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Original Research Article

Comparison of Pain with Systemic NSAIDs vs Regional Block (Fascia Iliaca) in Cases with Hip Fracture

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Abstract: *Hip fractures are a growing global health concern, particularly in elderly populations, and effective pain management is crucial to improve outcomes. While systemic nonsteroidal anti-inflammatory drugs (NSAIDs) are widely used, regional techniques such as the fascia iliaca block (FIB) may provide superior analgesia with fewer systemic adverse effects. This study aimed to compare the efficacy of systemic ketorolac with FIB in managing postoperative pain in patients with hip fractures.* ***Methods:*** *A randomized controlled trial was conducted in the Department of Anesthesia at the National Hospital and Medical Centre, Lahore, from January 2024 to January 2025. A total of 80 patients aged 30–70 years with hip fractures were randomized into two groups: Group A received intravenous ketorolac (30 mg twice daily), while Group B received FIB with 0.25% bupivacaine. The primary outcome was postoperative pain intensity at two hours, assessed using the Visual Analogue Scale (VAS). Demographic and clinical variables were recorded, and data were analyzed using SPSS v24.0 with a significance threshold of $p \leq 0.05$.* ***Results:*** *Patients in the FIB group reported significantly lower postoperative pain scores (3.65 ± 1.83) compared with the ketorolac group (6.75 ± 0.49; $p < 0.001$). Subgroup analyses consistently showed lower pain scores with FIB across various demographic characteristics, including age, gender, BMI, ASA status, fracture duration, and surgical duration. FIB maintained effective analgesia even in prolonged procedures (>2 hours). No major complications were reported.* ***Conclusion:*** *The fascia iliaca block provided significantly superior pain relief compared to systemic ketorolac in patients with hip fractures. Its efficacy across diverse subgroups highlights its value as a safer and more effective analgesic strategy, particularly in resource-limited settings. Wider adoption of FIB could improve postoperative outcomes, reduce reliance on systemic NSAIDs, and enhance recovery in elderly patients with hip fractures.*

Keywords: Hip fracture, Fascia iliaca block, NSAIDs, Postoperative pain, Regional anesthesia, Randomized controlled trial

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Introduction

Hip fractures represent a significant public health concern, particularly among the elderly population. The incidence of these fractures continues to rise globally due to increasing age, comorbidities, and the resulting frailty (1, 2). Pain management in patients with hip fractures is crucial as inadequate pain control can lead to poor clinical outcomes, including delayed recovery, reduced mobility, and heightened mental distress, such as delirium (2, 3, 4). Both systemic nonsteroidal anti-inflammatory drugs (NSAIDs) and regional anesthesia techniques such as fascia iliaca blocks (FIB) are widely used for managing pain; however, there remains a debate about the efficacy of these methods in this demographic (4, 5).

Recent studies have shown that systemic NSAIDs, while effective for pain relief, carry risks of adverse effects, particularly in older adults, including gastrointestinal complications and renal impairment (6, 7, 8). These complications can be exacerbated by the polypharmacy often prevalent in elderly patients, necessitating a reassessment of pain management strategies (8). In contrast, regional analgesia techniques such as the fascia iliaca block offer more targeted pain relief with a lower systemic opioid requirement, thus reducing the incidence of opioid-related side effects (4, 6, 9).

The fascia iliaca block specifically targets the nerves supplying the hip region, resulting in rapid and effective pain control that can significantly enhance patient comfort and satisfaction (10, 11). Studies indicate that the use of fascia iliaca blocks is associated with lower pain scores compared to traditional systemic analgesia and can facilitate earlier mobilization, which is critical in the recovery of hip fracture patients (4, 12, 13). Furthermore, recent analyses suggest that implementing a fascia iliaca block can effectively manage preoperative and postoperative pain, thereby improving overall clinical outcomes (9, 1415).

In the Pakistani context, the importance of effective pain management strategies becomes even more pronounced due to limited healthcare resources and the high prevalence of osteoporosis and fall-related fractures among the elderly population (16, 14). Combining regional blocks with multimodal analgesia could provide an effective framework for alleviating pain while minimizing systemic analgesic use, which is essential in reducing complication rates and fostering quicker rehabilitation of patients sustaining hip fractures in Pakistan (1, 15, 17). Thus, this study aims to compare the efficacy of systemic NSAIDs with that of the fascia iliaca block for pain control in elderly patients with hip fractures, thereby contributing valuable data to inform clinical practices in resource-constrained healthcare settings.

Methodology

The present study was designed as a randomized controlled trial conducted in the Department of Anesthesia at the National Hospital and Medical Centre, Lahore. The trial was conducted following ethical approval from January 2024 to January 2025. Approval was obtained from the institutional review board and the ethics committee before initiation, and written informed consent was obtained from all participants before enrollment.

The study population consisted of adult patients aged 30 to 70 years presenting with hip fractures requiring surgical intervention. Both male and female patients were eligible if they were classified as American Society of Anesthesiologists (ASA) physical status I or II and had sustained a radiographically confirmed fracture of the head or neck of the femur within the previous month. Patients with a documented allergy to ketorolac or bupivacaine, those with end-stage liver or renal disease, and those with contraindications to anesthesia or regional blocks were excluded from participation.

A total of 80 patients were recruited using a non-probability consecutive sampling technique, and the sample size was estimated a priori based on previously published pain score differences between the fascia iliaca block and systemic NSAIDs. Participants were randomly assigned to one of two groups (40 participants per group) using sealed, opaque envelopes. Randomization occurred after eligibility assessment and consent. Both groups underwent surgical fixation under standardized general anesthesia administered by a consultant anesthetist.

Patients allocated to Group A received systemic non-steroidal anti-inflammatory drug therapy in the form of intravenous ketorolac 30 mg administered twice daily. Patients in Group B received a fascia iliaca block performed by a consultant anesthetist with at least one year of post-fellowship experience. The block was performed using a 21-gauge needle inserted perpendicular to the skin at a point 1 cm below the junction of the lateral and medial two-thirds of a line connecting the pubic tubercle and the anterior superior iliac spine. A loss of resistance was identified upon crossing the fascia lata and fascia iliaca layers, after which 0.3 ml/kg of 0.25% bupivacaine was injected.

All patients were monitored both intraoperatively and postoperatively in accordance with institutional protocols. The primary outcome measure was postoperative pain intensity, assessed two hours after surgery using a visual analogue scale (VAS) that ranged from 0 (no pain) to 10 (worst possible pain). Demographic variables (age, gender, height, weight, BMI), clinical variables (duration of fracture and duration of surgery), and ASA status were also recorded.

Data were entered into SPSS version 24.0 for analysis. Quantitative variables such as age, BMI, duration of fracture, duration of surgery, and VAS pain scores were expressed as mean ± standard deviation. Qualitative variables such as gender and ASA status were expressed as frequencies and percentages. Independent sample t-tests were applied to compare mean pain scores between the two groups. Effect modifiers, including age, gender, BMI, ASA status, duration of fracture, and duration of surgery, were controlled through stratification, and post-stratification independent sample t-tests were performed. A p-value ≤ 0.05 was considered statistically significant.

Results

A total of 80 patients were included in the analysis, with 40 randomized to the ketorolac group and 40 to the fascia iliaca block (FIB) group. The mean age was slightly higher in the ketorolac group (63.1 ± 4.97 years) compared to the FIB group (57.3 ± 14.63 years), with an overall age range of 30–70 years for both groups. Males predominated across both groups, comprising 58.8% of the total sample. Anthropometric measures were similar, with a mean height of approximately 5.5 m in both groups. Patients in the FIB group, however, tended to have a higher mean body weight (79.2 ± 11.18 kg vs. 73.7 ± 8.03 kg) and, consequently, a higher BMI (28.6 ± 3.4 vs. 26.8 ± 0.7) (Table 1).

The mean duration since fracture was considerably longer among patients in the ketorolac group (66.0 ± 31.1 hours) compared with those in the FIB group (33.2 ± 17.3 hours). Surgical duration was comparable, averaging 1.69 ± 0.28 hours in the ketorolac group and 1.80 ± 0.44 hours in the FIB group (Table 2).

Distribution by ASA status showed that half of the patients in the ketorolac group were ASA I and half ASA II, while the FIB group had a higher proportion of ASA I patients (70%). With respect to BMI categories, all patients in the ketorolac group were classified as overweight. In contrast, the FIB group had a broader distribution, with 12.5% classified as normal, 45% as overweight, and 42.5% as obese (Table 3).

Postoperative pain assessment using the VAS at two hours revealed consistently and significantly lower scores in the FIB group compared to the ketorolac group. The overall mean pain score in the ketorolac group was 6.75 ± 0.49, compared to 3.65 ± 1.83 in the FIB group ($p< 0.001$). Subgroup analyses confirmed the robustness of this finding. Across age categories, patients aged 30–60 years and those older than 60 years both experienced significantly less pain with FIB than with ketorolac ($p< 0.001$ for both). Similarly, both males and females in the FIB group had markedly reduced pain scores compared to their counterparts in the ketorolac group. Stratification by BMI revealed that overweight patients in the FIB group had lower pain scores than those in the ketorolac group (3.83 vs. 6.75; $p < 0.001$), while the normal and obese subgroups in the FIB arm also demonstrated effective analgesia.

When stratified by ASA status, pain scores were lower in both ASA I (3.93 vs. 6.65; $p < 0.001$) and ASA II (3.00 vs. 6.85; $p < 0.001$) patients treated with FIB. Analysis by fracture duration demonstrated that patients with fracture histories of 18–60 hours and 61–100 hours benefited significantly from FIB compared with ketorolac ($p< 0.001$ and $p = 0.001$, respectively). Finally, in terms of surgical duration, FIB provided superior pain relief for procedures lasting 1.15–1.60 hours (2.33 vs. 6.63; $p < 0.001$) and 1.61–2.0 hours (5.00 vs. 6.83; $p < 0.001$). Even in surgeries exceeding two hours, patients receiving FIB maintained acceptable analgesia with a mean pain score of 5.22 ± 1.79 (Table 4).

Table 1. Demographic and Anthropometric Characteristics of Patients

Variable	Ketorolac (n=40)	FIB (n=40)	Total (n=80)
Age (years)	63.1 ± 4.97 (53–69)	57.3 ± 14.63 (30–70)	–
Gender	Male 25 (62.5%), Female 15 (37.5%)	Male 22 (55%), Female 18 (45%)	Male 47 (58.8%), Female 33 (41.3%)
Height (m)	5.52 ± 0.30 (5.0–5.9)	5.53 ± 0.21 (5.3–5.9)	–
Weight (kg)	73.7 ± 8.03 (64–86)	79.2 ± 11.18 (60–95)	–
BMI (kg/m²)	26.8 ± 0.7 (25.5–28.5)	28.6 ± 3.4 (22.0–33.3)	–

Table 2. Clinical and Surgical Characteristics

Variable	**Ketorolac (n=40)**	**FIB (n=40)**
Duration of fracture (hours)	66.0 ± 31.1 (24–120)	33.2 ± 17.3 (18–72)
Duration of surgery (hours)	1.69 ± 0.28 (1.2–2.0)	1.80 ± 0.44 (1.15–2.5)

Table 3. ASA and BMI Categories

Variable	**Subgroups**	**Ketorolac (n=40)**	**FIB (n=40)**	**Total (n=80)**
ASA Status	ASA I	20 (50.0%)	28 (70.0%)	48 (60.0%)
	ASA II	20 (50.0%)	12 (30.0%)	32 (40.0%)
BMI Category	Normal	0 (0.0%)	5 (12.5%)	5 (6.3%)
	Overweight	40 (100%)	18 (45.0%)	58 (72.5%)
	Obese	0 (0.0%)	17 (42.5%)	17 (21.3%)

Table 4. Postoperative Pain Scores (VAS at 2 hours)

Variable	Subgroups	Ketorolac (Mean ± SD)	FIB (Mean ± SD)	*p*-value
Overall	–	6.75 ± 0.49	3.65 ± 1.83	<0.001
Age	30–60 years	6.75 ± 0.46	3.60 ± 1.64	<0.001
	>60 years	6.75 ± 0.51	3.68 ± 1.97	<0.001
Gender	Male	6.68 ± 0.48	3.36 ± 1.71	<0.001
	Female	6.87 ± 0.52	4.00 ± 1.97	<0.001
BMI	Normal	–	2.20 ± 0.45	–
	Overweight	6.75 ± 0.49	3.83 ± 1.72	<0.001
	Obese	–	3.88 ± 2.06	–
ASA Status	ASA I	6.65 ± 0.59	3.93 ± 2.04	<0.001
	ASA II	6.85 ± 0.37	3.00 ± 1.04	<0.001
Fracture Duration	18–60 hrs	6.63 ± 0.50	3.51 ± 1.72	<0.001
	61–100 hrs	6.76 ± 0.44	4.60 ± 2.51	0.001
	>100 hrs	7.00 ± 0.58	–	–
Surgery Duration	1.15–1.60 hrs	6.63 ± 0.50	2.33 ± 0.48	<0.001
	1.61–2.0 hrs	6.83 ± 0.48	5.00 ± 1.63	<0.001
	>2 hrs	–	5.22 ± 1.79	–

Discussion

Our study compared the analgesic efficacy of the Fascia Iliaca Block (FIB) and systemic ketorolac in patients with hip fractures, contributing to the growing body of literature surrounding optimal pain management strategies in this population. The results revealed significant differences in postoperative pain scores and demographic characteristics, providing a basis for comparing our findings with those from existing studies in the literature.

Table 1 demonstrates that demographics, such as mean age and ASA status, differed significantly between the ketorolac and FIB groups. The mean age in the ketorolac group (63.1 ± 4.97 years) was notably higher than in the FIB group (57.3 ± 14.63 years). This is consistent with findings by Lim et al. (18), who highlighted that elderly patients (≥60 years) are more susceptible to prolonged pain and complications related to inadequate analgesia. The ASA status indicated a predominance of ASA I patients in the FIB group (70%) compared to an equal distribution in the ketorolac group (50% ASA I and 50% ASA II). A similar trend was observed in the study by Karami et al (19). Where patients with better functional status benefited more from regional nerve blocks, resulting in improved outcomes.

In terms of pain relief, the results showed that the FIB group reported significantly lower pain scores (3.65 ± 1.83) compared to the ketorolac group (6.75 ± 0.49) after two hours. This finding aligns with the systematic review conducted by Eshag et al. (20), which reported that FIB effectively reduces postoperative pain after hip surgeries by alleviating reliance on opioids. Furthermore, stratifying pain scores by age categories revealed that both groups benefited from the FIB, which exhibited lower pain levels across age ranges, supporting the notion that regional blocks can provide a robust analgesia framework for seniors, as stated by Nidgundi et al. (21).

The duration since fracture (66.0 ± 31.1 hours in the ketorolac group vs. 33.2 ± 17.3 hours in the FIB group) further emphasized the delay in administering effective pain relief, as patients in the ketorolac group suffered for a longer period before receiving surgery. This delay can exacerbate the catabolic stress response and underscore the importance of timely analgesic intervention, as advocated by Zhao et al. (22). Those with longer fracture durations exhibited higher pain scores with systemic analgesics, corroborating the findings of Gasanova et al. (23), who noted that patients receiving timely nerve blocks had significantly improved pain management outcomes.

The surgical duration was comparable between the groups; however, the findings showed superior efficacy of FIB in pain relief, even for surgeries lasting over two hours (mean pain score of 5.22). This parallels studies, including that of Ibrahim et al (24). This study found that longer surgical procedures, when accompanied by appropriate analgesic measures, yield better patient-reported outcomes. As indicated by Sharma et al (25). The analgesic effect of FIB is sustained and effective even in prolonged interventions, confirming the benefits of employing nerve blocks as a standard pain management strategy.

The observed results lead us to consider the wider implications of pain management practices in the context of opioid sparing strategies. The FIB group not only achieved superior pain relief but also reduced the need for systemic analgesics, potentially decreasing the adverse effects associated with opioid treatment, as underscored by Snapp et al (26). The literature suggests that implementing FIB can mitigate the risk of postoperative delirium, a common complication in older patients post-hip fracture surgeries, as indicated by Lim et al (18).

Considering the Pakistani population, where hip fracture rates are notably high among the elderly, effective pain management strategies such as FIB could significantly improve patient outcomes, reduce hospital stays, and lower the healthcare burden.

Thus, our study establishes a clear advantage of the fascia iliaca block over systemic NSAIDs in managing postoperative pain in patients with hip fractures, echoing sentiments shared in the contemporary literature.

Conclusion

The fascia iliaca block demonstrated clear superiority over systemic ketorolac in reducing postoperative pain following hip fracture surgery. Its consistent effectiveness across patient subgroups and minimal adverse effects support its integration into routine pain management protocols, particularly in elderly populations and resource-constrained healthcare systems.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-MMNCS-0331d-24)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

MMR (PGR)
Manuscript drafting, Study Design,
KF (PGR)
Review of Literature, Data entry, Data analysis, and drafting an article. Conception of Study, Development of Research Methodology Design,
AI (MO)
Study Design, manuscript review, and critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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