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NAIL OR PLATE IN THE MANAGEMENT OF DISTAL TIBIAL EXTRA-ARTICULAR FRACTURE, WHAT IS BETTER? EVALUATION OF FUNCTIONAL OUTCOME

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Abstract

The optimal treatment of fractures of the distal tibia without major disruption of the ankle joint has not been well defined. In this prospective study we reviewed our results of distal tibia shaft fractures treated with minimally invasive percutaneous plate osteosynthesis and IL nailing and compared the outcome

Keywords: *distal tibia, extra articular fracture, functional outcome*

Introduction

Distal extra-articular tibial fractures are unique. Fractures of extra-articular distal tibia occur typically as a result of axial and rotational forces on lower extremity and represents approximately 10% of the fractures of distal end of tibia. Fractures of the distal tibia metaphysis can be fixed by intramedullary nails or locked plates. Given ongoing controversy about the optimal management and outdated previous reviews, we set out to share our experience on this regard.

Aim

The present study aims to *compare the functional outcomes of distal extraarticular fractures of tibia with plating to that with intramedullary nailing.*

Material and method

The study consists of 10 patients who were admitted in stanley medical college and oshpital-chennai for a period of 12 months between oct 2017 to Sep. 2018 for distal extra-articular fracture of tibia.

Out of 10 patients, 5 patients were treated with plating and 5 patients were treated with nailing and serially followed up.

We compared in the 2 groups the mean operation time, the mean union time, the infection rate, rate of malunion and nonunion and full weight bearing time.

METHOD - Prospective cohort study

Inclusion criteria

- A. Skeletally mature patient
- B. Fracture involving distal 5cm of tibia (AO types A1, A2, A3)
- C. All closed and Gustilo-Anderson type 1 fractures

Exclusion criteria

- A. Skeletally immature patient
- B. Fractures with intra-articular extension (AO type B,C)
- C. Open fractures of Gustilo-Anderson type 2&3
- D. All cases with Diabetes Mellitus
- E. Cases with psychiatric illness and moribund condition (noncompliance).

In majority of cases, surgery was performed following period of temporary fracture immobilisation with above knee posterior plaster splint, above knee cast with window dressing to allow for soft tissue healing.

All patients with compound injuries were managed on emergency basis in operating room with irrigation and debridement

Intravenous antibiotics were given in compound injuries as per hospital policy.

The fibula was fixed in all cases necessary to restore the stability and normal anatomy of ankle joint, or where it was considered helpful to have a template for length. Image intensification was used intraoperatively for assessment of fracture reduction and fixation

Technique For Intramedullary Nailing

For intramedullary fixation we have used tibia interlocking nail with 2 proximal and 3 distal holes for locking screws, which were located in distal 3 to 4 cms of nail to secure at least four cortices of distal tibial fragment.

Patellar tendon splitting approach was used in all patients. Two hole in coronal plane and one in sagittal plane for distal fragment.

Reamed intramedullary nailing was done through patellar tendon splitting

approach, at least two and if possible three distal locking screws were inserted. All nails were statically locked.

Technique For Plating

For plating we have used precontoured, locked distal tibia plates. All plating cases were done through distal medial approach-minimally invasive technique.

Locked compression plate was inserted subcutaneously, but extreperiosteally through short longitudinal insertion over medial malleolus.

Mechanically locked plate construct does not require friction fit of the plate against bone and a gap beneath the plate has advantages in preserving periosteal circulation.

The locked compression plate was used as bridging construct across the diaphyseal-metaphyseal fracture.

Post op

Immediate post - operative radiograph done

Patient's wounds were inspected on 2nd and 5th post-operative days

Suture removal was done on 12th post-operative day.

Patient was mobilized day after surgery with non-weight bearing walking.

Intravenous antibiotics were given for 48 hours for closed fractures and for open fractures duration of intravenous antibiotics was decided depending on the condition of the wound.

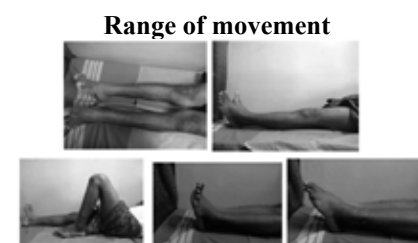
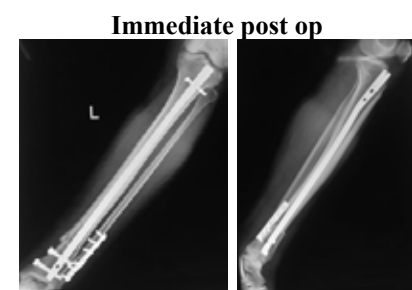
After the swelling subsided, immediate ankle joint mobilization was encouraged in all patients as tolerated

Serial evaluation was done every two weeks and after 6 weeks, patients were only allowed for toe touch walking with walker support which

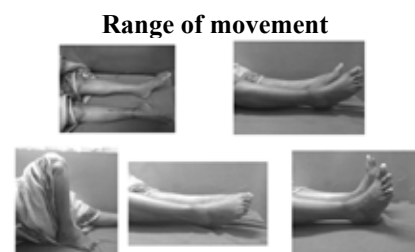
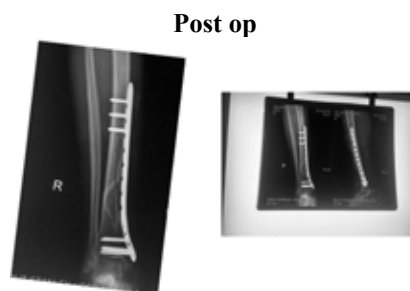
could then gradually be increased depending on the radiological and clinical findings.

Clinical evaluation included range of motion of knee and ankle, and existence of pain in adjacent joints and at the fracture site.

Case illustration



Case 2



Results And Discussion

Functional outcome

- Functional outcome was assessed by *Olerud and Molander functional evaluation score* at one year.
- The average Olerud and Molander score was 86 (range, 72-95) in group 1 and 84 (range, 80-88) in group 2 ($p = 0.008$).
- Associated fibula fracture was present in 90% in group 1 and 80% patients in group 2.
- 65% were closed and 35%

grade 1 open type in group 1 cases compared to 55% closed and 45% grade 1 open in group 2.

- Average trauma to surgery duration in group 1 was 7.4 days and in group 2 was 8.2 days which is almost equal in both groups ($p = 0.74$).
- The average duration of surgery in group 2 was 90 minutes (range, 50-170 minutes) whereas average duration of surgery in group 1 was 86 minutes (range, 65-140 minutes), ($p = 0.63$) meaning that difference between 2 groups regarding duration of surgery is not significant.
- No significant intraoperative complications were noted in both groups.
- Average time after which partial weight was started in group 1 was 6 weeks (range, 6 to 11 weeks) and in group 2, 10 weeks (range, 8 to 12 weeks), ($p = 0.015$) in both groups
- Average time after which patient was allowed full weight bear on the operated limb was 14.25 weeks (range, 11-18 weeks) in group 1 and 17.09 weeks (range, 14-21 weeks) in group 2, ($p = 0.001$)
- No patient in two groups developed a non-union. None of the patients obtained a fair or poor outcome.
- Overall 7 patients obtained an excellent results-70% and 3 patients obtained good result-30%.

Conclusion

- Our study results indicate a superiority of IMN over plating in terms of statistically

significant shorter time to full weight bearing, whereas plating appeared to be advantageous over IMN in terms of better anatomical and fixed reduction of fracture.

- The two treatments achieved comparable results in terms of operation time, hospital stay, union time and functional outcomes
- Postoperatively, wound dehiscence with exposure of plate was encountered in a case, nevertheless which showed good fracture union and healed by secondary suturing.

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