

Study of Functional Outcome of Proximal Tibia Plating in Intra-Articular Proximal Tibia Fracture-A Original ArticleDeepak Lamture¹, Namdev June², Sachin Suryavanshi³, Balasaheb Sanap⁴, Yashwant Lamture⁵¹Associate Professor in Orthopaedics, S.R.T.R. Government Medical College Ambajogai²Associate Professor in Orthopaedics, S.R.T.R. Government Medical College Ambajogai³Junior Resident in Orthopaedics, S.R.T.R. Government Medical College Ambajogai⁴Junior Resident in Orthopaedics, S.R.T.R. Government Medical College Ambajogai⁵Professor Surgery, AIIMS Nagpur

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Abstract

Proximal tibia fractures are treated with single medial, lateral, or dual plating, as well as an external fixator in some cases. Locking plates are now widely used, and fixing techniques are continually changing. From LISS, a less intrusive stabilizing system, to L.C.P., a periarticular locking compression plate system, to arthroscopic aided minimally invasive surgery, there is something for everyone. Because it lowers anatomical fracture and improves knee mobility, proximal tibia plating is the treatment of choice for these fractures. We investigated the functional result of plating-treated proximal tibia fractures. All 30 patients were observed for at least 12 months; the patients' ages ranged from 20 to 70, with the majority being male. The majority of patients had a functional result as measured by the knee sounds grading system have excellent results where good results in the remaining two patients. None of the patients had problems such as non-union, hardware failure, or knee discomfort. Because of their intra-articular nature, tibial plateau fractures are difficult for orthopedic surgeons to treat. This fracture will be stopped if it is close to a significant weight-bearing joint. Perfect anatomical restoration of the articular surface, secure fixation, and early range of motion physiotherapy are essential, and depending on the kind of proximal tibia, these can be done with single or dual plating.

Keywords- non-union, anatomical reconstruction, fracture of tibia, knee sounds scoring system

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Introduction

Proximal tibia fractures have traditionally been difficult to treat; these fractures are usually unstable and comminuted, and have the potential to cause long-term disability, stiffness, arthritis, and instability, all of which are major complications of intra-articular tibia fractures; soft tissue injuries are usually associated with complex tibia plateau injuries. [1]

The therapy seeks to restore joint congruity and retain the normal knee axis, as well as to establish a stable joint and restore knee mobility in order to maintain normal knee function. [2] It accounts for nearly 1% of all adult fractures. Various treatment options for proximal Tibia fracture are employed to restore pain-free knee motion. The proper implant selection is critical in such accidents. C.T. scans and M.R.I.s are newer techniques that can be used to analyze fracture patterns in complex proximal tibia fractures. Proximal tibia fractures are treated with single medial, lateral, or dual plating, occasionally with an external fixator. Locking plates are

commonly utilized, and fixation techniques are constantly evolving. [3] From LISS, a less invasive stabilization system, to L.C.P., a periarticular locking compression plate system, to arthroscopy-assisted minimally invasive surgery. Proximal tibia plating is the choice of treatment for these fractures as it gives anatomical reduction of fracture and restoration of knee motion. We have analyzed the functional outcome of proximal tibia fracture, which is treated with plating. [4,5]

Aim

To determine the efficacy of proximal tibia plating in tibia fracture.

Objectives

1. To estimate surgical site infection in patients with intra-articular proximal tibia fracture by proximal tibia plating.
2. To estimate malunion or non-union in patients operated for intra-articular proximal tibia fracture by proximal tibia plating.

Materials and Methods

Study design –

Cross-sectional study.

Study Duration – 6 months

Study Population –

A total of 30 patients from July 16 to July 18 with closed proximal Tibia intra-articular fractures were admitted to the tertiary care center. Ambajogai were included in the study.

Inclusion Criteria

1. age 18 to 76 years.
2. Patient with closed intra-articular displaced proximal Tibia fracture.

Exclusion Criteria

1. Patient with pathological fracture.
2. Fracture neurovascular deficit.
3. Mental retardation.
4. Patient having severe systemic disorder.
5. Compound fracture.
6. Non or minimally displaced fracture.

Operational definitions (Study outcome)

Surgical site infection

Non-union or malunion

Sample Size –

The sample size was calculated by employing openepi.com, a single proportion according to the following assumptions: 20% of patients operated by tibia plating have proximal tibia fracture [1], with a 95% confidence interval and 7% margin of error. The calculated sample size was 30. The sample size used in the study was N=30 patients. Twenty-seven of them were male, and three of them were females.

Sampling Method-

The probability sampling method was used

A simple random method was used.

Data Collection, Including Data Tools

Data for the study was collected using a personal interview technique with the help of a structured questionnaire, hospital case records, follow-ups, etc.

Project Implementation Plan

A detailed history was taken from the patient, radiography of fracture was obtained in A.P., and lateral

view and a C.T. scan with three-dimensional reconstruction were done to find out the exact location of intra articular fracture geometry, steps, and depression classified the fracture according to SCHATZKERS classification. Mainly, posteromedial fragment and communication are better previewed, hence better planning for alignment. M.R.I. is done in some cases with suspicious associated soft tissue injury With meniscal and ligament Tear. After obtaining the necessary investigation and surgical fitness, informed consent was taken. Then, patients were subjected to open reduction and internal fixation with anterolateral plating in 20 patients, posteromedial plating in 5 patients, and dual plating in 5 patients (AL and PM). All Patients were managed by locking plates.

Anterolateral Plating

The patient was lying supine on a typical radiolucent ortho operating table. After applying a tourniquet, a curvilinear incision was made 1 cm lateral to the tibial Crest, directed literally over Gerdys tubercle, and extended proximally to the lateral femoral condyle. Arthrotomy is performed so that the intra-articular fracture can be effectively reduced, and a locking plate is implanted once the fracture has been reduced. In 20 patients, the provisional plate was fixed with a K wire, and the anterolateral plate was secured with a 6.5 mm fully threaded cancellous screw in the metaphyseal region and a cortical screw in the diaphyseal region.

Posteromedial Plating

The patient is positioned supine, with the inferior extremity flexed and externally rotated. An incision is made one centimeter posterior to the PM edge of the tibial metaphysis, parallel with the sartorius and posterior border of the pes tendon proximally. In 5 patients, the fascia overlying the medial gastrocnemius is incised longitudinally, the pes anserinus tendon is moved anteriorly, and the posteromedial portion of the proximal tibia is revealed, the fracture is exposed, and a plate is applied following fracture reduction.

Dual Approach

In 5 patients, we used a combination of the A.L. and PM approaches to treat a lateral condyle fracture with a PM fragment. We started with the PM method and healed the fracture before moving to the lateral plating. In dual plating, a locking plate was utilized on one side with substantially more severe fracture communication, and a buttress plate was used on the other.

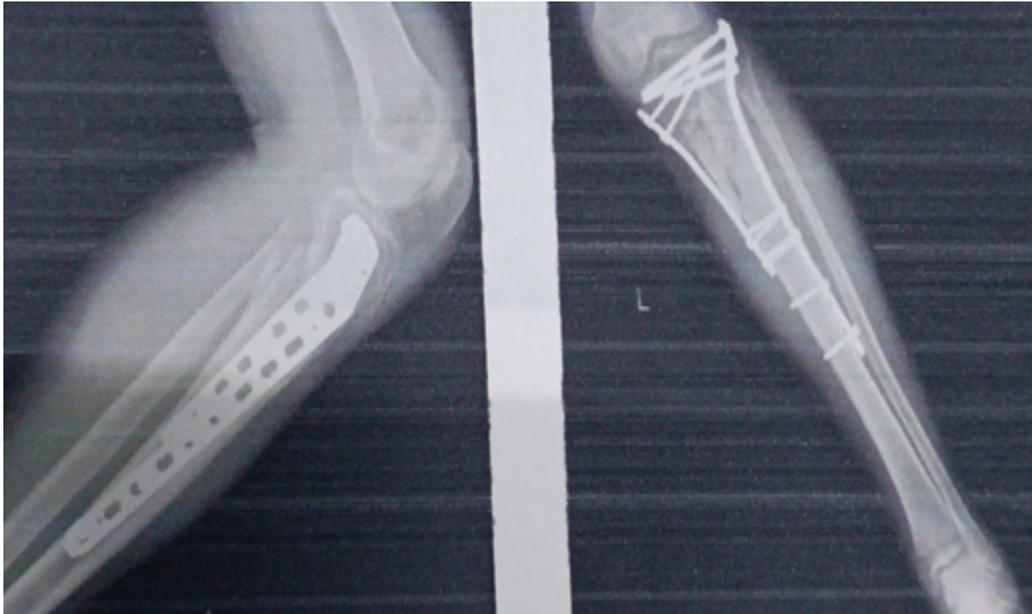


Figure 1-Dual Plating Left Proximal Tibia Fracture

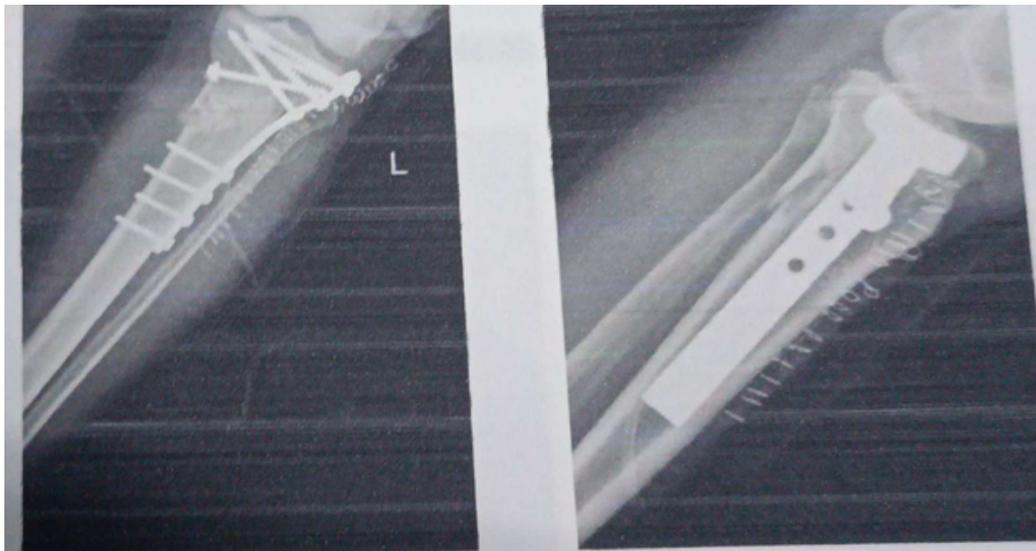


Figure 2-Anterolateral Plating Of Left Proximal Tibia Fracture

Post Operative

After the pain had subsided, isometric strengthening exercises, passive movements, and active movement of the knee joint were started. Non-weight-bearing walking continued till six weeks, and then partial weight-bearing started. After sign and radiological investigations, full weight bearing was started in patients. The principal investigator himself was responsible for data collection and its safety.

Data Analysis

Data entry was manually done. Coding and recoding were done. Prevalence was calculated. Descriptive statistics (percentage, mean, standard deviation (S.D.), and range) were used to summarize baseline characteristics of the study subjects. The data was

collected over six months using Epicollect 5 and was analyzed in Excel Sheet.

Human Subject Protection- institutional Ethics committee approval was obtained.

Results

All 30 patients were followed up for at least 12 months; the age range of patients in the study was from 20 years to 70 years, with a mean age of 44.16 \pm 12.77 years. In this study, 27 patients were male, and three patients were female.

Eleven fractures were type 5, 7 were type 6, 6 were type 3, 4 were type 2, and 2 were type 4.

Patient Characteristics

Age of the patient	Number of patients
Less than 40	13(43.33%)
More than 40	17(56.66%)

Sex

Male	27(90%)
Female	3 (10%)

Side of Patient

Right	20 (66.66%)
Left	10 (33.33%)

In this study, the most commonly affected side was the right side in 20 patients and the left side in 10 patients. All the treated patients of proximal tibia fracture were treated surgically with a single plate in 22(73.33%) patients and dual plating was done in eight (26.66%) patients.

Postoperative Complications

These include wound infections, which are treated successfully by IV antibiotics according to culture and Sensitivity. Functional outcomes evaluated by the knee sounds scoring system. The majority of patients, 28, had excellent results, with good results in the remaining two patients.

None of the patients developed complications like non-union, hardware breakdown, or knee stiffness.

Discussion

Tibial plateau fractures account for around 1% of intra-articular fractures. Several debates surround the care of this fracture because no method is completely appropriate for every instance. [6] The proximal tibial fracture geometry is likewise extensive and convoluted, ranging from a single split condyle fracture to a comminuted metaphyseal fracture reaching the diaphysis. As a result, 3D C.T. [7] scans are always required in proximal tibia fractures. As a result, treatment modality varies on a traditional basis when soft tissue envelope, fracture severity, age, and functional requirements of an individual patient are taken into account. Cast and braces, traction, external fixation, locking plate, arthroscopically aided fixation, and minimal percutaneous pinning, minimally invasive procedures (LISS) system are all therapeutic possibilities for proximal tibia fracture. [8,9]

Poor functional outcomes and extended hospital stays, along with loss of reduction, are formed with nonoperative management of proximal tibia fractures. [10] Wound dehiscence and infection are commonly found in treatment with open reduction and dual plating. Early diagnosis, soft tissue monitoring, anatomical reduction, stable internal fixation, and early joint motion are all critical for

successful outcomes. [11] The primary goals in the treatment of complex proximal tibia fractures are anatomical reduction of the articular surface, relative stability at the fracture site, excellent range of motion at the knee joint, and minimal morbidity. The study's population was followed up at regular intervals for up to a year, and the average age of the patients was 44.16 years, close to Kulwinder Singh's study. Among thirty patients, the majority were male, 27 patients were 90%, and three were female. [12]

All of the patients had closed tibial plateau fractures that were not pathological. All patients were operated on utilizing various types of plates for closure reduction and internal fixation. [13] In 25 of 30 patients, a single incision procedure with anterolateral and posteromedial approaches was performed. There were 20 patients with anterolateral and five patients with isolated posteromedial approaches, and dual plating was done in five patients. The functional result was measured using the knee society score and the Oxford knee score; 19 out of 30 patients have excellent function (63.33 percent), 8 have good function (26.66 percent), and 3 have poor functional outcome (10%).

Conclusion

Tibial plateau fractures are difficult for orthopedic surgeons to repair because of their intra-articular nature. Proximity to a large weight-bearing joint will stop this fracture. Optimum anatomical repair of the joint surface is necessary, as well as secure fixation and early firm movement of knee and physiotherapy. This can be accomplished with single or dual plating depending on the type of proximal tibia.

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