Evaluation of Functional Outcomes and intraoperative results in Proximal Tibia Fractures Treated with Suprapatellar Nailing in India: A retrospective study with 6 month follow up.

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Abstract: Background: Proximal tibia fractures are complicated injuries that frequently arise from high-energy trauma. Suprapatellar nailing (SPN) is used to improve surgical results. This study looks at the short-term functional results of SPN in proximal tibia fractures.

Materials and Methods: This retrospective study analyzed the medical records of 30 patients who underwent SPN for proximal tibia fractures between January 2023 and January 2024.

Results: The cohort consisted of 18 males and 12 females. Etiologically, 24 patients sustained injuries from road traffic accidents, while 6 patients had falls from height. The mean age was 36 years (SD 3 years). The average surgical duration was 110 minutes (SD 23 minutes), and the intraoperative blood loss was approximately 70 ml (SD 12 ml). Follow-up evaluations were conducted at 2 weeks, 3 months, and 6 months postoperatively. All patients achieved bone fusion by the 12-week follow-up. The average Visual Analog Scale (VAS) score for pain decreased significantly from a preoperative score of 8.2 (SD 1.1) to 1.5 (SD 1.1) at the 12-week follow-up.

Conclusion: SPN for proximal tibia fractures shows promising short-term outcomes, including effective pain reduction and successful bone fusion within 12 weeks. These findings support the use of SPN as a reliable surgical technique for managing complex proximal tibia fractures.

Keywords: Suprapatellar nailing, Proximal tibia fractures, Intramedullary nailing, Road traffic accidents, Fall from height, Surgical outcomes, Functional outcomes, Bone fusion, Visual Analog Scale (VAS)

Main article-

Introduction
Suprapatellar nailing (SPN) is the recommended treatment for proximal tibia fractures due to its patient positioning and fracture alignment advantages. Poor outcomes might arise from traditional infrapatellar nailing methods that struggle to preserve alignment and regulate deforming forces. The suprapatellar SPN treatment improves leg placement, decreases malalignment, and controls the proximal fragment.1 Recent research has demonstrated the therapeutic effectiveness and enhanced radiographic results linked with SPN. A thorough assessment of the procedure has shown that it can minimise the risk of problems, including malunion and nonunion, while also reducing the need for additional revision operations.2 Furthermore, the suprapatellar technique has considerable advantages in terms of reduced postoperative discomfort and speedier recovery, making it a feasible choice for treating complicated tibial fractures.3

The purpose of this paper is to assess the short-term functional results of SPN in proximal tibia fractures, with an emphasis on critical metrics such fracture union, pain recovery, and complication rates. This descriptive study seeks to give insights into the clinical advantages and possible problems of this sophisticated surgical method, assisting orthopaedic surgeons in optimising patient care and enhancing surgical results.

Material and methods- This retrospective interventional research looked at data from 30 patients who had surgery for closed proximal one-third tibia fractures. Patients were operated on between January 2023 and January 2024. The study's
inclusion criteria were closed proximal one-third tibia fractures, no neurological impairments, and the patient's who consented to surgery. Exclusion criteria include compound fractures, intra-articular fractures, and pathological fractures. Patient data were obtained from medical records and included demographic information, fracture characteristics, surgery details, and postoperative outcomes. All surgeries were conducted by skilled orthopaedic surgeons who followed standardised methods. The functional and radiological results were evaluated during the follow-up period.

Results-
Demographics-
The trial had 30 patients, with a male to female ratio of around 2:1. The aetiology of the injuries in 24 patients was road traffic accidents, whereas the remaining 6 patients had injuries via falls from height. The mean age of the patients was 36 years, with a standard deviation (SD) of 3 years.

Intraoperative findings-
The mean time of operation was 110 minutes, with a standard deviation of 23 minutes. The average intraoperative blood loss was 70 ml, with a standard deviation of 12 ml. Subsequent assessments were carried out at 2 weeks, 6 weeks, and 12 weeks after the surgery. All patients successfully achieved fusion during the 6 month follow-up timeframe.

Surgical outcomes-
The mean Visual Analogue Scale (VAS) pain score showed a substantial improvement from 8.2 (SD 1.1) before the surgery to 1.5 (SD 1.1) at 12 weeks after the surgery, as evaluated by a paired T-test. Two patients experienced postoperative knee discomfort during the 2-week follow-up, but it was completely cured by the conclusion of the 12-week follow-up period.

Discussion-
Our study examined 30 patients undergoing suprapatellar intramedullary nailing for proximal third tibia fractures and their clinical and radiological results. The Visual Analogue Scale (VAS) score for pain decreased from 8.2 (SD 1.1) preoperatively to 1.5 (SD 1.1) after 6 weeks postoperatively. Fusion was accomplished in all patients after 6 months. Two patients had surgical knee discomfort at 2 weeks, which disappeared by 12 weeks.

When these results are compared to the findings of Kulkarni et al. (2020), significant discrepancies and parallels appear. Kulkarni et al. included a larger sample of 43 patients, with a 20.4-month average follow-up time. Their study also used the Lower Extremity Functional Scale (LEFS) to measure clinical results, with an average LEFS of 89.4% (range 60%-95%) after one year. The radiological union took an average of 7.3 months (range: 4-13 months). In addition, their study documented four malunions (1 valgus, 3 anterior angulations), eight delayed unions, and one non-union, all of which needed bone grafting. Notably, there was no evidence of anterior knee discomfort in their population.

Kulkarni et al., like us, emphasise the effectiveness of the suprapatellar nailing approach in attaining positive clinical and radiological results. However, the extended follow-up period and the use of the LEFS allow for a more complete assessment of functional outcomes across time. The absence of anterior knee discomfort in Kulkarni et al.’s study contrasts with our findings, which show that two patients reported transient knee pain.

Other studies have shown the advantages and potential problems of suprapatellar nailing for tibial fractures. For example, Brink et al. (2016) emphasised the benefits of the semixtended posture in decreasing malalignment and permitting simpler patient placement during surgery. They observed a radiological union time of about 6 months and stressed the significance of using proper intraoperative technique to minimise problems such anterior knee discomfort. Cannada et al. (2020) examined long-term functional results and concluded that, while the suprapatellar method can successfully handle proximal tibial fractures, the possibility of postoperative anterior knee discomfort remains a concern, demanding cautious patient selection and surgical technique.

In conclusion, while our study and others show that suprapatellar nailing is effective in managing proximal tibia fractures, differences in follow-up duration, assessment tools, and reported complications highlight the importance of personalised patient care and ongoing research to improve outcomes.

Conclusion-
Suprapatellar nailing is effective for proximal third tibia fractures, demonstrating high fusion rates and significant pain reduction. Despite minor complications, such as transient knee pain, the approach proves beneficial in ensuring proper alignment and functional recovery, confirming its viability in orthopaedic practice.

References


