



FUNCTIONAL OUTCOME OF TIBIAL PLATEAU FRACTURE TREATED SURGICALLY WITH LOCKING COMPRESSION PLATE

Orthopaedics

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ABSTRACT

BACKGROUND: Tibial plateau fractures are common intra-articular fractures, representing 1.2% of all fractures. These fractures are common in two age groups: higher-energy fractures in younger patients and lower-energy fractures in elderly patients secondary to osteopenia. In the younger population, these injuries are associated with an increased incidence of complications like nonunion, infection, restriction of motion, and post-traumatic arthritis. The study aimed for final outcome of tibial plateau fracture using locking compression plate by minimally invasive percutaneous plate osteosynthesis (MIPPO). **METHODS:** 30 cases of tibial plateau fractures were treated by using locking compression plate and studied from december 2019 to december 2021 in Department of Orthopaedics, JLN Medical College Ajmer, Rajasthan, India. **RESULTS:** All the selected 30 cases were followed up for 6 months. The average time for union of fracture was 21 weeks ranging from 18-24 weeks. Full weight bearing was not allowed until 12 weeks or complete fracture union. Partial immobilization was kept for 6 weeks in long knee brace. An average flexion was achieved upto 0-114°. We observed 8 cases of postoperative complications that included 4 infections, 2 knee stiffness and 2 varus deformity. **CONCLUSIONS:** Surgical management tibial plateau fractures with locking compression plating by MIPPO gave excellent reduction, rigid fixation to restore articular congruity and provides early motion to achieve optimal knee function and reducing post-traumatic osteoarthritis.

KEYWORDS

Fracture, Proximal tibia, Locking compression plate, MIPPO

INTRODUCTION

The knee joint is complex and most commonly injured joint nowadays because of increased motor vehicle accidents and sports related injuries. The tibial plateau is the region of proximal tibia, which comprises of the superior articular surface^{1,2}. Its fractures classically were described as bumper or fender's fractures. They gravely affect the biomechanics, stability and range of motion of the knee joint. Tibial plateau fractures are common intra-articular fractures, representing 1.2% of all fractures³. These fractures are common in two age groups: as higher-energy fractures in younger patients and lower-energy fractures in elderly patients secondary to osteopenia. In the younger population, these injuries are associated with an increased incidence of complications like nonunion, infection, restriction of motion, and post-traumatic arthritis. It is essential to determine the force of injury since high energy trauma is associated with significant soft tissue and neurovascular damage. Apart from tibial plateau, meniscal tear and ligament injuries should also be assessed⁴. A better quality of implants, good principles of internal fixation, soft tissue care, selection of proper antibiotics and use of aseptic technique in operation theatres have all contributed to dramatic change in trauma care. Thus we have advanced from the conservative approach to internal fixation of fractures as a treatment modality of first choice. Open reduction and internal fixation has been advocated by using implants like locking compression plates to achieve good fracture union and optimal knee function. A brief review of literature reveals that different avenues are being explored for these fractures. Ali, et al reported a 31% fixation failure for tibial plateau fracture in their elderly population⁵. Stevens et al noted that only 57% of cases showed good functional outcome after surgical management of tibial plateau fractures in age <40 years⁶. Open reduction and internal fixation has a significant complication rate^{7,8}.

AIMS AND OBJECTIVES

- To evaluate the functional outcome of surgical management of tibial plateau fractures.
- To assess the mechanism of injuries of tibial plateau fractures.

MATERIAL AND METHOD

This prospective study was conducted during November 2019 to October 2021. We selected 30 patients who were treated surgically for proximal tibial fracture using locking compression plate at Department of Orthopaedics, J.L.N. Medical college, Ajmer.

INCLUSION CRITERIA

Inclusion criteria were age above 18 years for both sex; closed fractures; Schatzker's type 1, 2,3,4,5, and 6 fractures; associated ligamentous injuries; associated fibular upper end fracture.

EXCLUSION CRITERIA

Exclusion criteria were age below 18 years; compound fractures; other limb fractures and diseases; pathological fractures; associated neurovascular injury; patients who are medically not fit for surgery. Fracture was assessed for soft tissue injuries and followed by radiological assessment of fracture with Schatzker's classification¹⁴.

Follow up

Follow up was done at 2 weeks, 4 weeks, 6-8 weeks and 6 months.

Assessment of complications

- Mal unions, delayed union, non union
- Knee stiffness
- Nerve injury

RESULTS:

In our study, 28 (93.33%) were male patients and 2 (6.66%) were female patients with mean age 38.02 years (Table 3). The majority of patients were in the age group of 31-40 years (Table 4). Those who were highly associated with road traffic accident accounts for 80% of cases.

Table3: Gender distribution.

Gender	No. of patient	Percentage (%)
Male	28	93.33
Female	02	6.66
Total	30	100

Table4: Age distribution.

Age (in years)	No. of patients	Percentage (%)
<30	08	26.66
31-40	11	36.66
41-50	06	20.00
51-60	04	13.33
>60	01	3.33
Total	30	100

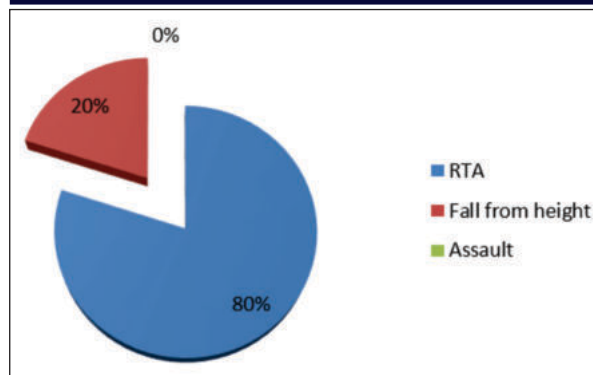


Figure1: Mode of injury.

In our series most of patients were outdoor workers 19 (63.33%). An average flexion was achieved upto 0-114° in present series. The average time for union of fracture was 21 weeks ranging from 18-24 weeks. In our study, 60.00% of the patients sustained injury on right side and 40.00% on left side, so there was right sided predominance as compared to the left side. Most of the patients were found to be type VI (12 cases) and type IV (8cases) Schatzker's classification (66.66%).

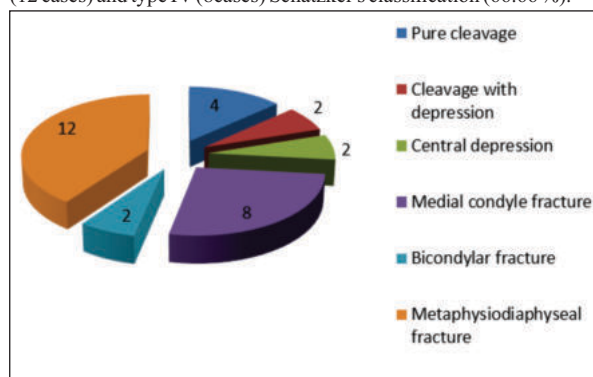


Figure2: Type of fractures

All fractures united within expected time (except two cases with infection), not a single case of nonunion was noted in our series.

Table5: Postoperative complications.

Postoperative complications	No. of patients	Percentage (%)
Infection and wound dehiscence	04	13.33
Varus deformity	02	6.66
Knee stiffness	02	6.66
Normal	22	73.33
Total	30	100

Out of 30 cases treated, 10(33%) fractures gave excellent results, 18 (60%) fractures healed with good results and 02(7%) fractures with fair results.

DISCUSSION:

Tibial plateau fractures are major traumatic injury occurring as the result of RTA, fall from height, violence etc. It is sometimes associated with other bony or soft tissue injuries. Hence the treatment of tibia plateau fractures has become a challenge for the orthopedic surgeon. Stable internal plate fixation without damaging the soft-tissue envelope is very difficult to achieve, only fair results are seen in 20% to 50% of these fractures. Outcome after tibia plateau fracture fixation depends mainly on knee range of motion and strength of the quadriceps. Knee stiffness is more clinically relevant than instability in these fractures.

We presented the clinical study of surgical treatment of 30 tibia plateau fractures. The analysis of the results were made in terms of gender, age, occupation, mode of injury, duration of hospitalization, types of fracture (Schatzker's classification), period of immobilization, complications and clinical results.

We have attempted to present the various types of tibia plateau

fractures in our Indian setup. It is found that the keenness for modernisation, mechanisation and industrial development created more automobile accidents due to increase in the number of population and automobiles.

The maximum incidence of tibial plateau fracture was found in the productive age population i.e., 31-40 years (36.66%). The mean age was found to be 39.6 years in our study. Seppo also showed age incidence of 20-60 years with an average of 39.8 years, which correlates with the present study¹⁵.

In our succession majority of the patients were male (93.33%). This can be attributed to our Indian setup where the female population mostly works indoor and less prone for injuries. So the significant proportions of tibia plateau fractures related to sex distribution were not available to comment. Occupationally tibia plateau fractures were seen in people with high level of activity, travel and outdoor working habits. In our study the commonest mode of injury was road traffic accident (80%), followed by fall from height (20%). There was a significant preponderance of right side laterality. The right tibia was affected in 60% and left tibia in 40% of cases.

In our series, Schatzker's type VI and type IV fractures dominated making 66.66% of all fractures. It was also concluded that metaphysiodiaphyseal fracture was more common.

The problem faced by us during the study was infection and wound dehiscence in four cases; hence immobilization was kept for longer duration in these patients. The infection might be attributed to nosocomial infection. An average flexion of 0-114° was achieved by less soft tissue damage, better implant placement and physiotherapy, similar also reported by Egol et al (0-1090°)¹⁶. In spite of all the ligament injuries and complications, we were able to achieve 33.33% excellent result, 60.60% good result with our surgical care using locking compression plate fixation. In addition we obtained 6.66% fair result in terms of functional outcome. These results were comparable with other documented standard studies of Schatzker and Seppo et al (86% satisfactory)^{14,15}.

CONCLUSION:

Anatomic reduction, accurate axial and articular alignment with rigid fixation should be the objective of the treatment to achieve a stable and functional knee joint. Minimal invasive surgery lead to less soft tissues dissection without draining fracture haematoma thereby reduction in the period of immobilization with less chances of infection and stiffness lead to excellent functional outcome of the knee joint.

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Ethical approval: The study was approved by the Institutional Ethics Committee.

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