



Assessment of Posteromedial Approach for Proximal Tibia Plateau Fractures: A Prospective Study

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Abstract

Introduction:

The fractures of the Posteromedial plateau are inherently unstable, and are nearly always associated with an obvious articular depression or displacement. The posteromedial approach best alternatives to effectively treat the posteromedial tibial plateau fractures as it gives direct visualization of the fracture fragment and helps minimize risk of trauma to neurovascular bundle. It also results in minimal soft tissue injury.

Materials and Methods:

The randomised trial was conducted Between December 2020 to July 2021 at a tertiary trauma centre on 33 consecutive patients with tibial plateau were treated with Open reduction and internal fixation through posteromedial approach and assessed on the basis of Knee Society Score for 6 months.

Results:

The tibial plateau fractures have always been an enigma in terms of appropriate management. The aim of our study was to examine whether the posteromedial approach was an effective, safe and better way of fixing fractures based on the three column concept. The results of the study were as stated- At the end of 6 months, 22 patients (66.7%) had excellent results with 10 patients (30.3%) reporting a good outcome. 1 patient reported a fair outcome. The mean clinical and functional scores were 85.08 and 86 respectively, giving us the net outcome of the study as excellent.

Conclusion:

In this prospective study, we have concluded that ORIF of proximal tibia fractures using the posteromedial approach is a satisfactory method for obtaining early rehabilitation of the patient with minimal complications

Keywords: NIL

Introduction

The knee joint, being one of the largest and most important weight bearing joint, comprises of three main articular surfaces with the proximal tibia playing a vital part. The fractures of the proximal tibia, especially tibial plateau are some of the most commonly occurring intra-articular fractures. They can be a result of direct compressive forces which act along the axis or indirect forces acting coronally.

They account for about 1% of all fractures and the number rises to approximately 8% for the elderly. While most of the injuries occur over the lateral condyle (55 to 70%), the fractures of the medial condyle account for 10 to 23% . Bicondylar fractures make up to 10 to 30% of all fractures of the tibial plateau.¹

There has been a radical change in our management of tibial plateau fractures over the past few decades, owing to the advancements in orthopaedic trauma management, better implant quality, better antibiotic coverage, detailed understanding of the biomechanics and greater attention to soft tissue care. This has allowed us to move on from conserving most of these fractures to operating upon them with anatomic reduction and stable fixation. Despite these advancements, the fractures of the tibial plateau and their appropriate management remains a hard puzzle owing to their wide variety and complex nature. In spite of the plethora of research publications and books having been written over the past 50 years that have tried to solve the complexity of classifying these fractures and assigning appropriate treatments, the optimal method of treatment remains elusive.²

The three-column theory for fixation of tibial plateau fractures, proposed by Lou *et al* is a new fixation concept. It is a simple yet extremely useful tool for fractures in multiple planes, especially those involving the posterior column. A combined posterior and anterior-lateral approach has been found to be a viable option for direct anatomic reduction and stable fixation for such difficult proximal tibial fractures.³

The fractures of the Posteromedial plateau are inherently unstable, and are nearly always associated with an obvious articular depression or displacement. Most surgeons have adopted an approach of open reduction with stable internal fixation for these difficult fractures. Despite extensive efforts that have been done to find an ideal surgical approach for such fractures, the optimal method and implant remain a huge controversy.⁴

The aim of the study was to evaluate functional and clinical outcome of tibial plateau fractures with open reduction and internal fixation through posteromedial approach.⁵

Materials And Methods

This cross-sectional study was conducted at a tertiary high volume trauma care center in Navi Mumbai, Maharashtra, India between December 2020- July 2021.

A total of 76 patients presented with Tibial plateau fracture of which 41 patients met the inclusion criteria and were initially enrolled in the study. 6 patients were lost to follow up at the end of 6 months and 2 patients died because of the pre-existing comorbidity 5 months post op.

Patients in the age group between 20-80years with isolated Proximal tibia fracture requiring postero-medial approach and medically fit for surgery were included in this study. Patients with open fracture, neuro-vascular deficit, associated knee dislocation, chronic fractures and skeletally immature patients were excluded in the study.

Operative Procedure- In prone position, a lazy S shaped incision is taken over the knee joint. It should ideally be 8 cm long on either side. The medial sural cutaneous nerve and the short saphenous vein need to be protected. The semimembranosus muscle is retracted to the medial side. The insertion of the medial head of gastrocnemius is visualized. The anterior edge of the gastrocnemius is also identified and retracted laterally. This helps to avoid all the important neurovascular structures. The knee joint capsule is visualized. It is incised to expose the fracture fragments. The fracture fragments are reduced and the reduction is confirmed using a C arm image intensification. Kirschner wires can also be used. The plate is placed on the fractured bone using anatomic landmarks. The 3.5 mm universal drill guide is pushed into the non-locking part of the elongated hole of the plate. With a the 2.5 mm drill bit, the bone is drilled and the plate held in place.



FIGURE 1 INTRA-OPERATIVE REDUCTION



FIGURE 2 POST-OPERATIVE XRAY

POST OP CARE

Prophylactic antibiotic cover was given with Cefuroxime and Amikacin for 3 days. Relevant analgesics were given to the patient.

The limb was immobilized in a knee brace till the pain subsided and early mobilization with physiotherapy was started.

Check x rays were done to assess the postoperative reduction of the fracture fragments.

A check dress was done on post op day 3 and 7. Suture removal was done on day 14 in the absence of any wound dehiscence or infection.

Rehabilitation of the limb and knee joint was started with range of motion exercises and nil weight bearing walking from day 3 onwards.

Partial weight bearing was allowed if the pain was absent and there were signs of radiological union at 4 to 6 weeks with the help of crutches or a walker.

At 8 weeks , the weight bearing was gradually increased to full weight bearing and without any support.

Follow Up

The patients, following discharge from the hospital, were assessed at every 4 weeks.

Local examination of the knee and proximal tibia was done to assess any implant impingement , tenderness and swelling.

X rays of the affected side were taken at each follow up.

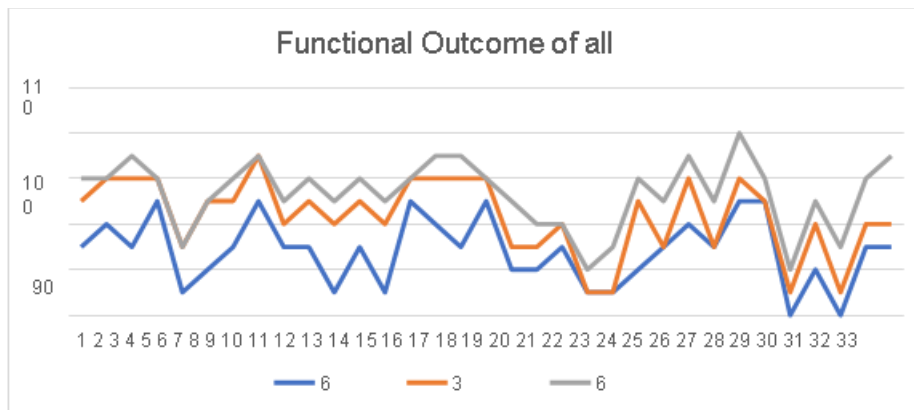
Knee society score of the patient was calculated and recorded at 6 weeks, 3 months and 6 months.

Patients were followed up till radiological union.

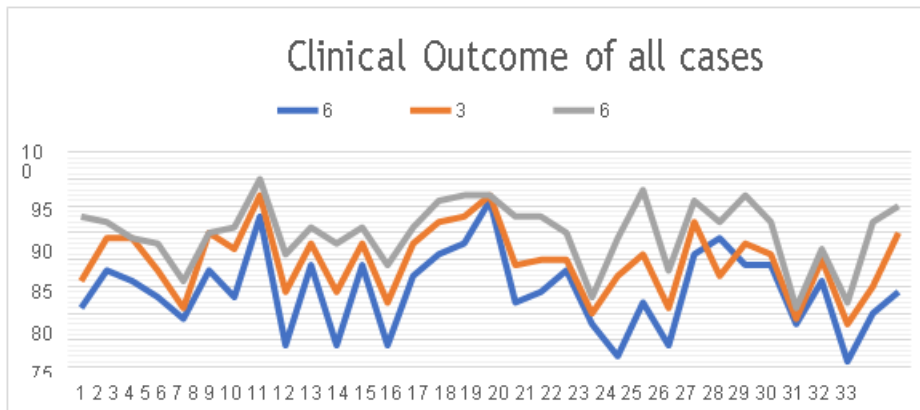
Observation And Results -

Knee society score-

The knee society score was calculated for all 33 patients at 3 weeks, 6 weeks and 6 months.



Graph 1 Comparison of Functional outcome of all cases



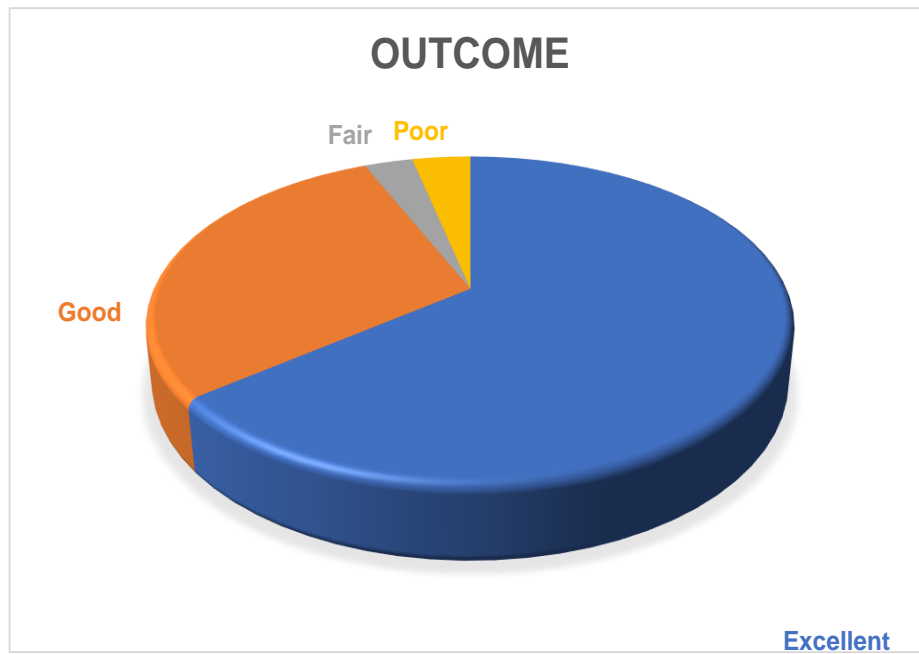
Graph 2 Comparison of Clinical outcome of all cases

Final Result

TABLE 1 OUTCOME

Result	Number of patients	Percentage
Excellent	22	66.7 %
Good	10	30.3 %
Fair	1	3.0 %
Poor	0	0.0 %
Total	33	100 %

Graph 3 OUTCOME



Complications: There were 3 cases of superficial infection, 2 wound dehiscence and 1 malunion

Discussion

The tibial plateau fractures have always been an enigma in terms of appropriate management. The aim of our study was to examine whether the posteromedial approach was an effective, safe and better way of fixing fractures based on the three column concept. In this study, 33 patients with a tibial plateau fracture were admitted in MGM

Medical College and Hospital, Kamothe, Navi Mumbai and treated with open reduction and internal fixation using the posteromedial approach. The results of this study, when compared to the following studies gave the following outcome.

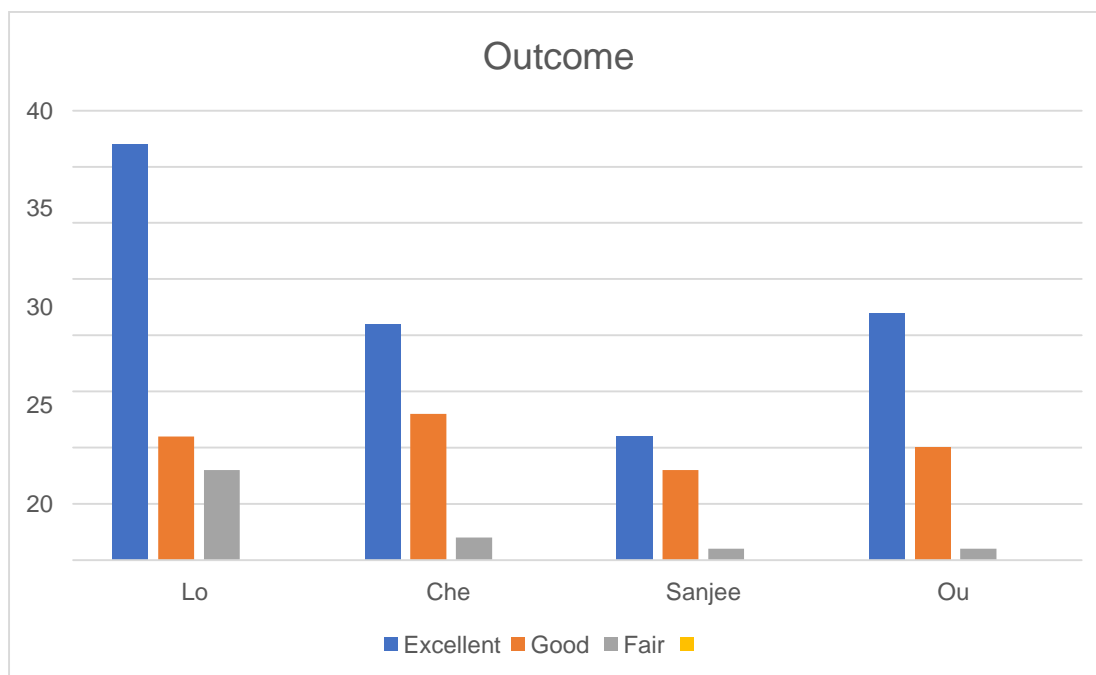
1. Luo et al⁶
2. Chen et al⁷
3. Sanjeev P et al⁸

Time to Union

Sr No.	Study	Time to union
1	Lou et al	17
2	Chen et al	16.5
3	Sanjeev et al	14
4	Our study	15

Functional Outcome

Sr No.	Study	Excellent	Good	Fair	Poor
1	Lou et al	37	11	8	0
2	Chen et al	21	13	2	0
3	Sanjeev et al	11	8	1	0
4	Our study	22	10	1	0



21 patients (63.7%) had a history of road traffic accident while 10 patients(30.3%) reported with a history of fall from height. One patient had the

fracture as a result of assault and one (3%) got injured while playing a sport.

The mean time to union was 12.75 weeks.

At the end of 6 months, 22 patients (66.7%) had excellent results with 10 patients (30.3%) reporting a good outcome. 1 patient reported a fair outcome.

The mean clinical and functional scores were 85.08 and 86 respectively, giving us the net outcome of the study as excellent. Hence, overall outcome of the posteromedial approach to proximal tibia fractures is overwhelmingly satisfactory and it is a good approach for such fractures.

Conclusion

In this prospective study, we have concluded that the open reduction and internal fixation of proximal tibia fractures using the posteromedial approach is a good method for obtaining early rehabilitation of the patient with minimal complications.

The technique ensures an anatomic reduction, stable fixation, good union and early mobilization with good and fast recovery.

However, this is a small study and requires a larger sample size for definitive conclusion.

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