their study of 46 patients found that the mean age of patients was 40.3 years. 27 cases were treated with MIPPO and 19 with IMN technique. Full bony union time was 15±12.7 weeks in MIPPO and 16±11.3 weeks in IMN group. However, secondary surgical intervention was performed in two patients (7.4%) of MIPPO group for severe wound dehiscence.

Indications for internal fixation by MIPPO are as multifragmentary fractures in the metaphysic, simple fractures in the diaphysis and metaphyseal regions and low grade open fracture.

Mippo has several advantages which include no need of extensive surgical exposure, improved rates of fracture union, decreased infection rate, decreased need for bone grafting, early mobilization of extremity possible, ideal technique for dealing with multiple injuries, decreased incidence of refracture after plate removal, decrease use of bone grafting. It minimizes extraosseous blood supply than open plating [10].

Arup *et al*. [11] in their study, included 42 patients, 21 underwent IMLN and 21 were treated with MIPPO. In IMLN group, average union time was 18.26 weeks and in MIPPO was 21.70 weeks. American Orthopedic Foot and Ankle Society score was 96.67. Average time required for partial and full weight bearing in the nailing group was 4.95 weeks and 10.09 weeks respectively as compared to 6.90 weeks and 13.38 weeks in the plating group. Lesser complications in terms of implant irritation, ankle stiffness, and infection, were seen in interlocking group as compared to plating group. Distal tibial fracture poses challenge and MIPPO has been proved beneficial in managing cases. We did not find any complication in our study. So MIPPO results were useful in present study.

Conclusion

MIPPO is one of the effective and efficient management for distal tibial fracture. Road side accident was the main reason for fracture.

References

1. Paluvadi SV, Lal H, Mittal D, Vidyarthi K. Management of fractures of the distal third tibia by minimally invasive plate osteosynthesis–A prospective series of 50 patients. Journal of Clinical Orthopaedics and Trauma. 2014; 5(3):129-36.
2. AO Muller, Beals RK. Fractures of the tibial plafond. J Bone Joint Surg Am. 1986; 68(4):543-51.
3. Kneifel T, Buckley R. A comparison of one versus two distal locking screws in tibial fractures treated with unreamed tibial nails: a prospective randomized clinical trial. Injury. 1996; 27:271-3.
4. Watson JT, Moed BR, Karges DE, Cramer KE. Pilon fractures. Treatment protocol based on severity of soft tissue injury. Clin Orthop Relat Res. 2000; 375:78-90.
5. Ravindran S. Prospective Study of Management of Distal Tibia Fracture with Locking Compression Plate Using Minimally Invasive Percutaneous Plate Osteosynthesis Technique. Journal of Dental and Medical Sciences. 2011; 15:63-87.
6. Martin J, Marsh JL, Nepola JV, Dirschl DR, Hurwitz S, De Coster TA. Radiographic fracture assessments: which ones can we reliably make? Journal of Orthopaedic Trauma. 2000; 14(6):379-85.
7. Sirbu, Reudi TP, Allgower M. The operative treatment of intra-articular fractures of the lower end of the tibia. Clin Orthop Relat Ras. 1979; 138:105-10.
8. Chandrakant H, Yokoyama K, Shindo M, Itoman M. Problems of various fixation methods for open tibia fractures: experience in a Japaneselevel I trauma center. Am J Orthop. 1998; 27:631-6.
9. Anil Taskesan, Othman M, Strzelczyk P. Results of conservative treatment of “pilon” fractures. Ortop Traumatol Rehabil. 2003; 5:787-94.
10. Ronga M, Longo UG, Maffulli N. Minimally invasive locked plating of distal tibia fractures is safe and effective. Clin Orthop Relat Res. 2010; 468(4):975-982.
11. Anup Redfern DJ, Syed SU, Davies SJ. Fractures of the distal tibia: Minimally invasive plate osteosynthesis. Injury. 2004; 35(6):615-620.