International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2019; 5(2): 1055-1057

www.orthopaper.com
Received: 17-02-2019
Accepted: 19-03-2019

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Functional and radiological outcome of unstable posteromedial condyle fracture in tibial plateau via lobenhoffer's direct, posterior approach: A prospective study

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DOI: https://doi.org/10.22271/ortho.2019.v5.i2p.1480

Abstract
Posterior column fractures of the tibial plateau are relatively rare, as described by Duparc in his revised classification as less as 5% of the tibial plateau fractures although Barie *et al* has shown upto 30% incidence among tibial plateau fractures [1]. This posteromedial fragment can exist as a solitary fragment or a part of bicondylar tibia plateau fracture is usually not straightforward to diagnose, usually necessitating a CT scan to establish it's presence and morphology. Study was conducted in department of orthopaedics, at Institute of Medical Science & Research Centre, from march 2017 to January 2019.All cases presenting to the outpatient and emergency department fulfilling the below mentioned criteria were taken up for study. Of 15 patients, Functional outcome was assessed using Oxford knee score 12 patients i.e. 85.7% had excellent outcome, 2 patient's i.e. 10.7% had good and 1 patient i.e. 3.6% had fair results. The mean OKS score was 40 (range 36 to 44) at the end of one year ange of motion > 130 degrees was achieve in 12 patients with rest of the three between 110 to 130 degrees. The commonest cause of tibial plateau fracture was Road Traffic Accident, which accounted to 12 patients i.e. 79% and domestic fall accounted for 3 patients i.e. 21%.Amongst the Road Traffic Accident group, 10 had excellent outcome and 2 had good outcome. Amongst the domestic fall group, 2 had excellent outcome and 1 had fair outcome.

Keywords: Unstable posteriomedial condyle fracture, tibial plateau, lobenhoffer's direct

Introduction
Posterior column fractures of the tibial plateau are relatively rare, as described by Duparc in his revised classification as less as 5% of the tibial plateau fractures although Barie *et al* has shown upto 30% incidence among tibial plateau fractures [1]. This posteromedial fragment can exist as a solitary fragment or a part of bicondylar tibia plateau fracture is usually not straightforward to diagnose, usually necessitating a CT scan to establish it's presence and morphology [2]. This was mainly because Shatzker's classification did not mention coronal plane fracture fragments and patterns. If these fractures are not recognised and fixed, it can lead to varus collapse, degenerative arthritis, chronic disability and pain with deformity [3].
These fractures are inherently unstable as they are associated with ligament injury and sometimes fracture-dislocation patterns. A midline approach in the supine patient position was usually performed to address multifragmentary fractures which involved the posteromedial fragment as well as posteromedial approach in the figure of four position, but they are rather difficult to negotiate and fix the posteromedial fragment and/or associated with wound healing complications especially seen in the former. Direct posterior approaches require the careful dissection of the posterior neurovascular structures [4-6].
The Lobenhoffer approach described by P. Lobenhoffer et. al allows for better exposure of the fracture, easier reduction and buttress plate placement as well as not requiring contact with the neurovascular bundle during exposure [7].

Methodology
- Study was conducted in department of orthopaedics, at Institute of Medical Science & Research Centre, from March 2017 to January 2019.

- All cases presenting to the outpatient and emergency department fulfilling the below mentioned criteria were taken up for study.

Inclusion Criteria

- Patients above 18 years
- Sex: Both sexes
- Radiological diagnosis of fractures with classification based on Schatzker's classification (types IV) (Duparc, Revised Classification, Group-V: Postero-Medical Fracture).
- Closed tibia plateau fracture with or without skin abrasions and contusions.

Results

Table 1: Gender Distribution

Male Patients	Female Patients
11 (71%)	4 (29%)

In our study of 15 patients, with a maximum follow up period of 18 months.

Table 2: Age Distribution

Age Group	Number of Patients	Percentage
< 35 years	4	26.66%
35-45 years	8	53.33%
>65 years	3	13%

The youngest patient was 28 years old and the oldest was 72 years old

Table 3: Clinical Outcome

Clinical Results	Number of Cases	Percentage
Excellent	12	85.7%
Good	2	10.7%
Fair	1	3.6%

Of 15 patients, Functional outcome was assessed using Oxford knee score 12 patients i.e. 85.7% had excellent outcome, 2 patient's i.e. 10.7% had good and 1 patient i.e. 3.6% had fair results. The mean OKS score was 40 (range 36 to 44) at the end of one year.

Range of motion > 130 degrees was achieve in 12 patients with rest of the three between 110 to 130 degrees.

The commonest cause of tibial plateau fracture was Road Traffic Accident, which accounted to 12 patients i.e. 79% and domestic fall accounted for 3 patients i.e. 21%.

Amongst the Road Traffic Accident group, 10 had excellent outcome and 2 had good outcome. Amongst the domestic fall group, 2 had excellent outcome and 1 had fair outcome.

No frank infection was observed in our study. The chance of infection, delayed wound healing and wound breakdown in complex tibial fractures (types IV, V, VI) are high.

Fig 1: Pre op X ray

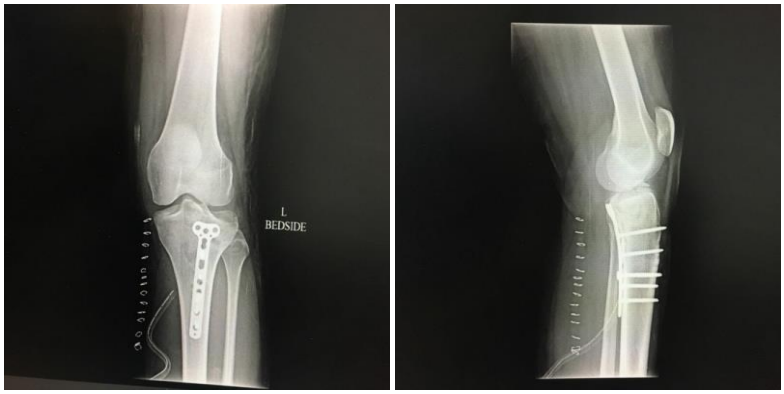

Fig 2: Post op X ray

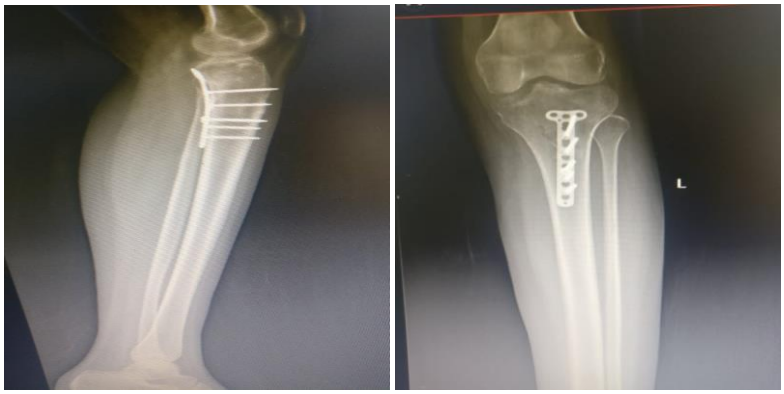

Fig 3: Follow up 6 month X ray

Discussion

The posteromedial tibial plateau fracture can be easily missed if the surgeon is not suspicious of it's presence, especially if keeping only Shatzker classification in mind. Being a coronal plane fracture, it necessitates a CT scan with 3D reconstruction to delineate the fracture morphology and plan the ideal surgical approach and plate position [8-9].

Barie *et al*. have demonstrated the posteromedial fragment in 33% of tibial plateau fractures, while Hackl *et al* noted that 40% of x-ray based Shatzker classification needed to be changed to a different Type after doing a CT scan. Hence, it is essential for proximal tibial plateau fractures to undergo a CT scan to classify the fracture pattern via Luo's column classification based on axial CT films or the revised Duparc system [5-6].

Our study showed that majority of the patients were in the middle-age group, the commonest mechanism of injury was direct trauma in a Road traffic accident. The functional outcome as assessed by the Oxford knee score demonstrated excellent outcome in 87.5%, good outcome in 10.7% and fair outcome in 3.6% patients. This is in keeping with the functional outcome in studies conducted by Zheng *et al*. [10] Bendayan *et al*. [11] and De Boeck *et al*. [12]

Also noted was better functional outcome among patients who sustained their injury in Road traffic accident as compared to those who were injured due to a fall. Infection was also negligible in this study. Barring the few complications associated with the prone position, we definitely recommend the Lobenhoffer approach for the exposure and fixation of the posteromedial fragment of the tibial plateau fractures.

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