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COMPARATIVE STUDY OF PAIN IN TOTAL KNEE REPLACEMENT: MEDIAL PARAPATELLAR APPROACH VERSUS SUBVASTUS APPROACH

Orthopaedics

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ABSTRACT

Background: Postoperative pain following total knee replacement (TKR) significantly influences early mobilization, rehabilitation, patient satisfaction, and length of hospital stay. Surgical approach plays a crucial role in determining the extent of soft-tissue trauma and subsequent pain. The medial parapatellar approach (MPA) is the most commonly used technique, whereas the subvastus approach1 (SVA) is considered more muscle-sparing and potentially less painful.**Aim:** To compare postoperative pain outcomes in patients undergoing primary TKR through the medial parapatellar approach versus the subvastus approach. **Materials and Methods:** A prospective comparative study was conducted on patients undergoing primary unilateral TKR for osteoarthritis. Patients were divided into two groups: Group A (medial parapatellar approach) and Group B (subvastus approach). Postoperative pain was assessed using the Visual Analog Scale (VAS) atpredefined intervals. Secondary outcomes included time to straight leg raise, opioid requirement, and length of hospital stay. **Results:** Patients operated using the subvastus approach demonstrated significantly lower VAS pain scores in the early postoperative period compared to the medial parapatellar group. Early functional recovery parameters were superior in the subvastus group, with reduced analgesic requirements. **Conclusion:** The subvastus approach in TKR is associated with reduced early postoperative pain and faster functional recovery compared to the medial parapatellar approach, without compromising surgical exposure or implant positioning.

KEYWORDS

Total knee replacement, medial parapatellar approach, subvastus approach, postoperative pain, VAS score.

INTRODUCTION

Total knee replacement is a highly successful surgical procedure for end-stage knee osteoarthritis. Despite excellent long-term outcomes, postoperative pain remains a major concern, often delaying rehabilitation and prolonging hospital stay. Various surgical approaches have been developed with the aim of minimizing soft-tissue trauma and improving early postoperative outcomes.

The medial parapatellar approach has long been considered the standard approach for TKR due to its excellent exposure and reproducibility. However, it involves incision through the quadriceps tendon, which may contribute to postoperative pain and extensor mechanism weakness. In contrast, the subvastus approach preserves the quadriceps tendon and extensor mechanism[6], potentially resulting in reduced pain and faster recovery.This study aims to compare postoperative pain and early functional outcomes between the medial parapatellar and subvastus approaches[3,7,8] in primary TKR.

MATERIALS AND METHODS

Study Design

A prospective comparative study is conducted in Orthopaedic department of Birrd Trust Hospital between November 2024-November 2025 for a span of 12 months.

Study Population

Patients undergoing primary unilateral total knee replacement for osteoarthritis.

Inclusion Criteria

- Age between 50 and 75 years
- Primary osteoarthritis of the knee
- Unilateral primary TKR

Exclusion Criteria

- Inflammatory arthritis
- Revision TKR
- Previous surgery on the affected knee
- Severe fixed deformities (>20° varus/valgus)
- Neuromuscular disorders

Sample Size

A total of 60 patients were included in the study, divided equally into two groups:

- Group A: Medial Parapatellar Approach (n = 30)
- Group B: Subvastus Approach (n = 30)

Surgical Technique

All surgeries were performed by experienced knee surgeons[2] using standardized instrumentation and cemented posterior-stabilized knee implants.

Postoperative Protocol

- Standard multimodal analgesia protocol
- Early mobilization from postoperative day 1
- Identical physiotherapy protocols for both groups

Outcome Measures

- Postoperative pain assessed using the Visual Analog Scale (VAS) at 24 hours, 48 hours, 72 hours, and day 7
- Time to straight leg raise (SLR)
- Total opioid/analgesic requirement
- Length of hospital stay

Statistical Analysis

Data were analysed using appropriate statistical tests. A p-value <0.05 was considered statistically significant.

RESULTS

Pain Assessment The subvastus group demonstrated significantly lower mean VAS scores in the first 72 hours postoperatively compared to the medial parapatellar group[5].

Time Interval	Medial Parapatellar (VAS)	Subvastus (VAS)	p-value
24 hours	7.2 ± 0.8	5.6 ± 0.7	<0.05
48 hours	6.5 ± 0.7	4.8 ± 0.6	<0.05
72 hours	5.8 ± 0.6	4.1 ± 0.5	<0.05
Day 7	3.9 ± 0.5	3.2 ± 0.4	>0.05

Secondary Outcomes

- Earlier straight leg raise achieved in the subvastus group
- Reduced opioid consumption in the subvastus group
- Shorter hospital stay in the subvastus group

DISCUSSION

Postoperative pain following TKR is multifactorial, influenced by surgical trauma, quadriceps handling, and soft-tissue dissection. The findings of this study demonstrate that the subvastus approach[4] offers significant advantages in terms of early postoperative pain reduction compared to the medial parapatellar approach.

Preservation of the quadriceps tendon and extensor mechanism likely

contributes to reduced nociceptive input and improved early quadriceps function. Although the subvastus approach is technically demanding and may have a learning curve, its benefits in selected patients are evident.

These findings are consistent with previous studies reporting reduced pain, earlier mobilization, and improved patient satisfaction with muscle-sparing approaches.

Limitations

- Relatively small sample size
- Short-term follow-up focused on early postoperative outcomes
- Surgeon-dependent learning curve for subvastus approach

CONCLUSION

The subvastus approach in total knee replacement is associated with significantly lower early postoperative pain and faster recovery compared to the medial parapatellar approach. It is a safe and effective alternative in appropriately selected patients and should be considered as a preferred approach for achieving early pain control and enhanced rehabilitation.

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