



Functional and Radiological Outcome Comparison for Plating vs Nailing Fixation in Closed Extra-Articular Tibia Fractures

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Abstract

Purpose: The treatment of tibia fractures remains a gray area due to its tendency to have different modalities for different fracture patterns, a high nonunion and malunion rate and its tendency for infection due to its proximity to the skin. We conducted a study to compare the results of tibia fractures in terms of the rate of union, quality of the limb, incidence of complications and patient satisfaction.

Methods: Patients with extra articular tibia fractures, who were admitted in a tertiary care hospital from July 2017 to May 2019 taken for study after obtaining their consent. Follow up of the cases done for a period of 24 months. Exclusion criteria included medically unfit patient for surgery, compound fractures and pathological fractures.

Conclusion: Fracture type or pattern does not influence the eventual functional outcome. Closed reduction with tibia interlocking nail has got lesser early as well as late post operative complications as compared internal fixation with plating. Closed reduction with interlocking nail has got the advantage of early mobilization with full weight bearing as compared to with plating in which weight bearing is delayed.

Keywords: Tibia shaft fracture, Extra articular, Nailing vs plating, LEFS score

Introduction

The tibia, commonly known as the shinbone, is the larger and stronger bone in the lower leg. It bears the full weight of the body and connects the knee joint to the ankle joint. Despite its strength, the tibia is the most commonly fractured long bone, due to its location, orientation, and lack of soft tissue protection. Tibial diaphyseal fractures are particularly common, with an incidence of approximately 26 per 100,000 people per year.

In recent times, closed reduction with intramedullary interlocking nailing has become the preferred method for managing tibial fractures in adults. This technique offers mechanical stability, better alignment, and preserves the biological environment of the fracture, allowing soft tissues to remain intact. Locking plate osteosynthesis is typically used for

fractures that extend into the metaphysis, though complications like infection, wound breakdown, malunion, and nonunion are frequently observed.

With both techniques being widely used, the choice of treatment for tibial fractures remains a subject of debate. This study aims to compare the outcomes of these two methods in terms of fracture union, limb quality, complication rates, and patient satisfaction.

Aims and Objective

The primary objective of this study is to compare the clinical outcomes of two surgical methods used to treat tibial fractures: intramedullary interlocking nailing and locking plate osteosynthesis. The study aims to assess the following:

1. Union Rate: Compare the time required for fracture union



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between the two techniques.

2) Functional Outcome: Evaluate the functional outcome using the Lower Extremity Functional Scale (LEFS).

3) Complication Rate: Identify early and late post-operative complications for both treatment options.

4) Patient Satisfaction: Measure patient satisfaction at follow-ups using clinical and functional parameters.

Materials and Methods

Source of Data

This prospective study was conducted on 46 patients with extra-articular tibia fractures, admitted to a tertiary care hospital from July 2017 to May 2019. Patients were followed for 24 months across six visits (6 weeks, 3 months, 6 months, 12 months, 18 months, and 24 months). The study was conducted after obtaining ethical approval from the institutional review board and informed consent from all patients.

Inclusion Criteria

- Patients with closed extra-articular tibial fractures.
- Patients with a mature skeleton.
- Patients medically fit for surgery.

Exclusion Criteria

- Medically unfit patients.
- Compound fractures.
- Pathological fractures.

Protocol

Upon admission, a detailed examination and routine pre-operative investigations were performed. X-rays (AP and lateral views) of the tibia, knee, and ankle were taken. After obtaining pre-anaesthetic clearance, patients underwent either closed reduction with intramedullary interlocking nailing or open reduction and internal fixation with locking plate osteosynthesis. The choice of surgical technique was based on fracture type and surgeon preference.

Functional outcomes were assessed using the Lower Extremity Functional Scale (LEFS), with scores ranging from 0 to 80. Higher scores indicate better functional outcomes.

Statistical Analysis

Data was analyzed using SPSS-17. Chi-square and Fischer's exact tests were used for qualitative data, while Student's t-test was used for quantitative data. A p-value of <0.05 was considered statistically significant.

Results

1) Demographics: Among the 46 patients, 36 were males (78.26%) and 10 were females (21.74%). The most common age group was 51-60 years (28.26%).

2) Fracture Types: Proximal third tibial fractures were the most common (60.86%), followed by distal and mid-shaft fractures

(19.57% each).

3) Mode of Injury: The majority of injuries were caused by road traffic accidents (65%), followed by railway accidents (35%).

4) Associated Injuries: Fibular fractures were the most common associated injury (59.45%).

5) Surgical Intervention: Tibial interlocking nailing was performed in 36.95% of cases, while tibial plating was performed in 45.65% of cases.

6) Complications Early post-operative complications (e.g., swelling, bleb formation) were more common with plating (27.58%) compared to nailing (11.76%). Late post-operative complications (e.g., wound dehiscence, infection) were significantly higher in the plating group compared to the nailing group.

7) Functional Outcome: The LEFS score was above 40 in 82.62% of patients, with better results observed in the nailing group.

8) Union Rates: Radiological union occurred within 90 days in 88.23% of nailing cases compared to 44.82% of plating cases. This difference was statistically significant ($p=0.0093$).

Conclusion

The study suggests that intramedullary interlocking nailing is a more favorable option for treating tibial fractures due to its lower complication rates, faster time to union, and better functional outcomes as measured by the LEFS. Plating, while effective for certain fracture types (e.g., fractures extending into the metaphysis), is associated with higher rates of early and late complications, such as wound infection and implant exposure.

Clinical Message

The results of this study have important implications for clinical practice. Intramedullary interlocking nailing should be the preferred treatment for extra-articular tibial fractures due to its superior outcomes in terms of union time, fewer complications, and better functional recovery. Surgeons should consider patient factors and fracture characteristics, but this study supports the widespread adoption of tibial nailing, especially in cases where early mobilization is desired.

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