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Original Research Article

Comparative Efficacy of Combined Femoral and Lateral Femoral Cutaneous Nerve Blocks Vs Injection Paracetamol for Postoperative Analgesia in Geriatric Patients with Intertrochanteric Fractures

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Abstract:

Introduction: Intertrochanteric fractures are a common and serious issue in geriatric patients, necessitating adequate postoperative analgesia to facilitate early mobilisation and improve outcomes. Traditional systemic analgesics such as opioids and NSAIDs pose significant risks in this population, prompting the need for alternative strategies. Regional anaesthesia, specifically combined femoral and lateral femoral cutaneous nerve blocks (FNB + LFCNB), has shown promise. This study compares the efficacy of FNB + LFCNB versus intravenous paracetamol for postoperative pain management in geriatric patients with intertrochanteric fractures.

Materials and Methods: A prospective, randomised, controlled trial was conducted at Mamata Medical College with 60 geriatric patients undergoing surgery for intertrochanteric fractures. Participants were randomised into two groups: one receiving FNB + LFCNB using bupivacaine and the other intravenous paracetamol. Pain was assessed using the Visual Analog Scale (VAS) at 6, 12, and 24 hours postoperatively. Secondary outcomes included analgesic consumption, time to ambulation, hospital stay duration, and adverse events. Statistical significance was set at $p < 0.05$.

Results: The FNB + LFCNB group demonstrated significantly lower VAS scores at rest and during movement ($p < 0.05$) and required less supplemental analgesia (12.4 ± 3.8 mg vs. 22.6 ± 4.5 mg, $p < 0.001$). Time to ambulation and hospital stay were shorter, and the nerve block group had higher patient satisfaction scores. Side effects were fewer and not statistically significant.

Conclusion: Combined femoral and lateral femoral cutaneous nerve blocks provide superior analgesia, faster recovery, and better functional outcomes than paracetamol in geriatric patients with intertrochanteric fractures, supporting their broader clinical use.

Keywords: Nerve block, postoperative analgesia, geriatric hip fractures.

Introduction

Hip fractures, particularly intertrochanteric fractures, are a significant concern among geriatric populations due to their high morbidity and mortality rates. [1] These fractures often necessitate surgical intervention, with early surgical repair within 48 hours being critical to reducing perioperative complications and improving patient outcomes. [2][3] Effective postoperative pain management is a cornerstone of care in this context, as it facilitates early mobilisation, reduces the risk of postoperative delirium, and enhances overall recovery. [4] However, pain management in elderly patients presents unique challenges, primarily due to the prevalence of comorbidities and age-related physiological changes that limit the use of traditional analgesics. [5] Opioids, while effective for severe pain, are associated with substantial side effects in older adults, including respiratory depression, delirium, hypotension, and dependency. [6] Similarly, nonsteroidal anti-inflammatory drugs (NSAIDs) pose risks of gastrointestinal bleeding, renal dysfunction, and cardiovascular events. [7] These limitations necessitate exploring alternative pain management strategies that provide effective analgesia while minimising systemic complications. Regional anesthesia has emerged as a promising solution, particularly for nerve blocks such as the femoral nerve block (FNB) and lateral femoral cutaneous nerve block (LFCNB). [8] [9] these techniques offer localised pain relief by targeting the sensory innervation of the affected area, thus reducing the reliance on systemic medications. [10] Studies have demonstrated that peripheral nerve blocks can significantly decrease pain scores, reduce opioid consumption, and lower the incidence of postoperative delirium in geriatric patients undergoing hip surgery. [11] Additionally, nerve blocks facilitate early mobilisation by preserving hemodynamic stability and avoiding sedation, which is critical for preventing complications such as deep vein thrombosis and pulmonary embolism. Despite the growing evidence supporting the use of nerve blocks, their comparative efficacy against standard systemic analgesics, such as paracetamol, remains underexplored in geriatric populations with intertrochanteric fractures. Paracetamol, a widely used non-opioid analgesic, is often preferred in elderly patients due to its favourable safety profile. [12]

This study compares the efficacy of combined femoral nerve block and lateral femoral cutaneous nerve block versus paracetamol for postoperative analgesia in geriatric patients with intertrochanteric fractures. This research seeks to provide evidence-based insights into optimising pain management in this vulnerable patient population by assessing parameters such as pain scores, analgesic requirements, and postoperative recovery outcomes. The findings could inform clinical guidelines and support the broader adoption of nerve blocks as a primary modality for managing postoperative pain in elderly patients with hip fractures. This approach aligns with the wider goals of enhancing patient comfort, minimising complications, and improving functional outcomes in the geriatric orthopaedic population.

Materials and Methods

This prospective, randomised controlled trial was conducted at Mamata Medical College, Khammam, between July 2023 and July 2024, after obtaining approval from the Institutional Ethics Committee. Written informed consent was obtained from all participants or their legal representatives. This study included 60 geriatric patients aged 65 years and above undergoing surgery for intertrochanteric fractures. Patients were randomly allocated into two groups of 30 each: one receiving a combined femoral nerve block and lateral femoral cutaneous nerve block (FNB + LFCNB) and the other receiving intravenous paracetamol for postoperative analgesia. Inclusion criteria encompassed patients classified as American Society of Anaesthesiologists (ASA) grade I or II, with no known allergies to study medications or contraindications to nerve block techniques. Exclusion criteria included coagulopathy, local infection at the block site, severe cardiopulmonary disease, or cognitive impairment preventing pain score evaluation. Randomisation was achieved using a computer-generated sequence, and group allocation was concealed in sealed opaque envelopes opened just before the intervention. For the FNB + LFCNB group, ultrasound-guided nerve blocks were performed preoperatively under sterile conditions using a 22-gauge needle and 20 mL of 0.25% bupivacaine for the femoral nerve and 10 mL for the lateral femoral cutaneous nerve. The paracetamol group received 1 g intravenous paracetamol every six hours, starting immediately postoperatively. All patients underwent standard general or spinal anaesthesia during surgery, and rescue analgesia with intravenous tramadol was administered for breakthrough pain exceeding a VAS score of 4.

Pain was assessed using the Visual Analog Scale (VAS) at rest and during movement at 6, 12, and 24 hours postoperatively. Secondary outcomes included total analgesic consumption, time to ambulation, length of hospital stay, and incidence of side effects such as nausea, vomiting, and dizziness. Data were collected by a blinded observer and analysed using appropriate statistical tests, with significance set at $p < 0.05$. The study adhered to ethical guidelines and ensured patient safety throughout.

Results

The study evaluated the comparative efficacy of combined femoral and lateral femoral cutaneous nerve blocks (FNB + LFCNB) versus paracetamol for postoperative analgesia in geriatric patients with intertrochanteric fractures. Baseline characteristics, including age, gender distribution, body mass index (BMI), and ASA grade, were comparable between the groups, with no statistically significant differences ($p > 0.05$). This ensured that observed outcomes were attributable to the analgesic interventions rather than demographic or clinical disparities. (Table 1)

Table 1: Baseline Characteristics of Study Participants

Variable	FNB + LFCNB Group (n=30)	Paracetamol Group (n=30)	p-value
Age (years, mean ± SD)	72.5 ± 6.8	73.2 ± 7.1	0.611
Gender (Male: Female)	16:14	15:15	0.796
BMI (kg/m², mean ± SD)	25.4 ± 3.2	25.7 ± 3.5	0.873
ASA Grade (I: II)	12:18	10:20	0.592

Pain scores assessed via the Visual Analog Scale (VAS) demonstrated significantly lower values in the FNB + LFCNB group at all measured time points, both at rest and during movement ($p < 0.05$). At 6 hours post-surgery, pain scores at rest were 2.3 ± 1.2 in the nerve block group compared to 4.1 ± 1.5 in the paracetamol group. During movement, the nerve block group reported scores of 3.2 ± 1.5, markedly lower than 6.2 ± 1.8 in the paracetamol group.

These trends persisted at 12- and 24-hours post-surgery, underscoring the superior analgesic efficacy of the nerve block technique. (Table 2)

Table 2: Pain Scores (Visual Analog Scale, 0-10) at Rest and Movement

Time Post-Surgery	FNB + LFCNB Group (n=30)	Paracetamol Group (n=30)	p-value
At Rest			
6 Hours	2.3 ± 1.2	4.1 ± 1.5	<0.001
12 Hours	1.8 ± 1.1	3.8 ± 1.4	0.004
24 Hours	1.4 ± 0.9	3.2 ± 1.3	0.006
At Movement			
6 Hours	3.2 ± 1.5	6.2 ± 1.8	<0.001
12 Hours	2.5 ± 1.2	5.4 ± 1.6	0.001
24 Hours	2.0 ± 1.1	4.9 ± 1.5	0.004

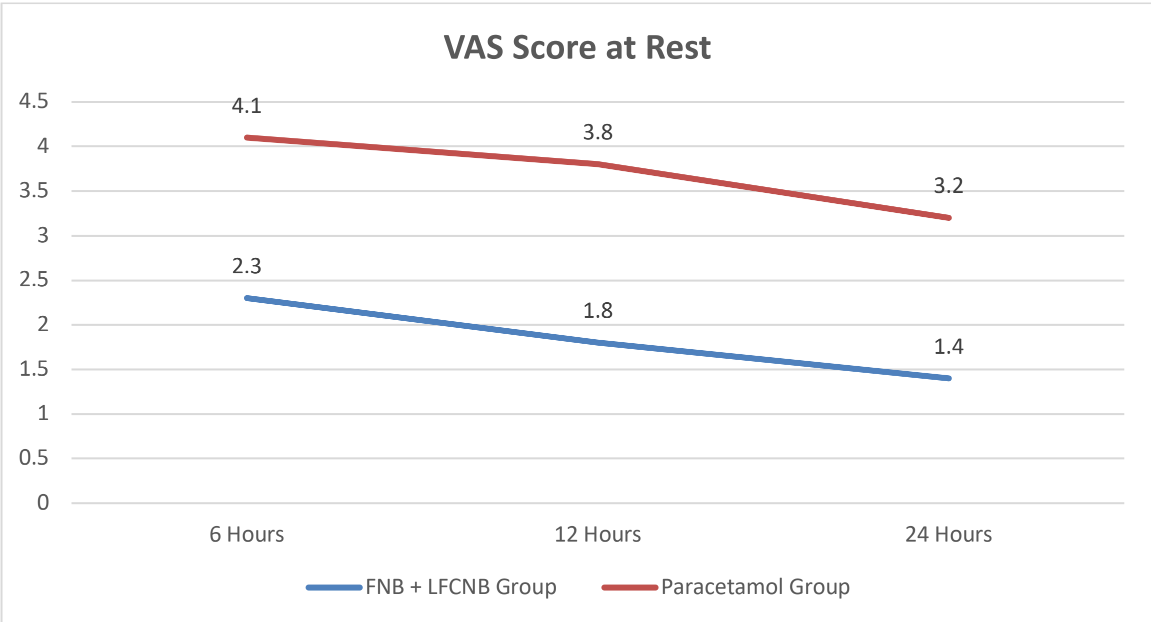

Figure 1: Comparison of VAS score at Rest

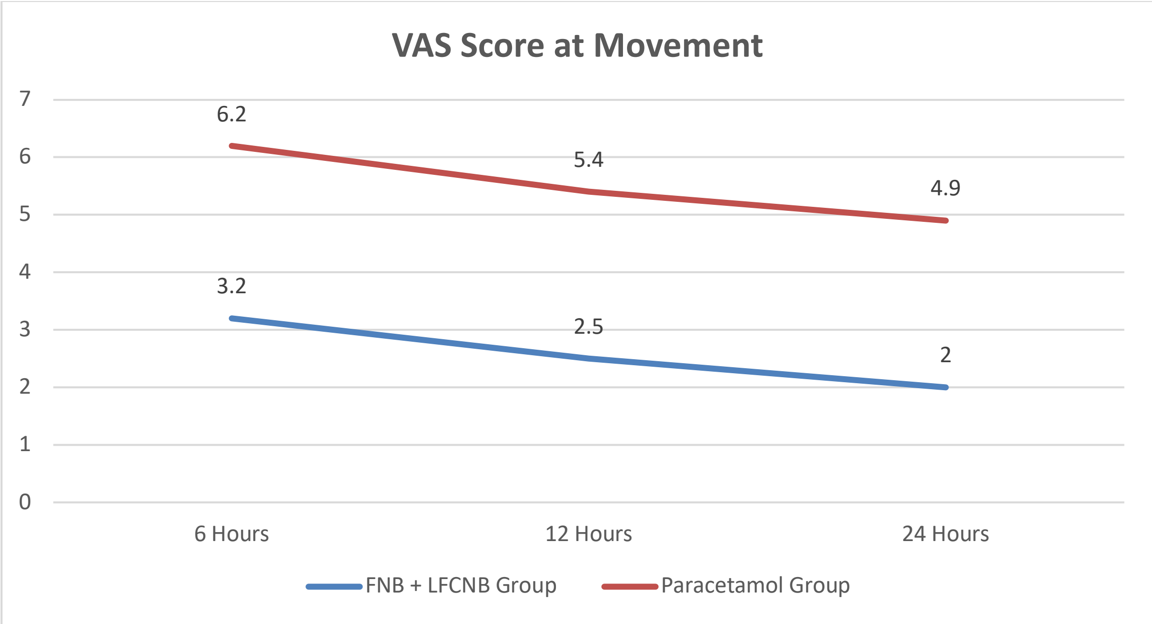

Figure 2: Comparison of VAS score at Movement

Analgesic consumption was also significantly reduced in the FNB + LFCNB group, with a mean consumption of 12.4 ± 3.8 mg compared to 22.6 ± 4.5 mg in the paracetamol group ($p < 0.001$). While side effects such as nausea, vomiting, and dizziness were slightly more frequent in the paracetamol group, these differences were not statistically significant.

Importantly, the reduced need for additional analgesics in the nerve block group further highlighted the clinical advantage of this approach. (Table 3)

Table 3: Analgesic Consumption and Side Effects

Variable	FNB + LFCNB Group (n=30)	Paracetamol Group (n=30)	p-value
Analgesic Consumption (mean ± SD)	12.4 ± 3.8	22.6 ± 4.5	<0.001
Nausea	2 (6.7%)	5 (16.7%)	0.228
Vomiting	1 (3%)	3 (10%)	0.301
Dizziness	3 (10%)	6 (20%)	0.278

Functional outcomes and patient satisfaction were notably better in the FNB + LFCNB group.

Time to ambulation was significantly shorter (26.5 ± 4.1 hours vs. 34.2 ± 5.9 hours; $p < 0.001$), and patients reported higher satisfaction scores (9.1 ± 0.7 vs. 7.8 ± 1.2; $p < 0.001$). Additionally, the length of hospital stay was reduced in the nerve block group (4.5 ± 1.1 days vs. 5.3 ± 1.4 days; $p = 0.002$), demonstrating the broader benefits of this analgesic strategy in promoting recovery and enhancing overall patient care. (Table 4)

Table 4: Functional Outcomes and Patient Satisfaction

Outcome	FNB + LFCNB Group (n=30)	Paracetamol Group (n=30)	p-value
Time to Ambulation (hours)	26.5 ± 4.1	34.2 ± 5.9	<0.001
Patient Satisfaction (1-10)	9.1 ± 0.7	7.8 ± 1.2	<0.001
Length of Hospital Stay	4.5 ± 1.1	5.3 ± 1.4	0.002

Discussion

The management of postoperative pain in geriatric patients with intertrochanteric fractures is challenging due to the need for adequate analgesia that minimises systemic side effects. The present study demonstrated that FNB + LFCNB is significantly more effective than paracetamol in reducing postoperative pain, improving functional outcomes, and enhancing patient satisfaction, aligning with findings from other studies.

In the present study, patients receiving FNB + LFCNB had significantly lower pain scores than the paracetamol group at all time points. For example, VAS scores at rest 6 hours post-surgery were 2.3 ± 1.2 in the nerve block group compared to 4.1 ± 1.5 in the paracetamol group ($p < 0.001$). These findings are consistent with Uysal AI et al.

[13], who demonstrated that femoral nerve blocks effectively reduced pain scores in geriatric patients undergoing surgery for intertrochanteric fractures. Similarly, Geizhals S et al. [14] found that femoral nerve blocks not only reduced pain but also decreased opioid consumption, providing an effective alternative to systemic analgesics. The reduced need for supplemental analgesics in the FNB + LFCNB group further supports its efficacy. In the present study, patients in the nerve block group required a mean of 12.4 ± 3.8 mg of additional analgesics compared to 22.6 ± 4.5 mg in the paracetamol group ($p < 0.001$). This outcome mirrors findings from Tuncer S et al. [15], who observed significantly lower analgesic consumption in patients receiving femoral nerve block than in patients with intravenous patient-controlled analgesia (PCA). Moreover, Amiri HR et al. [16] highlighted the benefits of combining femoral nerve block with spinal anaesthesia, which similarly reduced the need for postoperative pain management interventions.

Functional outcomes in the present study were significantly better in the nerve block group. Time to ambulation was shorter (26.5 ± 4.1 hours vs. 34.2 ± 5.9 hours; $p < 0.001$), and patients reported higher satisfaction scores (9.1 ± 0.7 vs. 7.8 ± 1.2; $p < 0.001$). These findings align with Klimkiewicz J et al. [10] who found that FNB combined with LFCNB facilitated earlier mobilisation and improved patient satisfaction in geriatric patients with intertrochanteric fractures. Additionally, early mobilisation is crucial for reducing complications such as deep vein thrombosis and pulmonary embolism, as highlighted by Muse IO et al. [4] who noted that peripheral nerve blocks support quicker recovery and better postoperative outcomes.

The present study also demonstrated a reduced length of hospital stay in the FNB + LFCNB group (4.5 ± 1.1 days vs. 5.3 ± 1.4 days; $p = 0.002$). This finding is consistent with observations by Muse IO et al. [4] who reported that patients receiving peripheral nerve blocks had shorter hospital stays and faster recoveries compared to those relying on systemic analgesics.

While the benefits of FNB + LFCNB are evident, limitations in the technique must be acknowledged. The reliance on operator expertise for ultrasound-guided nerve block placement introduces variability, as noted by Geizhals S et al. [14] who emphasized the need for standardized training. Furthermore, the single-shot nerve blocks used in the present study may limit the duration of analgesia compared to continuous infusion techniques. Klimkiewicz J et al. [10] suggested continuous nerve blocks could further enhance pain control and prolong the analgesic effect, particularly in frail geriatric patients.

Comparing these findings with Amiri HR et al. [16], who evaluated combined femoral nerve block and spinal anaesthesia, highlights the potential of multimodal approaches to optimise postoperative analgesia. While spinal anaesthesia remains a gold standard for many surgical interventions, the present study demonstrates the standalone efficacy of combining FNB and LFCNB as an alternative for patients with contraindications to spinal techniques.

Adverse effects in the present study were minimal, with fewer instances of nausea, vomiting, and dizziness reported in the nerve block group compared to the paracetamol group. These differences, though not statistically significant, emphasise the favourable safety profile of FNB + LFCNB. Tuncer S et al. [14] similarly reported fewer side effects in patients receiving femoral nerve block than those using intravenous PCA, further supporting the safety of this approach.

In conclusion, the present study adds to a growing body of evidence, including previous studies demonstrating that FNB + LFCNB is a superior option for postoperative pain management in geriatric patients with intertrochanteric fractures. By providing better pain relief, reducing analgesic requirements, and improving functional outcomes, this technique offers a compelling alternative to systemic analgesics such as paracetamol. Future studies should explore the integration of continuous nerve block techniques and further investigate their role in multimodal pain management strategies to enhance patient outcomes.

Conclusion

Combined femoral and lateral femoral cutaneous nerve blocks provide superior postoperative analgesia compared to paracetamol in geriatric patients with intertrochanteric fractures. This technique significantly reduces pain, decreases analgesic consumption, shortens hospital stays, and improves functional outcomes and patient satisfaction, making it a safe and effective alternative for pain management in this high-risk population.

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