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Posteromedial fragment fixation through Lobenhoffer approach in tibial plateau fractures

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ABSTRACT

Background: Management of tibial plateau fractures with coronal fractures especially posteromedial fragment is frequent and challenging. This study was conducted to evaluate the functional outcome of patients with tibial plateau fractures having posteromedial fragment treated with open reduction and internal fixation (ORIF) using Lobenhoffer approach.

Methods: Thirty two patients with tibial plateau fractures having posteromedial fracture alone or part of bicondylar fracture was operated with ORIF using Lobenhoffer approach. Time to union, maintenance of alignment, rate of complications and functional outcome was assessed using Oxford knee score.

Results: The mean time to healing was 16.4 weeks, without any complication in the form of non-union and infection. Malunion with secondary loss of alignment was seen in only one case due to fracture comminution and early weight bearing. Oxford knee score was good to excellent in all the cases.

Conclusions: With recent development in understanding these fractures, ORIF gives excellent to good outcome in all patients operated through Lobenhoffer approach. Long term disability can be prevented by maintenance of adequate alignment and reduction through direct visualization of fracture.

Keywords: Tibial plateau fractures, Posteromedial fragment, Lobenhoffer approach

INTRODUCTION

Management of tibial plateau fractures is challenging due to soft tissue concerns and fracture morphology.¹⁻³ Evaluation of these fractures with computed tomography and three dimensional (3-D) reconstructions has shown presence of posteromedial fragment in most of these cases.⁴ If not treated timely and adequately these fractures can lead to late onset disabilities. With recent change in trends, most of the authors recommend open reduction and internal fixation (ORIF) for these fractures. Controversy still remains with the optimal surgical approach.

Posteromedial fragment can be seen as an isolated fracture or part of bicondylar tibial plateau fracture. Barie et al have shown the presence of these fragments in 33% of tibial plateau fractures.⁵ Several biomechanical studies have proved that fixation of these fragment is necessary to prevent secondary loss of alignment like varus collapse.⁴ We have tried to assess the outcome of these fractures using ORIF with locking or buttress plate through Lobenhoffer approach.^{6,7}

METHODS

The study was conducted at IGGMC & Mayo hospital, Nagpur from January 2015 to January 2017. Thirty two

patients were operated after taking approval from institutional ethics committee and written informed consent. Patients were evaluated in emergency room with clinical examination, radiographs and computed tomography (CT). All patients with posteromedial fragment alone or in combination with bicondylar tibial plateau fractures were included in the study. Exclusion criteria were open fractures, neurovascular injury, pathological fractures and medical contraindications for surgery.

Surgical fixation was done in supine position with affected leg in figure of four positions under fluoroscopy control. Antibiotic prophylaxis was given preoperatively and continued for 48 hours postoperatively. Lobenhoffer approach was used in all cases, by taking curvilinear incision 1 cm posterior to the posteromedial border of tibia, utilizing plane between medial head of gastrocnemius posteriorly and pes anserinus anteriorly. Apex of the fractured fragment was exposed and provisional reduction done by extending the knee along with valgus force and held using pointed reduction clamps and Kirshner wires. Locking plate or distal end radius plate was used in buttress mode for definitive fixation. Reduction and alignment was confirmed with fluoroscopy.



Figure 1 (A, B): Preoperative and postoperative radiographs of isolated posteromedial fracture treated with posteromedial fixation.

Postoperative rehabilitation starts with passive range of motion (ROM) exercises from the first day and continued till suture removal. Patients were discharged after first wound check and followed up for suture removal on 14th postoperative day. Active ROM and quadriceps strengthening exercises were started after suture removal and patients were followed up at the end of 6th week. Clinical and radiological assessments were done at 6th week and partial weight bearing started accordingly. Patients were followed up 6 weekly from here onwards

till 6 months and 3 monthly till one and a half year. Minimum duration of follow-up was 18 months after which loss of alignment or any other complication was rare to see. Functional outcome was assessed with Oxford knee score in terms of excellent, good, fair or poor.



Figure 2 (A, B, C, D): Preoperative and postoperative radiographs of bicondylar tibial plateau fracture with posteromedial fracture treated with posteromedial and anterolateral fixation.

RESULTS

Total thirty two patients were operated for tibial plateau fractures with posteromedial fixation including 27 males and 5 females with mean age of 43. Road traffic accidents were the commonest mode of injury. Most common type of fracture was Type IV Shatzker type, with rest being Type V and Type VI. The average time between injury and surgery was 9 days with range from 7 days to 15 days. All fractures healed with mean healing time of 16.4 weeks and range from 15 to 22 weeks. The average follow-up duration was 22 months with range from 18 to 24 months. Associated injuries include ipsilateral shaft femur fracture, bony PCL avulsions and tibial tuberosity fractures.

All patients had an acceptable postoperative reduction and alignment, with only one case of secondary loss of alignment due to comminution and early weight bearing. Infection, nonunion, stiffness and posttraumatic arthritis were not seen in any of the case. Range of motion > 130 degrees was achieved in 29 patients with rest of the three patients between 110 to 130 degrees. Functional outcome was assessed using Oxford knee score which was excellent in 29 patients and good in rest of the three.

Table 1: Distribution of patients according toSchatzker fracture classification.

Shatzker classification type	Number of patients
Type IV	15
Type V	12
Type VI	5

Type I, II & III were not included in the study.

Table 2: Knee range of motion (ROM) distribution.

Range of motion interval	Number of patients
> 130 degrees	29
110 – 130 degrees	3
< 110 degrees	0

Table 3: Oxford knee score.

Outcome	Oxford knee score	Number of patients
Excellent	40-48	29
Good	30-39	3
Moderate	20-29	0
Poor	0-19	0

DISCUSSION

The goals of management for tibial plateau fractures are anatomical reduction, maintenance of alignment, and stable fixation to allow early rehabilitation.^{8,9} Failure to recognize presence of coronal fractures like posteromedial fragment in the past has led to loss of alignment and early arthritis. Evaluation of these fractures with computed tomography and 3-D reconstruction have shown the presence of posteromedial fragment in most of the cases. Barie et al have shown the presence of these fragments in 33% of tibial plateau fractures.⁵ Hackl et al found that 40% of the fractures classified with plain AP radiographs using Schatzker classification have to be changed after doing Computed Tomography (CT).¹⁰

Historically these fractures have been treated with single midline incision which was associated with high wound complication rate and secondary loss of alignment.¹¹⁻¹³ With development of newer approaches, posteromedial approach described by Lobenhoffer is now the standard of care for these fractures with minimal complication rates. Fixation was done on the buttress principle using locked or simple plates with similar results. Zeng et al. compared the use of different modalities like anteroposterior lag srews, anteromedial locking plate, lateral locking plate and posteromedial buttress plate and

found that posteromedial fixation was biomechanically the most stable. $^{\rm 14}$

We have found excellent to good results using posteromedial fixation through Lobenhoffer approach and recommend it in all cases of tibial plateau fractures with this fracture morphology. Complication rates are very low and functional outcome depends upon the postoperative rehabilitation. The limitation of our study was less number of cases and shorter follow-up.

CONCLUSION

Results of ORIF for posteromedial fragment using Lobenhoffer approach are good to excellent in all cases. It provides direct visualization of fracture so that anatomical reduction and alignment can be achieved. We recommend fixation of these fractures through Lobenhoffer approach to prevent long term disabilities and poor functional outcome.

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