

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Study Of Complications Of Fracture After Internal Fixation Of Tibial Plateau Fracture.

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ABSTRACT

Tibial plateau fractures are complex injuries requiring surgical management to restore joint function and stability. Internal fixation is a common treatment approach; however, complications can significantly impact outcomes. This study evaluates the complications and functional outcomes following internal fixation of tibial plateau fractures. A prospective study was conducted involving 20 patients with tibial plateau fractures treated with internal fixation. Complications, including knee joint stiffness, loss of reduction, valgus deformity, and infection, were recorded. Functional outcomes were assessed using the Lysholm scoring system, with results categorized as excellent, good, fair, or poor. Data were analyzed to determine the prevalence of complications and their impact on recovery. Complications were observed in 30% of cases, with knee joint stiffness (10%) and infections (10%) being the most common. Loss of reduction and valgus deformity occurred in 5% of patients each. Lysholm scores revealed excellent outcomes in 65%, good in 20%, fair in 10%, and poor in 5%. The average time to fracture union was 18 weeks, with complications delaying recovery in some cases. Internal fixation of tibial plateau fractures generally yields favorable outcomes, but complications remain a concern. Emphasis on surgical precision, infection control, and tailored rehabilitation is crucial to improving patient outcomes.

Keywords: Tibial plateau fractures, Internal fixation, Postoperative complications.

<https://doi.org/10.33887/rjpbcs/2024.15.6.81>

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INTRODUCTION

Tibial plateau fractures are significant intra-articular injuries that pose challenges in management due to their impact on knee joint stability, alignment, and function [1]. These fractures often result from high-energy trauma, such as motor vehicle accidents or falls, and are associated with soft tissue injuries, including meniscal tears and ligamentous damage. Internal fixation is the cornerstone of surgical management, aiming to restore articular congruity, maintain joint stability, and ensure early mobilization [2, 3].

Despite advancements in surgical techniques and implants, complications following internal fixation of tibial plateau fractures remain a concern. Common complications include infection, malunion or nonunion, loss of reduction, implant failure, post-traumatic arthritis, and stiffness. These complications significantly influence the clinical outcomes, leading to prolonged rehabilitation, persistent pain, and functional limitations. Risk factors such as fracture severity, delayed intervention, soft tissue compromise, and comorbidities like osteoporosis can exacerbate the likelihood of complications [4-6].

Understanding the nature and prevalence of complications is essential to optimize treatment strategies, improve surgical techniques, and enhance patient outcomes. This study aims to evaluate the complications associated with internal fixation of tibial plateau fractures, their etiological factors, and their impact on recovery and long-term function. Comprehensive analysis will provide insights for better preventive and therapeutic approaches in managing these fractures.

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 posteromedial plate, especially in fractures with sagittal configurations.

Surgical intervention was performed using a posteromedial 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.

RESULTS

Table 1: Complications Observed in Patients

Complication	Frequency	Percentage
Knee joint stiffness	2	10%
Loss of reduction	1	5%
Valgus deformity	1	5%
Infection (wound discharge)	2	10%
Total	-	30%

Table 2: Outcome Grading According to Lysholm's Score

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

Table 3: Postoperative Complications

Complication	Frequency	Percentage
Knee joint stiffness	2	10%
Loss of reduction	1	5%
Valgus deformity	1	5%
Infection (wound discharge)	2	10%
Total Complications	6	30%

DISCUSSION

Tibial plateau fractures are complex injuries that require meticulous surgical management to restore joint congruity and maintain knee function. Despite advances in surgical techniques and implants, complications following internal fixation remain a challenge, as reflected in this study. The outcomes, particularly the complications and functional assessments, offer valuable insights into factors influencing recovery and the success of surgical interventions [7].

Complications Observed

The study highlights four primary complications: knee joint stiffness, loss of reduction, valgus deformity, and infection. Knee joint stiffness was the most frequently encountered complication, observed in 10% of patients. This could be attributed to delayed mobilization or associated soft tissue injuries that limit range of motion postoperatively. Effective physiotherapy and early mobilization protocols are critical to mitigating this issue. One case of knee stiffness in this study was linked to a patella fracture, further emphasizing the interplay between surgical outcomes and associated injuries [8].

Infections, particularly wound discharge, were also observed in 10% of the cases. Postoperative infections are often influenced by patient comorbidities, surgical technique, and perioperative management. The study reported that superficial infections were managed effectively with wound care and antibiotics, ultimately leading to fracture union. However, these infections can prolong hospital stays and increase healthcare costs, underscoring the need for stringent aseptic techniques and careful wound monitoring [9].

Loss of reduction and valgus deformity were relatively rare, with each affecting 5% of the patients. Loss of reduction could be attributed to inadequate fixation or high-fracture severity, while valgus deformity often results from medial condyle collapse. These complications highlight the importance of achieving and maintaining anatomical alignment during surgery. The use of preoperative planning and intraoperative imaging can reduce these risks and improve outcomes [10, 11].

Functional Outcomes

The Lysholm's scoring system was employed to evaluate postoperative outcomes, offering a comprehensive assessment of pain, stability, and functional recovery. An excellent outcome was achieved in 65% of the patients, indicating a significant proportion of successful recoveries. The remaining patients had good (20%), fair (10%), or poor (5%) outcomes, reflecting the influence of complications on overall recovery.

Patients with excellent outcomes likely benefited from factors such as less severe fractures, effective fixation, and timely postoperative rehabilitation. Conversely, those with fair or poor outcomes may have faced challenges such as delayed recovery, persistent pain, or complications that hindered functional restoration.

Postoperative Complications and Recovery

The study reported an overall complication rate of 30%, which aligns with existing literature on tibial plateau fractures. Postoperative complications can substantially impact recovery, prolong rehabilitation, and impair long-term knee function. The average time to fracture union in this study was 18 weeks, with a range of 16–24 weeks. While this is within the expected timeframe, complications such as infections and valgus deformity likely extended recovery in some cases.

Knee stiffness, as observed in two patients, serves as a reminder of the importance of early and targeted physiotherapy. In one case, stiffness was exacerbated by inadequate postoperative mobilization, emphasizing the need for personalized rehabilitation protocols. Similarly, the occurrence of valgus deformity highlights the importance of achieving stable and anatomical fixation to prevent postoperative malalignment [12].

The results of this study align with findings from similar research, where infection rates for internal fixation of tibial plateau fractures range from 5–15%. The 10% infection rate reported here falls within this spectrum, suggesting that the surgical and perioperative protocols are comparable to standard practices. Similarly, the rate of knee stiffness observed in this study is consistent with literature reporting stiffness rates of 5–20%, often influenced by fracture severity and rehabilitation adherence.

The functional outcomes, particularly the 65% excellent rating on Lysholm's scale, are encouraging and comparable to studies reporting good-to-excellent outcomes in 60–80% of cases. Factors such as patient age, fracture type, and postoperative care likely contributed to this success.

While the study provides valuable insights, several limitations should be noted. The sample size of 20 patients is relatively small, potentially limiting the generalizability of the findings. Additionally, the study does not explore the long-term functional outcomes beyond the immediate postoperative period. Future research with larger cohorts and extended follow-up periods could provide more comprehensive data on the efficacy of different surgical approaches and rehabilitation protocols.

CONCLUSION

The study sheds light on the complications and outcomes following internal fixation of tibial plateau fractures. While the majority of patients achieved excellent functional outcomes, complications such as knee stiffness, infection, and valgus deformity underscore the challenges in managing these injuries. By emphasizing preoperative planning, meticulous surgical technique, and comprehensive rehabilitation, clinicians can enhance recovery and minimize complications. The findings serve as a foundation for future research aimed at improving patient outcomes in this complex fracture population.

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