Original Research Paper

Volume - 10 | Issue - 10 | October - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Orthopaedics

RESULTS OF TIBIA-INTERLOCKING NAILING IN MID-SHAFT TIBIA FRACTURES IN ADULTS

Dr. Mansi J. Patel* Senior Resident, Department of Orthopaedics, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat , India. *Corresponding Author

Dr. Ishani D. Patel Assistant Professor, Department of Orthopaedics, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat , India.

Dr. Dhaval R. Modi Professor and Head of the Department, Department of Orthopaedics, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat , India.

ABSTRACT **Aims and objectives:** The objective of this study was to find the outcome of interlocking nail in fracture tibia. **Materials and Methods:** This study was conducted in the Department of Orthopaedic Surgery in our institute from December 2017 to December 2019 for 35 patients of mid-shaft tiba fracture in adults. The clinical results of our study were rated on the basis of the criteria of union, nonunion, delayed union, or malunion. All patients were operated under general or spinal anesthesia. All patients were followed for 9 months. **Results:** Nearly 86.33% patients had union in 90–150 days with a mean of 110.68. Union was achieved in 10.07% patients in 95–109 days with a mean of 103.38. About 9.35% had delayed unions and 4.31% had non-union which were treated with dynamization and bone graft. The results were excellent in 86.33% and good in 9.35% patients. All of our patients had full range of motion of their knees and ankles. **Conclusion:** This technique is advantageous because of early mobilization (early weight-bearing) and less complication with good results and is economical.

KEYWORDS : Closed , interlocking nail, dynamization, tibial shaft fractures, union

INTRODUCTION

Tibia is the most commonly fractured long bone in the body. The annual incidence of tibial shaft fractures is 2/1000 individuals.[1] The complications of the non-operative treatment of displaced tibial shaft fractures that are the result of high-energy forces are associated with a high prevalence of malunion, stiffness of the joint, and poor functional outcome.[2] Closed displaced tibial shaft fractures have been internally fixed with plates or with intramedullary fixation devices such as centromedullary nails (K-nails and V-nails), interlocking intramedullary nails (reamed or unreamed), or multiple flexible intramedullary pins, for example, Ender nails.[3],[4] Intramedullary interlocking (IMIL) tibial nailing is considered the best modality of treatment of diaphyseal tibial fractures.[5],[6],[7] It has a biological and biomechanical advantage over plate osteosynthesis.[8] Various studies regarding the safety and effectiveness of closed IMIL nailing have been done.[7],[9],[10],[11] The C-arm image intensifier is generally used for closed reduction, closed nailing, and locking bolts proximally and distally.[4] The objective of this prospective study is to achieve the ultimate goal of fracture union and early rehabilitation, short hospitalization, and good fracture healing response.

MATERIALS AND METHODS

This prospective study was carried out at our institute from December 2017 to December 2019 in 35 adult patients of tibial shaft fracture.

Patients with closed tibial fracture with age more than 18 years, patients who presented within a week of the injury and patients who did not have any previous surgical treatment for the fracture were included in the study. Malnourished patients and those with open fractures, pathological fractures, and fracture nonunion were excluded from the study.

Examination of patients was done thoroughly at the time of admission to exclude other injuries. In majority of the patients, closed reamed interlocking nailing of the tibia was performed within the 2ndth–10th days of injury. In patients who were not fit for surgery due to associated injuries to vital organs, were hemodynamically unstable or due to active infection at injury site, or were pyrexial, delayed interlocking nailing was performed when their overall condition improved.

The patients were placed supine on a fracture table and general or spinal anaesthesia was given. The tibia was approached with the midline patellar incision which extends from the lower pole of the patella to just 1 cm distal to the tibial tuberosity. The entry point was made after retracting the patellar tendon in line with medial half of tibial tuberosity about 1.5–2 cm distal to the joint line.

After the entry point was connected to the medullary canal, a guidewire was passed. The fracture was reduced by longitudinal traction and manipulation under image intensification. After reduction, the guidewire was passed in the distal fragment and centered in anteroposterior and lateral projections. After sequentially incremental reaming, the guidewire was exchanged and appropriately sized nail inserted. Proximal locking was done by means of the jig, the fracture was impacted, and distal locking was done by freehand technique. All patients were followed for a minimum of 9 months. Wound was closed in standard manner, and antiseptic dressing was done. Rehabilitation such as touch-down weight-bearing was started on the 2nd postoperative day, and sutures were removed on the 14th post.operative day. These patients were assessed clinically and radiologically for union timing at 9 months following surgery.

Patients were assessed for delayed union (more than 4–6 weeks postoperative) and nonunion (9 months following surgery). Statically analysis was limited to calculation of percentage of patients who had unions, malunions, delayed unions, or nonunions and excellent, good, and poor outcomes. Functional outcomes were evaluated according to the Johner and Wruhs criteria.[12]

They were followed up after surgery and were clinically and radiologically assessed for fracture healing, joint movements, and implant failure. According to the criteria, the results are graded as excellent when the fractures unite within 16 weeks without any complication, good when union occurs within 24 weeks with treatable complications such as superficial infection and knee/ankle stiffness, and poor when union occurs before or after 24 weeks with one or more permanent complications such as infection (osteomyelitis), implant failure, nonunion, limb shortening, and permanent knee/ankle stiffness. Delayed union was recorded when the fracture united between 3 and 6 months while nonunion was noted when union had not occurred after 8 months of treatment. Follow-up was done.

Pre-operative radiograph

Post-operative radiograph

DISCUSSION AND RESULTS

There were 35 patients in this study, 79.13% patients were male, and 20.86% patients were female. About 64.74% patients had tibial fractures at middle one-third, 19.42% at proximal one-third, and 15.82% at distal one-third.

The clinical results of our study were rated on the basis of the criteria of union, nonunion,[13] delayed union, or malunion. The patients were followed according to their clinical status. Almost 86.33% patients had union in 90–150 days with a mean of 110.68. Union was achieved in 10.07% patients in 95–109 days with a mean of 103.38 .

Rehabilitation: We allowed our patients to start touch-down walking with crutches on the 2nd day of operation as they feel comfortable. All patients, started partial weight-bearing on the 6th week and full weight-bearing on the 12th week. All of our patients had a full range of motion of their knees and ankles. About 4.31% patients complained postoperative knee pain, which was spontaneously resolved in 2 week. 15.10% patients needed dynamization within 6 weeks because of obvious gap at the fracture site in subsequent radiographs. This was due to over distraction of fracture during operation. They were dynamized before starting partial weight-bearing. The screw of less critical stability was determined (the screw which was away from the fracture) and it was removed in local anesthesia. There were 9.35% delayed unions which were treated by dynamization. In our study, only 4.31% of our patients were labeled as non-union and were treated by bone graft and dynamization. The results were excellent in 86.33% , good in 9.35% , and poor in 4.31% patients.

CONCLUSION

Closed interlocking nailing in tibial shaft fracture allows earlier weight-bearing leading to earlier fracture union with less morbidity. Because of the high union rate and low infection rate, we consider closed interlocking nailing as the best mode of treatment for tibial shaft fractures.

REFERENCES

1. Batta V, Dwyer AJ, Gulati A, Prakash J, Mam MK, John B, et al. No difference in the long term final functional outcome after nailing or cast bracing of high energy displaced tibial shaft fractures. J Trauma Manag Outcomes 2012;6:5.
2. Tonk G, Menwal G, Gupta AK, Rustagi N, Kumar A. Anterior knee pain in transtendinous and paratendinous aprroaches of tibia interlocking nail: A comparative study. J Evol Med Dent Sci 2014;3:7874-80.
3. Rose KM. Update in tibia intramedullary nailing: Percutaneous suprapatellar access route with the knee in semi extended position for intramedullary stabilization of tibia fractures. Tech Orthop 2014;29:56-61.
4. Kamal Y, Khan HA, Gani NU, Gul S, Lone AA, Singh D. role of primary intramedullary interlocking nail in compound Gustilo-IIIA tibia fracture in developing world. Int J Health Sci Res 2014;4:151-8.
5. Mitkovic M, Milenkovic S, Micic I, Mladenovic D, Mitkovic M. Results of the femur fractures treated with the new selfdynamisable internal fixator (SIF). Eur J Trauma Emerg Surg 2012;38:191-200.
6. Wähnert D, Stolarczyk Y, Hoffmeier KL, Raschke MJ, Hofmann GO, Mückley T, et al. Long-term stability of angle-stable versus conventional locked intramedullary nails in distal tibia fractures. BMC Musculoskelet Disord 2013;14:66.
7. Rose DM, Smith TO, Nielsen D, Hing CB. Expandable intramedullary nails in lower limb trauma: A systematic review of clinical and radiological outcomes. Strategies Trauma Limb Reconstr 2013;8:1-2.
8. Kanhei RA. Orthopaedic Surgery. Disst. University of Seychelles; 2012.
9. Li CX, Zhao HJ, Zhao WQ, Xu YQ. System evaluation on reamed and non-reamed intramedullary nailing in the treatment of closed tibial fracture. Acta Cir Bras 2013;28:744-50.
10. Schemitsch EH, Bhandari M, Guyatt G, Sanders DW, Swiontkowski M, Tornetta P, et al. Prognostic factors for predicting outcomes after intramedullary nailing of the tibia. J Bone Joint Surg Am 2012;94:1786-93.
11. Kafle D. Management of fracture shaft of tibia by closed interlocking intramedullay nailing non-reaming versus reaming. J Inst Med 2013;36:83-91.
12. Johner R, Wruhs O. Classification of tibial shaft fractures and correlation with results after rigid internal fixation. Clin Orthop 1983;178:7-25.
13. Sahu R. Percutaneous k-wire fixation for femur shaft fractures in children: A treatment concepts for developing countries. Ann Med Health Sci Res 2013;3:197-201. [PUBMED] [Full text]
14. Hooper GJ, Keddell RG, Penny ID. Coservative management of closed nailing for tibial shaft fracture. A randomized prospective trial. J Bone Joint Surg Br. 1991;73:83-5.
15. Larsen LB, Madsen JE, Høiness PR, Øvre S. Should insertion of intramedullary nails for tibial fractures be with or without reaming? A prospective, randomized study with 3.8 years' follow-up. J Orthop Trauma 2004;18:144-9.
16. Ekeland A, Thoresen BO, Alho A, Stromsoc K, Folleras G, Hankeko A. interlocking intramedullary nailing in the treatment of tibial fractures, A report of 45 cases. Clin Ortho 1988;231:205-15.