

Study of various treatment modalities and functional outcome for tibial plateau fractures

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ABSTRACT

Background: The optimum treatment of tibial plateau fracture remains controversial. Various authors have mentioned different parameters to choose either the conservative or the surgical treatment.

Aim: To evaluate the different patterns of tibial plateau fractures and assess the functional outcome of various modalities of treatment.

Methods: Patients were managed conservatively as well as surgically based upon the above mentioned criteria. Out of the 50, 14 patients were treated with a above knee plaster cast while 36 patients were treated with various surgical modalities. Fractures were classified according to Schatzker and their functional outcome was calculated by HSS score.

Results: Males and age group of 20-50 yrs formed majority of our patients with road traffic accident as the prime cause. Bicondylar fracture was most common. All the conservatively treated patients yielded satisfactory results, while in surgically treated group 77.77 % of patients yielded satisfactory result. No complications were noted in conservatively treated group at 6 month follow-up.

Conclusion: Minimally displaced tibial plateau fractures with articular depression less than 8 mm can be successfully managed conservatively.

Keywords: tibial condyle, conservative management, CC screw, lateral locking plate, JESS

INTRODUCTION

There are conflicting views concerning the best treatment for patients with fractures of the tibial plateau. Many surgeons claim that anatomical reduction and stable internal fixation of the fragments is the treatment of choice.^{1,2} On the other hand, several long-term studies have demonstrated that conservative treatment is a satisfactory alternative, despite imperfect radiological appearance of the fracture.^{3,4} In the recent years, operation with anatomical restoration of the articular cartilage has been recommended by most authors⁵ but good results have also been reported after conservative treatment of displaced fractures.^{6,7} Hohl⁸ achieved similar clinical results with operative and non operative treatment of fractures with 8 mm depression or less while other group of authors considered that the major indication for surgery

was clinical valgus or varus instability and not the radiological depression of the articular surface.⁹ This study intends to evaluate the different patterns of fractures of tibial plateau and assess the functional outcome of various modalities of treatment employed.

MATERIALS AND METHODS

This prospective study was conducted on fifty patients with tibial plateau fractures. Both open and closed were included in the study with a minimum follow up of 6 months. Patients with ipsilateral tibial shaft, ipsilateral distal femur and ipsilateral patella fractures were excluded. Fractures was classified as per Schatzker classification and the functional outcome is evaluated using HSS (Hospital for Special Surgery) Knee Scoring System. Surgical as well as conservative methods were used for the management of the fractures. In our study we

operated on patients with displaced tibial plateau fractures with articular depression more than 8mm and bicondylar fractures.

The data was analyzed in relation to age, sex, cause of injury, various types of fractures, various modalities of treatment used and compared and contrasted the functional results with other series.

Immediate management consisted of either above knee pop slab or calcaneal traction. In cases of open fractures surgical debridement under anaesthesia was performed. For non operative treatment we applied above knee plaster cast from groin to foot with knee in 5-10 degree of flexion. Cast was kept for minimum of 6 weeks after which mobilization was started. Fractures were reviewed radiologically and decision for weight bearing was made accordingly. Surgical methods employed in our study were percutaneous cannulated cancellous screw fixation, open reduction and internal fixation with lateral locking plate and Joshi External Stabilization System (JESS).¹⁰ Injectable antibiotics were given for 4-5 days. Static quadriceps exercises were started from second day. Gradual knee bending exercises were started and continued till 70-90 degrees of knee flexion was achieved. Further flexion was achieved by asking the patient to sit at the edge of the bed and bending the knee. Continuous passive motion was given for about 1 hour daily after pain and edema subsided. The patient was mobilized on crutches. Suture removal was done on 12th postoperative day. The patient was discharged non weight bearing. The patient was followed up every 4 weeks for a minimum period of 6 months. Partial weight bearing was started from 6 to 9 weeks in correlation with X-rays. Clinical and radiological evaluation was done at every visit. Any complication early or late was noted.

Functional outcome for each case was calculated using the Hospital For Special Surgery Scoring System at the completion of post-op 6 months. Excellent and good were deemed Satisfactory, while fair and poor were deemed unsatisfactory.

RESULTS

Patients comprised of 38 males and 12 females, males majority indicating their frequent exposure to high velocity injuries and trauma. Majority of the cases in our series were between 20 - 50 years indicating that tibial condylar fractures occur in the working age groups more commonly due to increased mobility. The youngest patient was 20 years old and the oldest was 62 years old.

Road traffic accidents formed a major cause in our series. Out of the 50, there were 44 closed fractures while rest 6 were open fractures. Bicondylar fractures comprises majority of cases (Type 1 - 8 cases, Type 2 – 6 cases, Type 3 – 6 cases, Type 4 – 8 cases, Type 5 – 12 cases and Type 6 – 10 cases) indicating increasing incidence of high velocity injuries. This indicates the changing factors from M. Hohl's series where local compression and minimally displaced fractures were more common.

The knee mobilization was started as soon as possible on the 2nd post-operative day in the surgically treated cases (with one exception of type 1 fracture treated with CC screws in which a 6 weeks above knee cast was applied in extension for intercondylar eminence fracture) while it was late in conservatively treated cases (6 weeks). However there was no significant difference between two groups in relation to starting of weight bearing. The average duration of stay in the hospital was less in case of the patients who were treated conservatively with above knee cast compared to those treated operatively.

Of the 14 patients treated conservatively (100%), excellent result were obtained in 8 cases (57.14%) and good result in 6 cases (42.86%), All the 14 cases treated non – operatively yielded satisfactory result.

Of the 36 patients treated operatively (100%), excellent Result (E) were obtained in 14 Cases (38.88%), good result (G) in 14 cases (38.88%),

fair result (F) in 6 cases (16.66%) and poor result (P) in 2 cases (5.55%). 28 patients (77.77 %) yielded satisfactory results, while 8 patients

Table.1. Surgically treated group (Total N=36)

Type	Results				Total no. of cases
	E	G	F	P	
Schatzker Type 1	4(CC)	2(CC)	-	-	6
Schatzker Type 2	2(CC)	2(CC)	2(CC)	-	6
Schatzker Type 3	-	-	-	-	-
Schatzker Type 4	-	-	2(LCP)	-	2
Schatzker Type 5	4(LCP)	6(LCP)	2(JESS)	-	12
Schatzker Type 6	2(JESS) 2(LCP)	4(LCP)	-	2(LCP)	10
Total	14	14	6	2	36

CC – Cannulated Cancellous Screw, LCP – Lateral Locking Plate, JESS – Joshi External Stabilization System

Fifty cases were studied of which (22+20=) 42 cases (84%) had satisfactory result and (6+2) 8 cases (16%) had unsatisfactory result. No complications were noted in the 14 cases treated non-operatively, while out of 36 treated operatively 6 cases (16.67%) got infected and 4 cases (11.11%) had knee stiffness.

DISCUSSION

In our series 14 cases were treated conservatively of which all the 14 (100%) had Satisfactory outcomes. Of the 36 cases treated surgically, 28 had satisfactory results (77.77%); and 8 had unsatisfactory results (22.22%). A direct comparison between the conservative and operatively treated cases if done would be fallacious because of different age groups, type of fractures, displacements, indications and

preference of surgeons.¹¹ The duration of our study is small to comment on osteoarthritic changes.

Our results are comparable with other series. Analyzing the series of different authors results of conservative treatment varied from 62%-95% and for surgical treatment varied from 61.5% - 92%. Bakalim and Wilppula have obtained 86% results conservative and 61.5% result with surgical treatment¹²; Apley's conservatively treated series had excellent results in 80% while Burri's surgically treated series had good to acceptable results in 89-97%.^{7,13}

CONCLUSION

Undisplaced or minimally displaced tibial plateau fractures with articular depression less than 8 mm can be successfully managed Conservatively. However a large scale study is required to arrive at final illation. Early motion is necessary for the preservation of joint motion and soft tissue function. Furthermore, it has a profoundly beneficial effect on cartilage regeneration.

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