

Management of bicondylar fracture tibia by bicolunar plating: An observational study

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Abstract

Background: The fractures of proximal tibia particularly those that extended into the knee joint are termed as tibial plateau fractures. Bicondylar fractures are less common and are more difficult to treat due to complexity of configuration and associated soft tissue injuries. Schatzker type V and VI fractures are high-energy fractures often accompanied by other injuries and complications, such as postoperative inflammation, wound problems and infections. They tend to have a poor prognosis. Various surgical approaches and fixation techniques have been developed to treat Schatzker type V and VI fractures. **Aim and objectives:** To evaluate the functional outcome of bicolunar plating in the management of bicondylar fracture tibia. **Methodology:** The study was conducted among 30 consecutive patients with SCHATZKER'S TYPE V and VI bicondylar fracture tibia. All the patients were evaluated subjectively, clinically and radiologically at subsequent follow ups. **Results:** The mean age among patients was 41.38 ± 12.37 years. The male: female ratio was 2.75. Among 30 patients; 5 (16.67%) had Diabetes Melliteus while 3 (10%) had hypertension. 70% patients were in Class V and 30% patients were in Class VI. Mean duration of surgery from time of injury was 7.89 ± 3.98 days. Mean hospital stay in patients was 13.16 ± 3.69 days. Mean time for union in patients was 12.18 ± 4.83 weeks. 6.67% patients had malunion. The functional outcome was 83.33%, 10%, 6.67% and 3.33% excellent, good, fair and poor respectively according to Knee Society score. **Discussion and conclusion:** The bicolunar plating fixation is the best, effective and simple procedure in treatment of complex bicondylar fracture tibia. (Types V and VI of Schautzker classification)


Key Word: bicondylar fracture tibia, bicolunar plating.

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INTRODUCTION

The knee joint is complex joint and is the commonly injured joint now a day because of increased vehicular trauma and sports related injuries. Being superficial joint and more exposed to external forces, this joint easily gets injured.¹ Complex kinematics of its weight bearing position and complex ligamentous stability and articular congruency are the main reason why these fractures are of

concern to surgeon and cause disability to the patients. The fractures of proximal tibia particularly those that extended into the knee joint are termed as tibial plateau fractures. The principles of treatment of joint fractures that evolved included accurate reduction of articular surfaces with early movement of the joint. The indications for non-operative vs. operative treatment vary widely among surgeons as do the specific methods for many fractures configurations and concomitant lesions. Several fixation methods could be used for tibial plateau fractures including unilateral fixation with a single plate, dual-plate, a hybrid external fixator or a less invasive stabilizing system (LISS). The present study was proposed to for the prospective evaluation of results of bicolunar plating for bicondylar fracture tibia.

MATERIALS AND METHODS

The present study was prospective observational study undertaken to evaluate the functional outcome of bicolunar plating in the management of bicondylar

fracture tibia. The study population was all cases of bicondylarfracture tibia attended at the department of Orthopaedics, Bharati Vidyapeeth Medical College and Hospital, Sangli during December 2014 to June 2016.

Inclusion Criteria: All patients with schatzker’s type V and VI were included in the study after taking written consent from them.

Exclusion Criteria:

1. Patient with all open compound fractures.
2. Patient with SCHATZKER’S TYPE I-IV fractures.
3. Patients neurovascular deficit.
4. Patients with old deformities of lower limb.

The study was approved by the ethical committee of the medical college all patients of bicondylarfracture tibia attended at the department of orthopaedics were studied. a detailed history was taken of these patients and was explained about the investigations and study. Patients were operated under regional or general anesthesia after pre operative assessment. Post operative radiographs were reviewed to assess the adequacy of articular reduction, metaphyseal-diaphyseal reduction, and alignment. The drains were removed after 48 hrs above knee slab or removable knee brace with leg elevation given to decrease the pain and edema. Injectable antibiotics given for 3 to 5 days. static quadriceps exercises and ankle pump exercise started on second day. The patients with stable fixation were allowed intermittent knee mobilization once the wound pain subsided in type v and vi in^{2,3} days. Patients were encouraged to do active assisted knee bending exercises and quadriceps exercises. the patient was followed up on^{1,3,6} and 12 months. the outpatient records were reviewed to obtain data regarding pain, disability, wound healing, and range of movements of the knee. Follow up radiographs were reviewed to note the time to union, any loss of articular reduction, fixation failure, or deformity. After clinical and radiological union, data regarding the functional recovery, such as walking ability, ability to climb and descend stairs, and activities of daily living were recorded. Return to pre-injury employment and ability to participate in sporting activities was also noted. At the end of 1 year follow up, all patients were evaluated using knee society score for assessment of both functional and radiographic results

RESULTS

Table 1: Distribution of patients according to age

Age (years)	Frequency	Percentage
21-30	04	13.33
31-40	05	16.67
41-50	06	20.00
51-60	12	40.00
>60	03	10.00
Total	30	100
Mean Age (years)	41.38	± 12.37

Table 1. showed distribution of patients according to age. It was observed that majority of patients were from age group 51-60 years (40%). The mean age among patients was 41.38 ±12.37 years. Majority of patients were males (73.33%) while females were 8 (26.67%). The male: female ratio was 2.75:1. Among 30 patients 23 (76.67%) had history of high velocity trauma and 7 (23.33%) had low velocity trauma. Of all 17 (56.67%) had right sided fracture while 13 (43.33%) had left sided fracture. It was observed that among 30 patients; 5 (16.67%) had Diabetes Mellitus while 3 (10%) had hypertension.

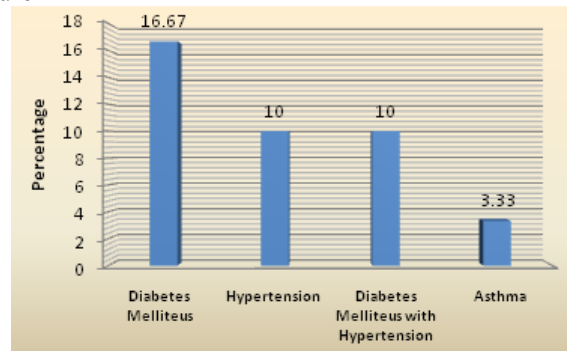


Figure 1: Distribution of patients according to Comorbidity

It was observed that among 30 patients; 17(56.67%) had no associated injuries while 13 (43.33%) had associated injuries. According to schatzker classification of fracture 21 patients (70%) were in Class V and 9 (30%) patients were in Class VI. Mean duration of surgery from time of injury was 7.89 ±3.98 days. Mean hospital stay in patients was 13.16 ±3.69 days. Mean time for union in patients was 12.18 ±4.83 weeks. The mean knee flexion at 1 year after surgery 122.12 ± 04.82 °. The mean knee extension at 1 year after surgery and 1.76 ± 00.82 °.

Table 2: Distribution of patients according to complications

Complications	Frequency	Percentage
Malunion	02	06.67
Nonunion	01	03.33
Infection	01	03.33
Arthritis	03	10.00

(Multiple Response)

Table 2 showed distribution of complications among patients. It was observed that among 30 patients, 2 (6.67%) patients had malunion. The arthritis was observed in 10% patients.

Table 3: Distribution of patients according to functional outcome (Knee Society Score)

Outcome	Frequency	Percentage
Excellent	25	83.33
Good	03	10.00
Fair	01	06.67
Poor	01	03.33
Total	30	100

It was observed that functional outcome was 83.33%, 10%, 6.67% and 3.33% excellent, good, fair and poor

respectively according to Knee Society score table 3.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5

DISCUSSION

In the present study, it was observed that majority of patients were from age group 51-60 years (40%). The mean age among patients was 41.38 ± 12.37 years. Majority of patients were males (73.33%) while females were 8 (26.67%). This high incidence of sex versus upper tibial fractures can be attributed to an over whelming large proportion of male patients, because in our Indian setup, the female population largely working indoors or in the agricultural fields and do not indulge themselves in travelling or outdoor activities. In study done by Prasad TG, *et al*³ the age of the patients varied from 22 to 61 years, The average age among patients was 40 years. There were 33 males and only 7 females in the study. The age and sex distribution pattern observed in the present study was in agreement with a study by Prasad TG *et al*³ suggesting male preponderance. The average age of the patients was 51.6 year with 50% of males and 50 % of females in study by Cho KY *et al*⁴ In studies by Cho KY *et al*⁴, Prasad TG, *et al*³ 100% of the patients sustained bicondylar tibia fracture due to high velocity trauma as contrast to this study. In a study done by Ebrahim Ghayem Hassankhani *et al*⁵ among 22 patients 63.63% had Class V and 36.37% had Class VI according to SCHATZKER'S Classification of Fracture It was observed that among 30 patients; 17 (56.67%) had no associated injuries while 13 (43.33%) had associated injuries. Similar findings were seen in study done by Ebrahim Ghayem Hassankhani *et al*⁵ where among 22 patients⁵ (22.72%) patients had associated injuries. Mean hospital stay in patients was 13.16 ± 3.69 days in present

study, The findings were in contrast with study done by Avinash Jain *et al*⁶ where mean hospital stay was 9.32 ± 5.20 days. The delay of mean surgery time was due to the soft tissue swelling. In a study by Prasad TG, *et al*³ union was achieved in 8-22 weeks with average of 14 weeks and Ebrahim Ghayem Hassankhani *et al*⁵ showed among all 22 patients the fracture had union with the average time up to 15 weeks (range 12-23). Majority of patients had good range of movements at knee with mean extension was 1.75° and the mean flexion was 128.5° in a study done by Prasad TG, *et al*³ The good range of movement in present study was due to early mobilization and use of Continuous passive motion (CPM) machine. Time of allowing weight bearing after surgery was determined by type of fracture, stability of fixation and also by associated injuries. After the clinical and radiological signs of union, patients were allowed partial weight bearing and gradually progressed to full weight bearing. Present study showed various complications similarly Kulwinder Singh *et al*⁷ done a study were among 30 patients, 2 cases developed superficial infection, which were treated with antibiotics and regular dressings. The incidence of superficial infection was 6.7%. Implant removal was not done in any case and there was no case of deep infection. Malunion and Joint Stiffness was observed in One case of type VI. There was no case of non union. In study done by Ebrahim Ghayem Hassankhani *et al*⁵ functional outcome according to Knee Society Score among 22 patients was, excellent in 19 patients (86.4%), good in 2 patients (9.1%), fair in 1 patient (4/5%), and poor in no patient (0%).The

functional outcome observed in the present study was similar to the study done by Prasad TG *et al* though the approach used was different while it was similar to study done by Chang-Wug Oh *et al.*⁸ but authors evaluated functional scores according to Hospital for Special Surgery (HSS) scores. The limitation of the study was smaller number of subjects. Still there were a number of results in our study which showed trends that approach the accepted level of significance.

CONCLUSION

The majority of fractures were in younger males due to high velocity energy. The good anatomical knee joint reduction, the relative stability and alignment of the proximal tibia allowing the earliest knee mobilization, while keeping complications to a minimum rate, are the major goals in the treatment of complex proximal tibial plateau fractures which had been achieved in the present study. Hence, the bicolumnar plating fixation is the best, effective and simple procedure in treatment of complex bicondylar fracture tibia. (Types V and VI of Schatzker classification)

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