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To study the functional outcome of surgical management of intrarticular proximal tibia fracture with posteromedial fragment.

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Abstract

Introduction: Knee joint is an important joint as it is involved in varied functions like load bearing, walking, running, sitting. Fractures of the tibial plateau represent 1% of all fractures and approximately 8% of fractures occurring in the elderly. In case of complex bicondylar tibial plateau fracture with larger postero-medial fragment, isolated lateral plating resulting in varus malalignment, in such fracture it is imperative to fix the medial plateau with buttressing plate in addition of postero-medial plate by dual postero-medial and antero-lateral incision.

Objective: To evaluate the Retrospective Study of Functional Outcome of Surgical Management of Intraarticular Proximal Tibia Fracture with Postero-Medial Fragment.

Methodology: Study Area- New Civil Hospital, Surat. Sample Size: 30.

Results: The average time for fracture healing was 10 weeks (ranging from 8 weeks to 12 weeks). Fracture pattern, type of fracture and presence of infection significantly affected the fracture healing. Anatomical reduction and relatively stable fixation had early rehabilitation and reduced complications.

Conclusion: Posteromedial plating in posteromedial column fracture aids in good fracture union and the weight transmission from the femur can be proper and early mobilization is possible. Avoids skin necrosis which was potential problem in proximal tibia fractures. Patient compliance is more.

Keywords: Tibia, proximal tibia fracture, dual plating in proximal tibia

Introduction

Knee joint is an important joint as it is involved in varied functions like load bearing, walking, running, sitting etc. Knee joint is comprised of distal femur, proximal tibia & patella. Injuries of the knee must be treated properly to maintain a good knee function.

Fractures of the tibial plateau represent 1% of all fractures and approximately 8% of fractures occurring in the elderly [1]. These are serious injuries resulting frequently in functional impairment [2]. Despite many advances in the care of intra-articular fractures, tibial plateau fractures continue to be a difficult surgical problem. A survey of the literature indicates that many authors report only slightly better than 50% satisfactory results with either closed or operative methods of treatment. The failures of treatment are usually due to residual pain, stiffness, deformity, recurrent effusions, and instability. The successful management of these fractures demands familiarity into the character of fracture, technical aspect of fracture fixation, knowledge of implant profile and art of the post-operative management [3]. Review of over 140 of these fractures treated by both closed and operative methods has shed considerable light on the reason for the failures (Schatzker *et al.* 1979) [4].

For over three decades various modality of treatment starting from (traction, knee spanning external fixator to total knee arthroplasty) used for tibial plateau fractures. Traction and closed reduction followed by POP application will not restore the articular surface and lead on to articular surface collapse and knee stiffness. Open reduction and fixation with plating will lead to good reduction of articular surface. ORIF with dual plating has been an attractive treatment method for complex types of injuries [5].

In case of complex bicondylar tibial plateau fracture with larger postero-medial fragment, isolated lateral plating resulting in varus malalignment, in such fracture it is imperative to fix the medial plateau with buttressing plate in addition of postero-medial plate by dual

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postero-medial and antero-lateral incision [6] ORIF Plating with Addition of posterior approach for stabilization of the posteromedial fragment in posterior tibial plateau fractures achieves early and improved knee functions, good range of movements, minimal deformities, and pain scores by the time fracture unites [7].

Postro-medial Fragment specific fixation of proximal tibia fracture provide stable fixation, articular reduction, and limb alignment, while minimizing the complications of hardware prominence [8].

Aim of the Study

To evaluate the retrospective study of functional outcome of surgical management of intraarticular proximal tibia fracture with Postero-medial fragment in department of orthopaedics, new civil hospital, Surat

Materials and Methods

- Type of study: Retrospective study
- Sample size: 30 patients, All patients had recent injury and reported within 15 days of injury.
- Study period: All 30 Patients were operated for intra-articular proximal tibia fracture with postero-medial fragment during January 2018 - July 2019.
- Study Setting: New civil Hospital. Surat
- Permission from HREC was received from the institute and data were collected from the New Civil Hospital record section from jan'18-july'19.
- All patients evaluated during hospital stay and clinical, Radiological and Functional outcome Assessed.
- Clinically all patient operated after excessive swelling subside for that ice fomentation, elevation given.
- Haematological investigation, Plain Radiograph, conducted before surgery for all patients.
- After the explanation of the advantages and disadvantages of therapeutic methods, the patients will be placed in study on their own volition.
- Choice of the surgical techniques determine by the surgeon. All patients were operated by through posteromedial approach of Lobenhoffer, the patient were laid prone on radiolucent table, If necessary, a postero-lateral approach was used where posterior condylar fracture was from lateral aspect. After posterior fixation and closure were done, the patient was repositioned to supine position for antero-lateral fixation. For that standard antero-lateral approach or minimal invasive percutaneous plate osteosynthesis were done for medial plating.

Inclusion criteria:

- Age above 18 years
- Closed Tibial plateau fractures (Schatzker type4, 5 and type 6) with posteromedial column fracture, If adjunctive fixation of the lateral tibial plateau is required, such as in the case of bicondylar fracture.
- No medical contraindications for operation

Exclusion criteria:

- Age less than 18 years
- Patients with co-morbid medical condition
- Pathological fractures
- Fracture in middle and distal third of tibia

Analysis of Functional Outcome

- All the cases were analyzed as per the following criteria

- Age distribution
- Sex distribution
- Side of injury
- Mode of injury
- Classification of fractures

Observation

Age distribution

The Age group varied from 18 to 70 years with mean age of 45 years. Incidence of fracture was observed maximum between 40 to 60 years of age

Table 1.

Age group (in years)	No. of cases	Percentage (%)
18-30	4	13.3
31-40	5	16.7
41-50	9	30
51-60	9	30
61-70	3	10

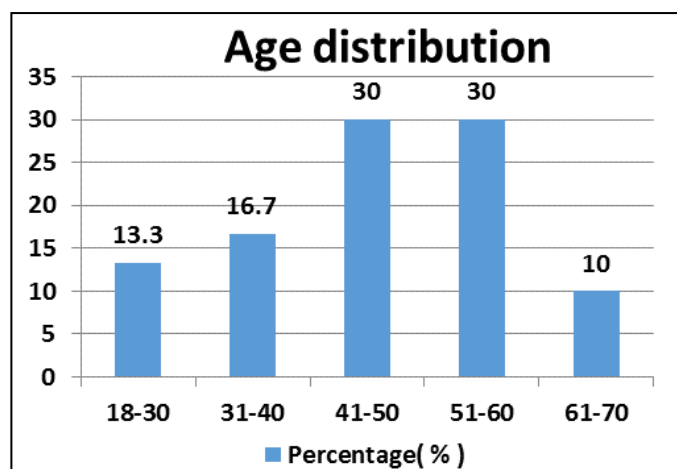


Fig 1.

Sex Distribution

Males are more affected in our study compare to females. In our study more than 2/3rd patient were male.

Table 2.

Sex	No. of cases	Percentage
Male	21	70
Female	9	30

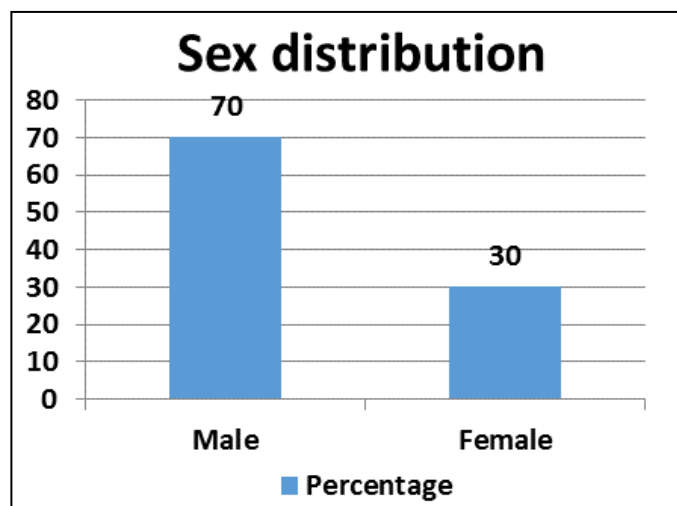


Fig 2.

Side of Injury

In our study more than 2/3rd patient had right side injury and about 1/3rd patient had left side injury.

Table 3.

Side of injury	No. cases	Percentage
Right	22	73.3
Left	8	26.7

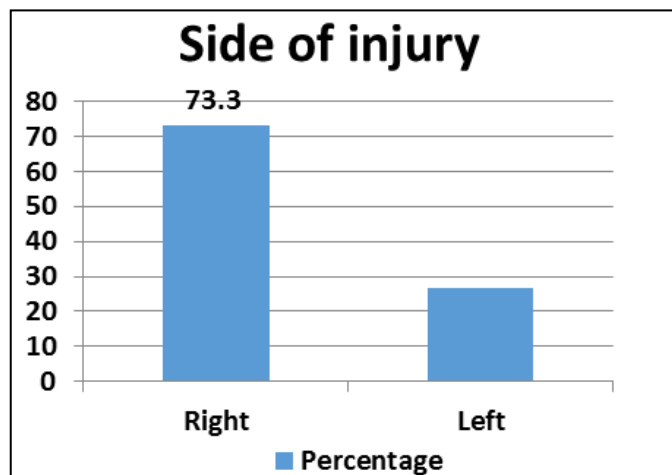


Fig 3.

Mode of Injury

Commonest mode of injury was RTA, In current study more than 2/3rd patient had injury in form of RTA And four patient had history of fall down.

Table 4.

Mode of injury	No. of cases	Percentage
RTA	25	83.3
Fall down	4	13.3
Others	1	3.4

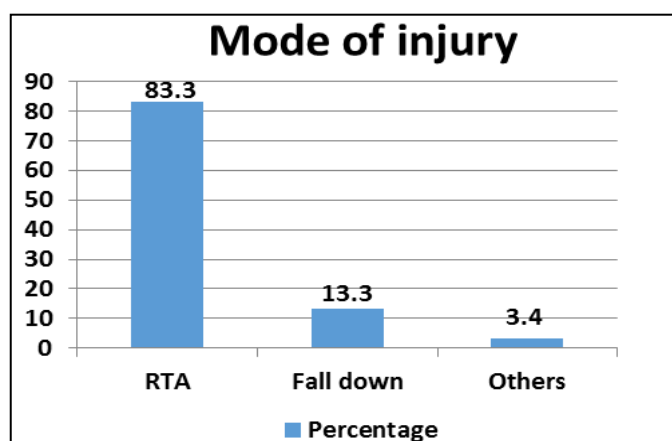


Fig 4.

Classification of Fractures

According to Schatzker classification, twelve patient had type-4 and twelve patient had type-5 injury, and about 1/3rd patient had type-6 injury.

Table 5.

Schatzker Classification	No. of cases	Percentage
Type 4	12	40
Type 5	12	40
Type 6	6	20

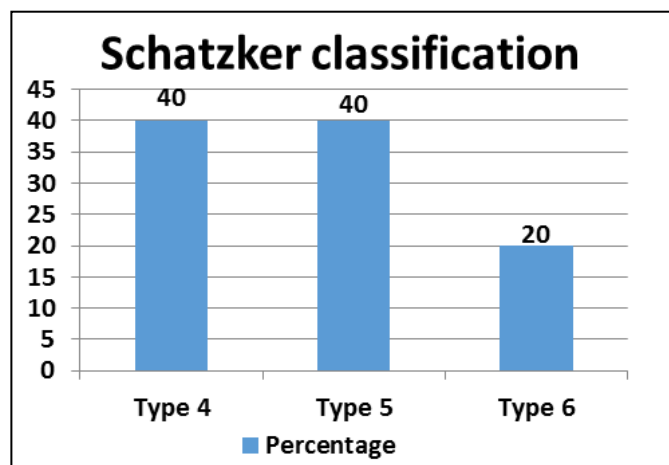


Fig 5.

Results

The analysis was done using criteria for Rasmussen radiologic assessment, oxford knee scoring system and the following results were obtained criteria for Rasmussen radiologic assessment

Table 6.

Grading	No. of cases	Percentage (%)
Excellent	17	56.7
Good	11	36.7
Fair	2	6.6
Poor	0	0

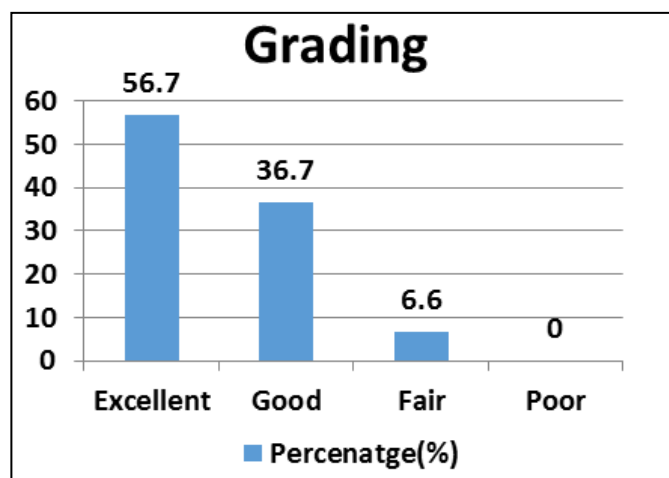


Fig 6.

According to Schatzker's type

Table 7.

Schatzker's type	No. of cases	Rasmussen score
Type 4	12	15.7
Type 5	12	16.5
Type 6	6	17.7

The average time for fracture healing was 10 weeks (ranging from 8 weeks to 12 weeks).

Fracture pattern, type of fracture and presence of infection significantly affected the fracture healing. Anatomical reduction and relatively stable fixation had early rehabilitation and reduced complications.

Posteromedial plating in posteromedial column fracture aids in good fracture union and the weight transmission from the

femur can be proper and early mobilization is possible. Avoids skin necrosis which was potential problem in proximal tibia fractures. Patient compliance is more.

According to Oxford Knee Score

Table 8.

Oxford knee Score	No.of cases	Percentage
0-19	0	0
20-29	1	3.4
30-39	4	13.3
40-48	25	83.3

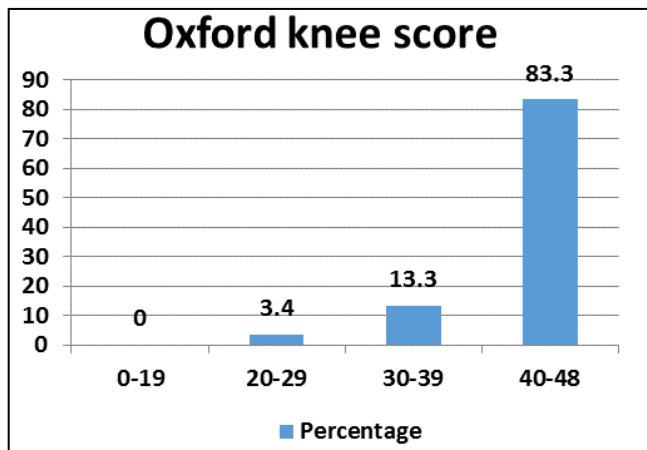


Fig 7.

Discussion

The goals of operative treatment for PTPF were anatomical reduction, specially by restoring articular congruity, stable fixation for early rehabilitation and avoiding complication particularly infection, nonunion. Despite many advances in the care of intra articular fracture. Tibial condylar fractures continue to be a difficult problem. The results of non-operative management of these injuries have historically been unsatisfactory.

Age incidence:

In current study, the average age group was 45 years, 60% were between 41-60 years of age group, youngest being 18 years and oldest being 70 years.

Comparison of age incidence between current study and study by Berber R *et al.* [9].

Table 9.

Study	Average age at presentation(years)
Current (n=30)	45
Berber R <i>et al.</i> (n=16)	53.1

Average age at presentation(years)

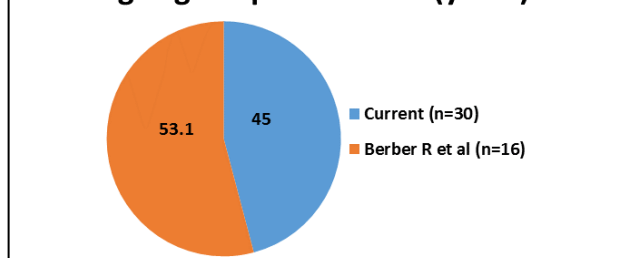


Fig 8.

Sex incidence

This study has male predominance (70%). The study done by Berber R *et al.* had male preponderance (50%).

Mechanism of injury

Comparing between various modes of injury, in current study almost 1/3rd had injury in form of RTA, and study done by Berber R *et al.* had more than 1/2nd in form of RTA.

Table 10.

Mechanism of injury	Current study (n=30)	Berber R <i>et al.</i> (n=16)
RTA	83.3%	56.3%
Fall from height	13.3%	43.7%
other	3.4%	0%

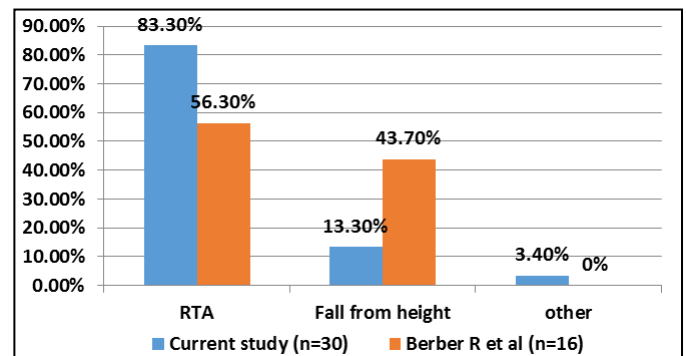


Fig 9.

Detailed analysis of demographic data showed that "Younger male patients tend to sustain fractures secondary to high velocity trauma such a road traffic accident or a fall from height

Incidence of Fracture classification

In Current study 40% had type 4 and 5 and about in Berber *et al.* had 50% had type 6.

Table 11.

Study	Type 4	Type 5	Type 6
Current (n=30)	40%	40%	20%
Berber R <i>et al.</i> (n=16)	25%	25%	50%

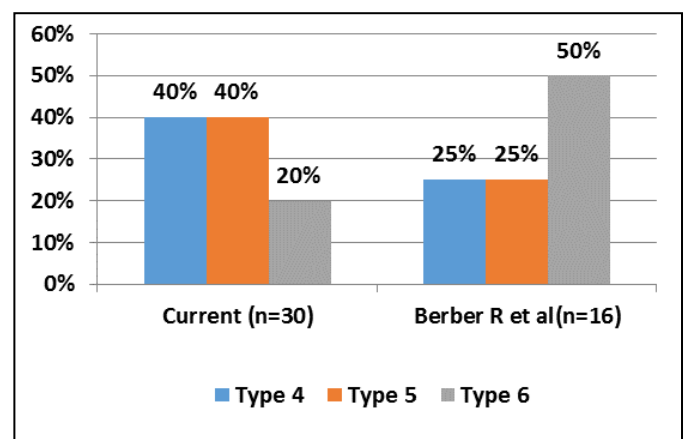


Fig 10.

Side of injury

In current study more than 70% had right side injury and in Berber *et al.* had more than 50% had left side.

Table 12.

Study	Right	Left
Current (n=30)	73.3%	26.7%
Berber R <i>et al.</i> (n=16)	43.7%	56.3%

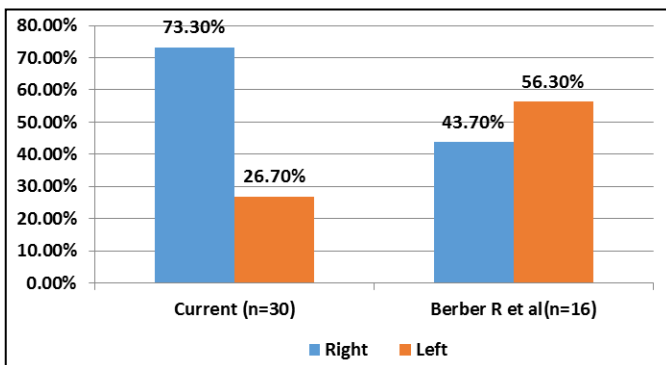


Fig 11.

Time to surgery

In current study about 60% patient operated between 2-5 days and in Berber *et al.* study more than 50% patient operated between 5-14 days.

Table 13.

Study	<2 days	2-5 days	5-14 days
Current (n=30)	10%	60%	30%
Berber R <i>et al.</i> (n=16)	12.5%	31.2%	56.3%

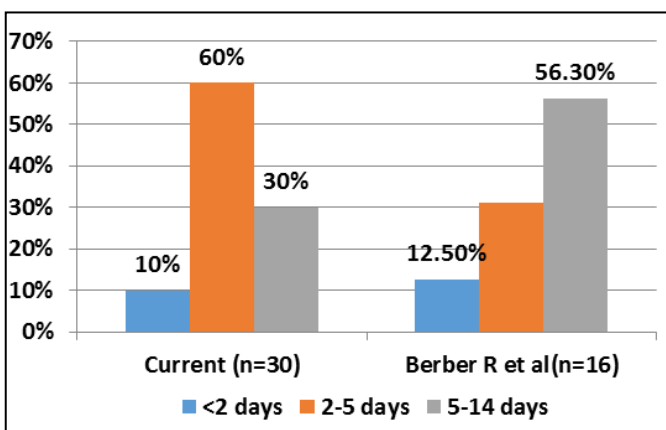


Fig 12.

The average clinical results obtained in our study

Table 14.

Study	No. of cases	Excellent	Good	Fair
In our study	30	56.7%	36.7%	6.7%
Mean Rasumann score				16.4
Mean Oxford knee score				42.9

Following plating if the wound gets infected and not properly treated lead to septic arthritis which is most dreaded complication. Knee stiffness was another notorious complication for proximal tibia fractures. In our study it was 13.3% even though it looks high and study period was too short to commit these results. After the couple of years their range of movements in these patients may improve and functional outcome may go up. These results are comparable with the various prospective study conducted all over the world, which are shown below, according to Rasmussen scoring system:

Table 15.

Study	No. of cases	Excellent	Good	Fair
Weil Ya, Gardner MJ, Boraiah S	28	55%	41%	4%
Lobenhoffer P, Gerich T, Bertram T	21	57%	42%	1%
Berber R, Lewis CP, Copas D	11	54%	36%	9%
Current study	30	56.7%	36.7%	6.6%

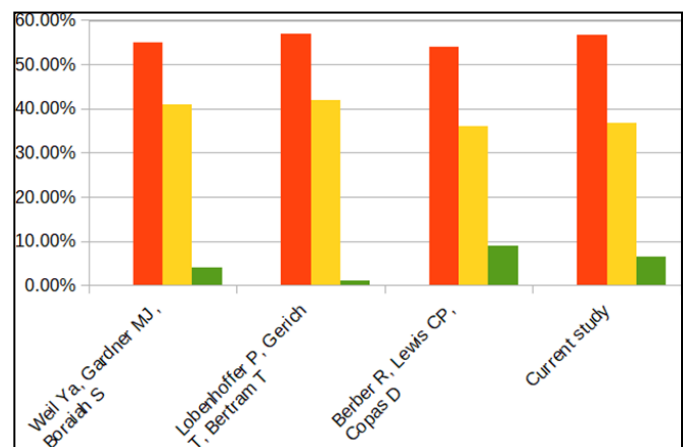


Fig 13.

Out of the thirty patients 17 patients had excellent results 11 patients had good results and for two patient result was fair. No patient had poor results. This criteria was based on Rasmussen Radiologic assessment. Of which twelve cases were Schatzker type IV who had average Rasmussen's score of 17.5. twelve patients had Schatzker type V proximal tibia fracture and had an average of 15.5 Rasmussen's score. six patients were diagnosed to have Schatzker type VI proximal tibia Fracture and the Rasmussen's score was 15. Functional assessment of the post operative patients were assessed with Oxford Knee Scoring System. In our study Mean Oxford Knee score was 43.5 which indicate satisfactory joint function. Radiological union and results are also compared with other studies.

Conclusion

- The high energy tibial plateau fractures are not uncommon fractures.
- Due to increased incidence of the road traffic accidents (high velocity injury) occurrence in young patient is increasing.
- Frequency of posteromedial fragment in bicondylar tibial fractures are high.
- Computerized tomography is a must in evaluation of proximal tibial fractures.
- Fixation of the posteromedial fragment through posteromedial approach with a strong locking plate is mandatory if present to give more stability to knee.
- Posteromedial approach and necessarily combined antero-lateral approach and fixation with or without additional medial plating have significant value for the management of complex unstable tibial plateau fractures.

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