



ORIGINAL RESEARCH PAPER

Orthopaedics

STUDY OF OUTCOME OF POSTERIOR PLATING IN TIBIAL PLATEAU FRACTURE WITH POSTEROMEDIAL APEX BY DIRECT POSTERIOR APPROACH

KEY WORDS:

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ABSTRACT

Purpose -Tibial plateau fractures, one of the commonest intra articular fractures, are major traumatic injuries occurring as a result of RTA, fall from height. The management of tibial plateau fracture has always been a subject of debate because of their variety and complexity. Any fracture around the joint (especially weight bearing knee joint in the lower limb) is of paramount importance as it would result in significant morbidity and quality of life may be affected. High energy intraarticular fractures of the tibial plateau cause on going management problems and remains challenging for orthopedic surgeons even to date.

Methods-Total 60 cases were included in the study.and We compare our study of posterior plating in tibial plateau fracture with posteromedial apex with 1 indian and 4 foregin author in terms of age, sex ratio, average time for surgey , average time for union, average time for partial and full weight bearing , range of motion on day 2, 6 week,3month and 6 month,fracture classification , infection, non union, varus malunion, nerve injury,. And functional outcome with lyshlom knee score at tertiary care center.

Results- This study achieved excellent results in 34 patients ,good in 13 patients,fair in 12 patients,poor in 1 patients evaluated as per the criteria suggested by lyshlom knee score. in this study , 7 pts had SSI and 1 Patient had loss of reduction with no other evidence of varus deformity or deep infections. Our case series attributes to 78% of excellent to good results and 20% of fair 2%of poor results.

Conclusion-1.The main aim of surgical treatment include precise reconstruction of articular surface, stable fixation which allows early mobilization of knee which prevents knee stiffness and arthritis.

2.Direct posterior approach to knee gives better visualization of fragment which allows placement of T plate in buttress mode on apex of posteromedial fragment.

3.Fixing the fragment avoids late varus malunion of knee and maintain the knee biomechanics.

4.Non weight bearing knee mobilization on day 2 allows patients early rehabilitation of knee and preventing knee stiffness and gaining functional range of motion.

INTRODUCTION

Fracture of tibial plateau involves major weight bearing joint and may alter knee kinematics. Anatomic reconstruction of proximal tibial articular surface, restoration of limb axis and stable fixation permitting early joint motion are goal of treatment.

Advances in mechanization and acceleration of travel have resulted in number of tibial plateau fracture. They were first called "bumper" or "fender" fracture by Cotton and Berg (1929)¹. Tibial plateau fractures constitute about 1% of all fracture and 8% of all elderly people². Presently the majorities of tibial plateau fracture are secondary to high speed vehicle accident and fall from height³. The direction, magnitude and location of forces, as well as position of knee at impact determine the fracture pattern, location and degree of displacement⁴.

Most studies have shown that most injuries affect lateral plateau (55- 70%), isolated injuries to medial plateau (10-23%) and involvement of both plateau (10-30%) of reported series⁵. Tibial plateau fracture associated ligament and soft tissue injuries. Fractures of tibial plateau occur as a result of strong valgus or varus forces combined with axial loading⁶. Posterior column fragment are relatively uncommon in proximal tibial plateau fracture. It is a specific fracture pattern

that is not well described by the AO or Schatzker classification system⁷, because these classification systems do not differentiate case in between the medial fragment is primarily posterior & sometimes associated with dislocation or subluxation of the knee joint. Recently, posteromedial fracture was well defined in the revised duprc classification⁸, using important finding to classify the type 4 fractures. Coronal plane proximal tibial plateau fracture which are only visible on lateral Radiograph or CT scan. If wrongly diagnose, they may lead to the use of in appropriate fixation techniques that results in poor outcomes.

Reduction problem is often faced during posteromedial displacement of tibial fragment under knee flexion. The supine position with posteromedial approach requires extensive dissection for reduction approach. Furthermore, biomechanical principles of management of these fractures require placement of posterior anti glide buttress plate. Therefore they cannot be optimally treated by conventional approach⁹.

The direct posterior approach to posteromedial fragment with patient in prone position has been used to overcome the limitation to conventional posteromedial approach. It allows reduction by hyperextension of knee through axial traction over surgical bump. The technique allows direct visualization of posteromedial fracture without need for dissection of neurovascular bundle and for placement of an antiglide

buttress plate at apex of posteromedial fracture fragment.

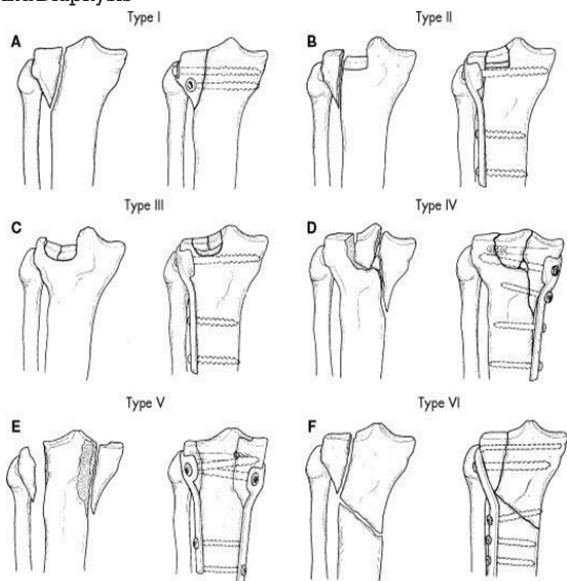
Patient undergoing fracture repair through posterior approach can typically be mobilized on their first day after surgery with functional rehabilitation and restricted weight bearing for 8 to 10 weeks post operatively.

MATERIALS AND METHOD

All patients between 18 to 70 years of age with tibial plateau fracture with apex posteromedial will be included in study. All patients will undergo pre-operative investigation and who will be fit for surgery for open reduction and internal fixation with plating under general or spinal anesthesia. Pre tested pre validated structured questionnaire will be used. All patient who's fracture pattern describe in Schatzker type 4 to 6 or Moore type 1,2 and 5 will be used in data collection tool. All the 60 patient included in this study conducted at tertiary care hospital. Patient were followed up at regular interval at 6 week , 3month, 6month and functional outcome assessment with Lyshlom knee score

SCHATZKERS CLASSIFICATION¹⁰

- Type I** - Pure Cleavage:
- Type II** - Cleavage Combined With Depression:
- Type III** - Pure Central Depression:
- Type II** - Fractures Of Medial Condyle:
- Type V** - Bicondylar Fractures:
- Type VI** - Plateau Fracture With Dissociation Of Metaphysis And Diaphysis



HOHL And Moores Classification:

- Fracture Pattern**
- TYPE 1:** Split fractures of the lateral condyle.
 - TYPE 2:** Lateral compression.
 - TYPE 3:** Split with compression fracture.
 - TYPE 4:** Total condylar fractures.
 - TYPE 5:** Bicondylar fractures

HOHL-MOORE CLASSIFICATION

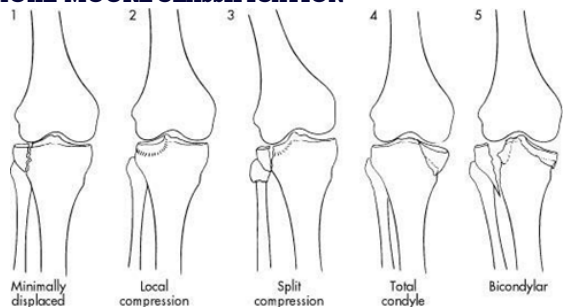


Fig 7; Fracture Pattern

INCLUSION CRITERIA

1. Patient who gave consent for this procedure.
2. Patient who are fit for surgery
3. patient with tibial plateau fracture of Schatzker type 4 to 6 or Moore type 1,2 and 5

EXCLUSION CRITERIA

1. Fractures of tibial plateau not included in this study
2. Pre existing inflammatory or degenerative arthritis of the injured knee
3. Pathological fracture

OPERATIVE PROCEDURE¹¹

Surgical fixation was done in prone position under fluoroscopy control. Antibiotic prophylaxis was given preoperatively and continued for 48 hours postoperatively. Inverted L incision made after superficial dissection tendon of Gastrocnemius seen and muscle is retracted laterally, popliteus and soleus are subperiosteally elevated off posterior tibia. Apex of the fractured fragment was exposed and provisional reduction done by extending the knee 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.

X- RAYS



PRE OP



post op xray

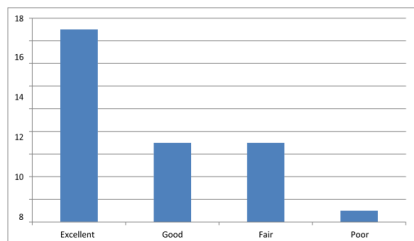
3 month follow up

RESULT

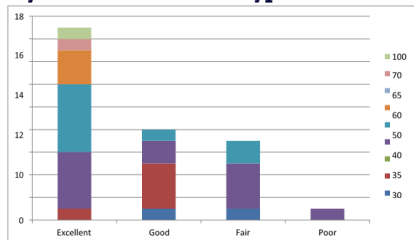
Schatzker type 4, 5, 6 in 60 patients

Schatzker Type	No. Patients
IV	32
V	24
VI	4

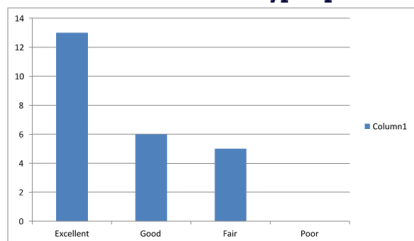
Schatzker type 4 in Lyshlom knee score



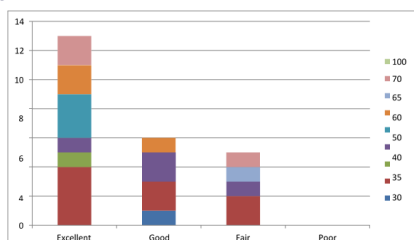
Post OP day 2 ROM in Schatzker type 4 fracture



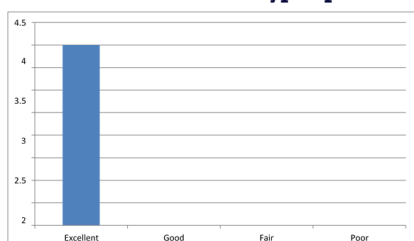
Lyshlom Knee Score in Schatzker type 5 patients.



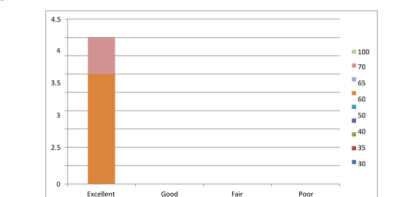
Post OP day 2 Range of Motion in Schatzker Type 5 Fracture.



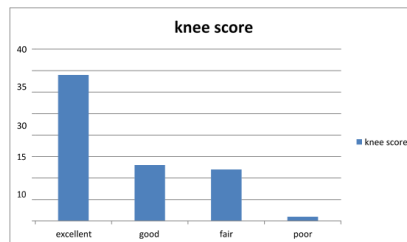
Lyshlom Knee Score in Schatzker type 6 patients.



Post OP Day 2 Range of Motion in Schatzker Type 6 Fracture.



LYSHLOM KNEE SCORE IN TOTAL 60 PATIENT



COMPLICATION

COMPLICATION	Type
SSI	7
Loss of reduction	1
Varus collapse	0
Deep infection	0

DISCUSSION

Tibial plateau fractures, one of the commonest intra articular fractures, are major traumatic injuries occurring as a result of RTA, fall from height. The management of tibial plateau fracture has always been a subject of debate because of their variety and complexity. Any fracture around the joint (especially weight bearing knee joint in the lower limb) is of paramount importance as it would result in significant morbidity and quality of life may be affected. We compare our study with 1 indian and 4 foregin author in terms of age, sex ratio, average time for surgey , average time for union, average time for partial and full weight bearing , range of motion on day 2 ,6 week,3month and 6 month,fracture classification , infection, non union, varus malunion, nerve injury,. And functional outcome with lyshlom knee score.

Chandel VS et al discussed in their study 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. Range of motion in 29 achived 130 degree with rest in between 110 to 130.¹²

Galla M et al studed three cases of tibial posteromedial fracture dislocation were treated by direct posterior approach in prone position in January and February 2002. The report shows that direct posterior surgical technique allows optimal exposure, reduction and internal fixation of medial split fracture of the tibial plateau with minimal trauma. These posterior approaches to proximal tibia allow appropriate positioning of the anti-glide plate.¹³

Chen CW et al studied 8 cases from June 2008 to February 2011 patient with posterior tibial plateau fracture treated with posterior approach, were reviewed retrospectively. All cases had admitted bone union; time of bone healing was 14.5 weeks in average ranging from 11 to 21 weeks. No infection, no blood vessel or nerve injuries and loosening or breakage of screw were found. Radiologic results were graded with Ramussen functional score to evaluate the reduction of fracture, the scores at last followed up was 14 to 18 score, the result were excellent in 6 and good in 2.¹⁴

Lin K.C. et al find in there study that all fractures healed within 6 months, without secondary displacement. Ten knees had post-operative anatomic reduction (0 mm step-off) and 6 had acceptable reduction (< 2 mm step-off). At 34.4 ± 9.6 months, median extension was 3 (5-10) and flexion 135 (100- 145). The mean Lysholm score was 95 (75-100) and the mean Tegner

activity score was 6 (5–8). All patients were satisfied with the operation. No cases of post-traumatic osteoarthritis of the knee occurred during follow-up.¹⁵

Qiu WJ et al studied in 95 patients' average age was 46.2 years old (range, 22.0–89.0). The fractures were mainly from high energy injuries involving posterior (and medial) column. 78 of 95 cases were combined with an additional anterolateral approach due to the lateral column involvement. The average follow-up was 52.0 months (range, 12.4–102.6). The total complications rate was 4.2% (4/95). Intraoperative complications occurred in two patients (2.1%). One suffered a popliteal artery injury resulted from an antero-posteriorly drilled K-wire. The patient had a loss of 7° knee extension at one year's follow-up. The other endured an injury of nutrient vessel within the medial head of gastrocnemius. Postoperative skin paresthesia occurred in two patients (2.1%). The mean HSS score was 96.1 (range, 80–100). The mean SF-36 score was 94.2 (range, 80–100). The posterior reversed L-shaped approach allows satisfied visualization of the medial and posterior tibial plateau and has promising clinical results with low complication occurrence. It can be recommended as a routine approach for the treatment of the tibial plateau fractures involving the posterior column.¹⁶

In our study we found young population with average age was 32 years with most common modalities of injury was road traffic accident. Out of 60 patient 32 (53%) of Schatzker type 4, 24 (40%) of Schatzker type 5, 4 (7%) of Schatzker type 6. With predominance of type 4 fracture seen in our study. According to Lysholm knee score we found that in excellent category 34 (57%) patient, in good category 13 (22%) patient, in fair category 12 (20%) patient and in poor category 1 (1%) patient. Total 77% in our study attain excellent to good outcome.

The average time between trauma and day of surgery was 5 days. As we were fixing posteromedial apex with T plate in buttress mode we started early knee mobilization on day 2 only. Average range of motion on day 2 was 46°. And on 6 weeks was 72°, on 3 months was 95°, on 6 months was 116°. Our early non weight bearing knee mobilization protocol prevents knee stiffness, arthritis and which helps patient for early rehabilitation.

CONCLUSION

1. The main aim of surgical treatment include precise reconstruction of articular surface, stable fixation which allows early mobilization of knee which prevents knee stiffness and arthritis.
2. Direct posterior approach to knee gives better visualization of fragment which allows placement of T plate in buttress mode on apex of posteromedial fragment.
3. Fixing the fragment avoids late varus malunion of knee and maintain the knee biomechanics.
4. Non weight bearing knee mobilization on day 2 allows patients early rehabilitation of knee and preventing knee stiffness and gaining functional range of motion.

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