

Comparison of Surgical Management of Extra Articular Distal Tibial Fractures with Closed Interlock Nailing and Minimal Invasive Percutaneous Plate Osteosynthesis

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ABSTRACT

Introduction: In distal tibia extra articular fractures plating has advantage of better reduction and malunion but can cause infection and wound healing problems. Interlock nailing has knee pain complication but less infection and wound healing problems. So we decided to carry out prospective cohort study to compare the results of interlock nailing and minimal invasive percutaneous plating osteosynthesis (MIPPO).

Materials and Methods: There were 25 patients in MIPPO group and 26 in intramedullary interlock nailing group. We used poller screw to obtain good placement of interlock nail, which were removed after fixation. Patients were followed upto 1 month, 3 months and 6 months.

Results: There were 20 males in interlock nailing group and 21 in MIPPO group. There was no statistical difference regards to operative time, pain, union time, malunion, non-union, delayed union, infection or resurgery. Hospital stay was less in interlock nailing group and was statistically significant.

Conclusion: There is shorter duration of hospital stay in distal tibia extra articular fractures treated by interlock nailing as

compared to MIPPO, however both interlock nailing and MIPPO are equally effective and safe to treat distal tibia extra articular fracture.

Keywords: Extraarticular Distal Tibial Fractures, MIPPO, Interlock Nailing.

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Article History:

Received: 25-08-2017, Revised: 28-09-2017, Accepted: 17-10-2017

Access this article online	
Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2017.3.6.012	

INTRODUCTION

With the increasing incidence of road traffic accidents distal tibia fractures incidence is also increasing. Distal tibia has precarious blood supply and hence usually preferred methods of fixation when fracture is extra articular are either minimally invasive percutaneous plate osteosynthesis (MIPPO) or Interlock nailing (ILN) and open reduction is usually avoided.^{1,2} Plating is said to have advantage of better reduction and less malunion as even smaller fragments can be fixed and is without knee pain complication seen, with interlock nail insertion. However plating can cause superficial or deep infection and wound healing problems.³ We therefore divided to carry out study to compare results of MIPPO versus ILN (Interlocking nail). Our hypothesis was that patients treated with MIPPO had poor outcome as compared to ILN.

MATERIALS AND METHODS

We carried out prospective cohort study at MIMER Medical College Talegaon Dabhade from June 2015 to May 2017. Patients with extraarticular distal tibia fracture who presented to casualty

were included for study after obtaining written consent from them. We had obtained ethical committee approval from MIMER Medical College Talegaon Dabhade.

Our exclusion criteria were patients with age < 18 years, intraarticular extension of fracture, pathological fractures, fractures more than 3 weeks old, as neither MIPPO nor closed ILN is possible in these. There were 25 patients in MIPPO group and 26 patients in ILN group. After x ray patients were given pain killer injection and above knee slab for 3-5 days before they were taken for surgery to get time for swelling to decrease and obtain fitness for surgery till then additionally they were given oral NSAIDS and limb elevation on Bohler Braun Splint till they were taken for Surgery. Operative technique for interlocking nailing was as described elsewhere. We did Patellar tendon splitting approach for making entry point for nail insertion. We used poller screws as a tool to obtain good placement of interlocking nail wherever needed distally. However screws were removed after insertion of at least two distal locking screws under C arm guidance. Technique of MIPPO was also as described elsewhere. Medially transverse

incision was taken 1 inch proximal to fracture for insertion of locking compression plate 4.5mm for distal tibia. Reduction was checked under C arm guidance prior to insertion of plate. Indirect reduction was obtained and plate was put in submuscular plane to avoid injury to periosteum pressure haematoma.

Postoperative x rays were taken on 2nd or 3rd postoperative days. Patients were given IV antibiotics for 2 days and later oral antibiotics were given. Limb elevation was given for 2 days. Suture removal was done after 12-14 days. Oral antibiotics and analgesics were given till suture removal. Partial weight bearing with crutches was allowed. Patients were followed up at 1 month, 3 month, 6 months and X ray were taken at followup. Accordingly

further management was done including physiotherapy. Following observations were recorded:

1. Operating time
2. Pain at operative site
3. Healing time (weeks)
4. Hospital stay (days)
5. Infection
6. Malunion (varus/valgus >5 degree, antero posterior angulation >10 degree, Rotation > 10 degree, shortening > 1 cm)
7. Non union/ delayed union
8. Resurgery (including implant removal)

Table 1: Mean age and sex distribution

		ILN	MIPPO
Sex	M	20	21
	F	6	4
Total		26	25
Mean Age		32.1	29.7

Chart 1: Mean age and sex distribution

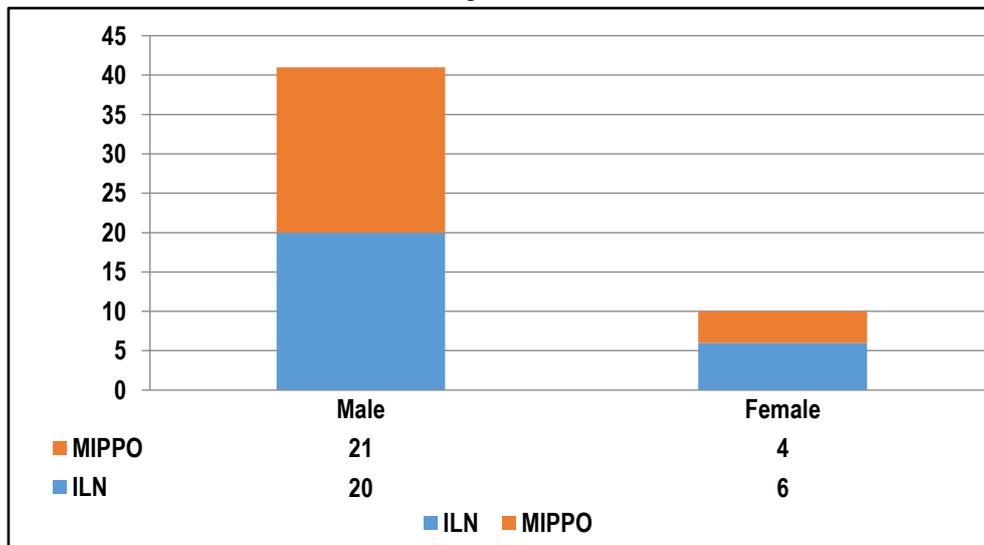


Chart 2: Comparison of results of various factors between ILN and MIPPO (in percentage)

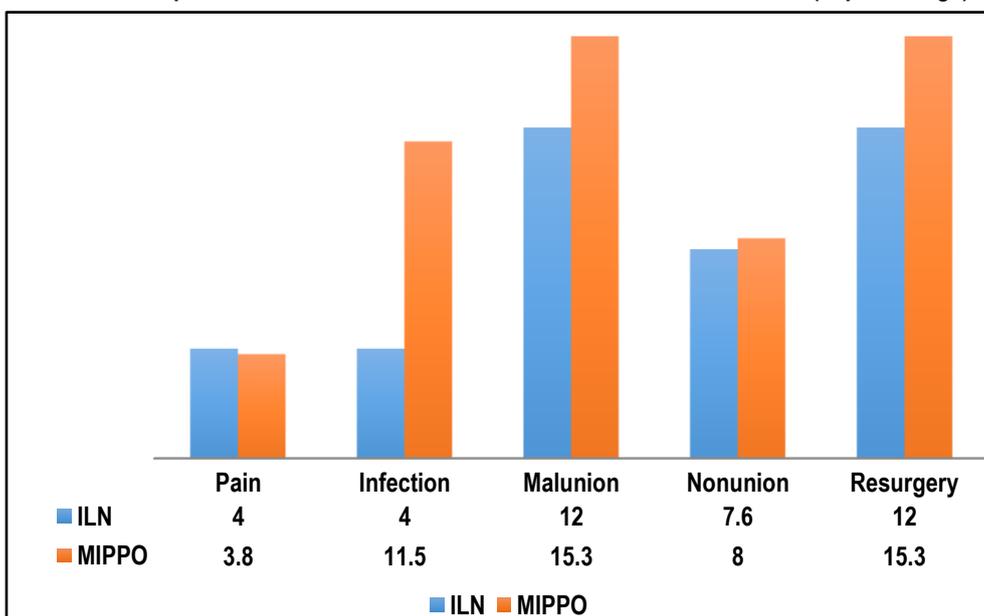


Table 2: Comparison of results of various factors between ILN and MIPPO

	ILN	MIPPO	P value
Operative Time (min)	97.9 +/- 8.8	95.04 +/- 7.4	0.83
Pain	4%	3.8%	0.5%
Union Time (weeks)	21.4 +/- 4.3	19.5 +/- 4.8	0.64
Hospital stay (Days)	5.12 +/- 0.8	9.90 +/- 2.6	0.0001
Infection	4%	11.5%	0.15%
Malunion	12%	15.3%	0.36%
Non union/Delayed union	7.6%	8%	0.52%
Resurgery	12%	15.3%	0.36%

RESULTS

There was no statistical difference as regards operative time, union time, malunion, pain, non-union/delayed union, infection or reoperation only. Hospital stay was less in ILN group and was statistically significant.

DISCUSSION

MIPPO and ILN both preserve extrosseus blood supply and allows load bearing without soft tissue injury and therefore it is difficult to say which technique is better. MIPPO has claimed theoretically to avoid malunion as compared to interlock nailing but in our study there was no significant difference due to use of poller screws intraoperatively and multidirectional screw insertion in ILN.⁴ Pain is said to be more in ILN at entry point of nail.^{5,6} But in our study pain at operative site was not statistically significant as pain does exist even in MIPPO due to plate irritation.⁷ Also we use to prepare size of nail length and minimised soft tissue damage during insertion of nail. Plating is said to be associated with increased incidence of infection and there were few patients with infection in our study group.⁸⁻¹⁰ The difference was not statistically significant however we suggest that with soft tissue problems like thin skin and diabetics etc plating should be used cautiously.

MIPPO has been claimed in literature to give stronger fixation and thus less incidence of delayed or non-union.⁸ But there was significant difference in our study. Probably this can be explained by better interlocking technique like polar screws and multidirectional screws. Theoretically incidence of fat embolism is there in ILN group but was not seen in study. There was no significant difference between two groups as regards operative time, union time, reoperation etc and hence both techniques give good results clinicoradiologically. Only significant difference between two groups was as regards duration of hospital stay which was less in interlocking nail group. However to recommend one technique over the other based on this observation is not justified. Limitation of this study is small sample size and short follow up Long term complications like ankle arthritis or delayed infection could not be studied at all.

CONCLUSION

From our results we can say that there is shorter duration of hospital stay in distal extra articular tibia fractures treated by intramedullary nailing as compared to MIPPO technique. Hence hospital treatment cost could be less which is important in our country. However both ILN and MIPPO are equally effective and safe techniques to treat distal tibia extra articular fractures as complication rates are similar if technique such as polar screws

and multidirectional screws are used. Surgeons and patient preference and condition could be the guiding factors.

REFERENCES

1. ImGI, Tae SK. Distal metaphyseal fracture of tibia: a prospective randomized trial of closed reduction and intra medullary nail versus open reduction and plate and screws fixations. *J Trauma* 2005; 59: 1219 - 1223.
2. Jansson KW, Biert J, Vau Kampen A. Treatment of distal tibial fractures: plate vs nail: a retrospective outcome analysis of matched pairs of patients. *Int Orthop*. 2007;31:709-714.
3. Borg T, Larsson S, Lindsjov. Percutaneous plating of distal tibial fractures. preliminary results in 21 patients. *Injury*.2004;35:608-614.
4. Liy, Liu, Tang X, Pei F, Wang G, Fang Y, Zhang H, Crook N. Comparison of low, multidirectional locked nailing and plating in the treatment distal metadiaphyseal fractures. *IntOrthop*2012;36:1457-62.
5. Toivanen JA et al. Anterior knee pain after intramedullary nailing of fractures of the tibial shaft. A Prospective, randomized study comparing two different nail insertion techniques. *J Bone Joint surg AM* 2002; 84-A:580-585.
6. Keating JF, OrfalyR, O'Brien PJ. Knee pain after tibia nailing. *J orthop trauma*.1997;11:10-13.
7. Busam ML, Es ther RJ, Obremsky WT. Hardware removal: indications and expectations. *J AmAcadorthop.surg*.2006;14:113-120.
8. Bahari S, Lenehan B, Khan H, Mc Elwain JP. Minimally invasive percutaneous plate fixation of distal tibia fractures. *Acta orthop Belg*.2007;73:635-640.
9. Lau TW, Leung F, Chon CF, Chow sp. Wound complication of minimally invasive plate osteosynthesis in distal tibia fractures. *Int Orthop*.2008;32:697-703.
10. Maffuli N, Toms AD, Mc Murtie A, ol.ya F. Percutaneous plating of distal tibia fractures. *Int Orthop*.2004;28:159-162

Source of Support: Nil. **Conflict of Interest:** None Declared.

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Cite this article as: Santosh Shridhar Borkar, Shivraj Satish Konde, Rahul Patil, Sidheshwar Thosar, Nitinkumar Kanode. Comparison of Surgical Management of Extra Articular Distal Tibial Fractures with Closed Interlock Nailing and Minimal Invasive Percutaneous Plate Osteosynthesis. *Int J Med Res Prof*. 2017 Nov; 3(6):60-62. DOI:10.21276/ijmrp.2017.3.6.012