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Study Of Operative Management Of Tibial Plateau Fracture Treated With Posteriomedial Plate With Inclusion Or Exclusion Of Anteriolateral Plate.

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ABSTRACT

Tibial plateau fractures are complex injuries requiring meticulous management to restore joint stability and function. This study evaluates the operative outcomes of closed tibial plateau fractures managed with posteriomedial plating, with or without anterolateral plating. A prospective study was conducted on 20 patients with Schatzker Type IV, V, and VI tibial plateau fractures admitted to Basaveshwar Teaching and General Hospital, Gulbarga, from October 2017 onward. Patients underwent fixation with posteriomedial plating alone or combined with anterolateral plating. Functional outcomes were assessed using the Lysholm Knee Scoring Scale at 6 months, and complications were documented. The majority of patients were male (95%) and aged 31–40 years (55%). Schatzker Type IV and V fractures were most common (40% each). Double plating was used in 60% of cases, while 40% required only posteriomedial plating. Excellent functional outcomes were achieved in 65% of patients, with a mean union time of 18 weeks. Complications included knee stiffness (10%), superficial infections (10%), valgus deformity (5%), and loss of reduction (5%).Posteriomedial plating, with or without anterolateral plating, is effective for managing complex tibial plateau fractures, offering favorable functional outcomes. Early mobilization and individualized surgical planning are critical for success.

Keywords: Tibial plateau fractures, posteriomedial plating, functional outcomes

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INTRODUCTION

Tibial plateau fractures represent a significant orthopedic challenge due to their complex anatomy, potential for joint instability, and the need to restore both mechanical alignment and articular congruity [1]. These fractures often result from high-energy trauma, such as motor vehicle accidents, or low-energy injuries in osteoporotic patients. They involve the articular surface of the proximal tibia, with posteriomedial and anterolateral involvement being particularly common in bicondylar fractures. Accurate reduction and stable fixation are paramount to achieving good functional outcomes and preventing complications such as post-traumatic arthritis, instability, or malunion [2].

Surgical management typically employs a variety of fixation strategies, with dual-plating techniques gaining popularity for addressing complex bicondylar fractures. The posteriomedial plate offers enhanced fixation strength for the posteromedial fragment, while the anterolateral plate provides stability for lateral condylar fragments. However, the inclusion or exclusion of the anterolateral plate remains a topic of debate, as it may influence surgical complexity, biomechanical stability, and complication rates [3-5].

This study aims to evaluate the operative management of tibial plateau fractures treated with a posteriomedial plate, with or without the addition of an anterolateral plate, analyzing clinical outcomes, radiological parameters, and associated complications. The findings aim to provide insights into optimizing surgical strategies for these challenging injuries.

METHODOLOGY

Materials and Methods

This prospective study was conducted on 20 consenting cases of closed tibial plateau fractures admitted to Basaveshwar Teaching and General Hospital, Gulbarga, since October 2017. Patients were selected based on specific inclusion and exclusion criteria and were followed up during the study period. All participants provided written informed consent after being informed about the study in detail. The follow-up period for each patient was at 6 weeks, 3 months, and 6 months postoperatively.

The cases were collected using a convenient sampling method. All patients who presented to the Orthopaedics Department during the study period and fulfilled the inclusion criteria were evaluated. Preoperative assessments included plain radiographs (anteroposterior and lateral views), 15° oblique radiographs in doubtful cases, and computed tomography (CT) scans of the knee. The fractures were classified according to Schatzker's classification. Preoperative planning involved determining the need for a posteriomedial plate, especially in fractures with sagittal configurations.

Surgical intervention was performed using a posteriomedial plate, with or without an anterolateral plate, depending on the fracture type and stability requirements. Postoperative evaluation included clinical and functional assessments using the Lysholm Knee Scoring Scale at 6 months. Data on personal details, fracture classification, surgical procedure, hospital stay duration, mobilization, physiotherapy, and range of motion were recorded. Complications, both intraoperative and postoperative, were also documented.

Patients were monitored for early complications such as compartment syndrome, vascular injuries, wound healing issues, infection, deep vein thrombosis, and nerve injuries, as well as late complications like knee stiffness, instability, angular deformities, malunion, and osteoarthritis. Routine investigations, including blood tests, ECG, chest radiographs, and imaging studies of the knee, were performed to support the diagnosis and treatment planning. Observations were systematically recorded to analyze the outcomes based on fracture type, treatment, and associated complications.

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RESULTS

Table 1: Age-Wise Distribution of Study Participants

Age Group (Years)	Frequency	Percentage (%)
18-30	3	15
31-40	11	55
41-50	4	20
51-60	2	10
61-70	0	0
Total	**20**	**100**

Table 2: Type of Fracture Based on Schatzker Classification

Type of Fracture	Frequency	Percentage (%)
Type IV	8	40
Type V	8	40
Type VI	4	20
Total	**20**	**100**

Table 3: Type of Surgical Plate Used During Surgery

Type of Plate	Frequency	Percentage (%)
Single (Posteriomedial Plate)	8	40
Double (Posteriomedial and Anterolateral Plate)	12	60
Total	**20**	**100**

Table 4: Lysholm's Scoring of Cases

Grade	Frequency	Percentage (%)
Poor	1	5
Fair	2	10
Good	4	20
Excellent	13	65
Total	**20**	**100**

Table 5: Operative Management Details

Parameter	Details
Preoperative Imaging	X-rays (AP and lateral views), 15° oblique views, CT scan
Fracture Classification	Schatzker's classification (Type IV, V, VI)
Surgical Technique	Fixation using posteriomedial plate (alone or combined with anterolateral plate)
Type of Plate Used	Single plate: 40% (8 cases) Double plate: 60% (12 cases)
Mobilization Initiation	Postoperative physiotherapy initiated early
Follow-Up Periods	6 weeks, 3 months, 6 months
Postoperative Complications	- Knee stiffness: 2 cases (10%) - Infection (superficial): 2 cases (10%) - Valgus deformity: 1 case (5%) - Loss of reduction: 1 case (5%)
Average Time to Union	18 weeks (range: 16–24 weeks)

DISCUSSION

Tibial plateau fractures are among the most complex injuries encountered in orthopedic trauma, often necessitating meticulous surgical intervention for optimal outcomes. The present study evaluated

the operative management of tibial plateau fractures using posteriomedial plates, with or without anterolateral plates, in 20 patients. The study analyzed demographic distribution, Schatzker classification, surgical techniques, outcomes, and complications, providing valuable insights into the effectiveness and challenges of these procedures [6, 7].

Demographic Distribution

The age distribution in this study showed a predominant concentration in the 31–40 years age group, which constituted 55% of the cases. This finding aligns with existing literature indicating that tibial plateau fractures are more common in active, working-age populations, often due to high-energy trauma such as road traffic accidents (RTA). This is corroborated by the mode of injury data, which showed that 80% of the injuries were caused by RTA. The predominance of male patients (95%) reflects gender-based differences in exposure to high-energy trauma, particularly in active occupational and outdoor activities.

Fracture Classification and Surgical Approach

Schatzker classification system is widely utilized to categorize tibial plateau fractures based on their anatomical and biomechanical characteristics. In this study, Schatzker Type IV and V fractures accounted for 40% each, while Type VI represented 20% of cases. These results are consistent with the study population being selected for posteriomedial plating, as Type IV, V, and VI fractures frequently involve complex bicondylar patterns requiring robust fixation for stability.

Operative management employed posteriomedial plating for all cases, with anterolateral plating added in 60% of cases. This dual plating strategy is widely recognized for addressing the inherent instability in bicondylar fractures. Single posteriomedial plating was used in 40% of cases, likely reflecting the adequacy of fixation in less comminuted fracture patterns. The use of CT imaging in the preoperative planning stage facilitated the precise assessment of fracture geometry, aiding in the decision-making process regarding plating techniques.

Postoperative Functional Outcomes

Postoperative functional outcomes were assessed using the Lysholm Knee Scoring Scale at six months. The results demonstrated excellent outcomes in 65% of cases, good outcomes in 20%, fair outcomes in 10%, and poor outcomes in only 5%. These findings indicate that the majority of patients achieved favorable functional recovery, with early mobilization and physiotherapy contributing significantly to the restoration of joint function. This underscores the importance of postoperative rehabilitation as an integral component of fracture management.

The range of motion (ROM) analysis further supports these positive outcomes, with 60% of patients achieving a ROM greater than 120°, indicative of excellent knee joint mobility. However, a subset of patients (10%) had a ROM below 90°, reflecting potential complications such as stiffness or suboptimal rehabilitation compliance.

Complications and Union Time

Despite the overall positive outcomes, complications were observed in a small proportion of cases. Superficial wound infections occurred in 10% of patients, necessitating timely intervention with antibiotics and wound care. Knee stiffness was reported in 10% of patients, attributed to delayed mobilization and associated injuries such as patellar fractures. Valgus deformity and loss of reduction, each observed in 5% of cases, highlight the challenges in achieving and maintaining optimal fracture alignment, especially in highly comminuted patterns [8].

The average time to union was 18 weeks, within the expected range for tibial plateau fractures managed with stable fixation. Notably, delayed union was observed in cases with complications, such as infection and valgus deformity, necessitating prolonged follow-up and additional interventions.

Comparison of Single vs. Double Plating

The study revealed that double plating (posteriomedial and anterolateral) was utilized in 60% of cases, reflecting its necessity in providing stability for bicondylar fractures. In contrast, single posteriomedial plating was sufficient in 40% of cases with less complex fracture patterns. While both techniques yielded satisfactory outcomes, double plating demonstrated slightly better functional results, as evidenced by higher Lysholm scores in this group. This aligns with biomechanical studies supporting dual plating for improved load distribution and stabilization in complex fractures.

However, double plating is associated with increased surgical complexity, higher soft tissue dissection, and potential risks of complications such as wound healing problems. The absence of implant-related complications, such as screw or plate failure, is noteworthy and highlights the efficacy of modern plating techniques and meticulous surgical execution [9].

CONCLUSION

The operative management of tibial plateau fractures using posteriomedial plates, with or without anterolateral plates, demonstrated favorable outcomes in terms of functional recovery and union rates. The study highlights the importance of individualized surgical planning, the role of dual plating in complex fractures, and the critical contribution of rehabilitation to achieving excellent results. Despite a small proportion of complications, the overall outcomes validate the efficacy of modern plating techniques in managing these challenging fractures. Future research with larger sample sizes and extended follow-up periods is essential to further refine surgical strategies and improve patient outcomes.

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