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Pain Score after Fascia Iliaca Compartment Block for Acute PAIN Management in Hip Fractures at Tertiary Care Hospital

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ABSTRACT

Background: Managing pain associated with hip fractures is a significant challenge. Fascia iliaca compartment block is a local anaesthetic injection that may provide good analgesia. **Objective:** To compare the pain score on movement and at rest among patients with and without fascia iliac compartment block for acute pain management in hip fractures. **Material and Methods:** This randomized controlled study included 124 participants. Patients were randomly assigned to two groups: Group-A had a fascia iliac compartment block (FICB), whereas Group-B did not. Pain evaluations were performed pre-operatively at 0-minutes, 15-minutes, 2-hours, and 6-hours using visual analogue scale (VAS). SPSS was used for data analysis. The normality of the data was evaluated. Quantitative variables were presented as median (IQR). Qualitative variables were presented as frequency and percentages. Group comparisons were performed with the Mann-Whitney U test, with significance established at $p \leq 0.05$. **Results:** Patients who received FICB were mostly female (56.5%) and more often categorized as ASA 3 (12.9%), in contrast to the absence of such classification in the NO FICB group ($p=0.011$). The age distribution was similar ($p=0.088$). FICB was correlated with markedly reduced pain ratings at rest and during movement at all time intervals ($p<0.001$). Preoperative analgesic intake was significantly decreased ($p<0.001$), and the duration of hospital stay was abbreviated ($p<0.001$). **Conclusion:** The fascia iliaca compartment block offers enhanced short-term analgesia preoperatively, both at rest and during movement. It also reduces the preoperative analgesia consumption and hospital stay.

INTRODUCTION

Hip fractures, often known as HFs, are orthopaedic occurrences that occur frequently in clinical settings, particularly among the elderly population.[1,2] The average age of the world's population is gradually increasing, and along with it comes a rise in the incidence of hip fractures.[3] Emergency medical services throughout the world are dealing with a significant rise in the number of people who have hip fractures.[4] As of the year 2050, it is anticipated that there would be six million people who suffer from hip fractures during the whole year.[5]

Increases in the frequency of hip fractures that are associated with advancing age result in the incidence of hip fractures about doubling for every decade beyond the age of 50.[6] Roughly ninety percent of hip fractures occur in people who are sixty years old or older.[7] Within the next thirty years, it is anticipated that Asia will be responsible for around fifty percent of all osteoporotic fractures.[8] Fractures of the hip in elderly patients are very prevalent injuries that are accompanied with substantial morbidity and death rates.[9] There are patients who have suffered hip fractures and are presented with a challenging recovery and a death rate of up to 35 percent after one year[10]

Pain management is a hard challenge for emergency healthcare providers since patients who suffer from hip fractures experience tremendous pain. Hip fractures are considered to be substantial traumas for the patient.[11] Patients who are experiencing pain but are not receiving treatment are at an increased risk of developing delirium and the neuro-hormonal stress response.[12,13]
Commonly prescribed analgesics are usually harmful and increase the risk of delirium, which is a common consequence with rates as high as 70 percent. This is because of the presence of comorbidities.[14] Because of this challenge, there has been a continual emphasis placed on both pharmaceutical and non-pharmacological methods of pain treatment. These methods may or may not require the use of regional anaesthetics.[15]
Skin traction, skeletal traction, splints, nerve blocking, and pillow care are some of the treatments that are assumed to

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give pain relief for patients who have hip fractures prior to ultimate surgical repair. However, there is no one approach that is considered to be the most effective.[16–17]

Since it was initially presented by Dalens et al.,[18] fascia iliaca compartment block (FICB) has been shown to be a more superior alternative analgesic for hip fractures. It has been proven to result in a more substantial decrease of the peri-operative pain score, as well as a reduction in the usage of systemic opioids.[19-22] FICB may be conducted safely using either the anatomical landmark method or the ultrasonography guidance, with a high success rate of up to 96%[20,23-26] in both of these procedures.

In order to alleviate pain, the fascia iliaca compartment block (FICB), which is a local anaesthetic injection that is injected directly into the hip area, is widely used by medical professionals and nurse practitioners.[27] There is a possibility that the fascia iliaca compartment block treatment will not only give good analgesia but also make it possible to reduce the amount of morphine that is administered.[15] The fascia iliaca compartment block tends to result in a shorter amount of time spent in the hospital. In addition, there is some data that suggests that the incidence of pneumonia has reduced.[28]

An investigation of the effectiveness of fascia iliac compartment block in the management of pain in one of the studies. The average age of the patients who had fascia iliac compartment block was determined to be 84.6±6.7 years, whereas the patients who did not have this condition had a mean age of 84.9±7.7 years. At the time of admission, the mean pre-operative VAS movement score was recorded as 7.61±2.36 in the FICB group, whereas the non-FICB group had a score of 6.22±3.08. In patients who had fascia iliac compartment block, the pre-operative VAS movement score after two hours and six hours was recorded as 6.83±2.41 and 6.68±1.93, respectively. While in patients who did not have fascia iliac compartment block, the scores were recorded as 6.79±3.00 and 6.61±3.06, respectively. As of admission, the mean pre-operative VAS score at rest was recorded as 4.16±3.28 in the FICB group, whereas the non-FICB group recorded a score of 3.37±3.10 on the same scale. Patients who had fascia iliac compartment block had a pre-operative VAS score of 3.39±2.84 and 3.16±2.84 at rest after two hours and six hours, respectively. Patients who did not have fascia iliac compartment block had a score of 3.64±3.12 and 3.25±3.14, respectively without fascia iliac compartment block.[29]

By searching the relevant literature, we were unable to find any similar local trials that compared and contrasted the benefits of fascia iliac compartment block on reducing the need for anaesthesia and pain medication. Comparing the levels of pain experienced by individuals with hip fractures who were given fascia iliac compartment block (FICB) to those who did not receive FICB is the purpose of the present research. Within the context of our therapeutic practice, this research will provide local data on the fascia iliac compartment block, which is an excellent method for alleviating pain. The more favorable outcomes of the research using fascia iliac compartment block will lead us to the conclusion that this is advantageous in reducing discomfort, expenditures, and length of stay, and as a result, it has the potential to be used in normal pre-operative alternate analgesia.

MATERIAL AND METHODS

Under the direction of the Department of Orthopaedics at Liaquat National Hospital in Karachi, this randomized controlled experiment was carried out over the course of a period of six months, beginning on December 2024 and ending on May 2025. In order to comply with ethical standards, the Institutional Ethical Review Committee gave its permission. A total of 124 patients were included in the study, with 62 patients being assigned to each group. The sample size was determined by calculating the mean and standard deviation of the pre-operative pain ratings on movement at the time of admission. The sample size was determined using Open Epi Software, which had a power of 80% and a confidence interval of 95%. Patient enrolment was accomplished by the use of a non-probability sequential sampling method. The participants were divided into two groups based on a random assignment: Group A was given the fascia iliac compartment block (FICB), whereas Group B was not given the procedure.

Both male and female patients between the ages of 60 and 85 years old, with an ASA physical status of I–III, and a verified diagnosis of acute hip fracture were eligible for inclusion in the study. Patients were not allowed to participate in the study if they had a history of allergic reactions to local anaesthesia, had undergone numerous traumatic injuries, appeared with more than one fracture.

After obtaining informed permission, all patients who presented with hip fractures via the emergency room were screened, and those patients who met the inclusion criteria were enrolled for the study. The individuals' demographic and clinical information, which included their age, gender, height, weight, body mass index (BMI), residential status, fracture side and duration, ASA status, hypertension, and diabetes, were documented.

The fascia iliac compartment block was performed in the emergency department by principal investigator under the supervision of the anesthesia team. The fascia iliac was performed in supine position and after all aseptic measures drawing a line between the anterior superior iliac spine and the pubic tubercle, the point of entry of the needle for this landmark-based technique is 1 cm caudal to the intersection of the lateral third and medial two-thirds of this line using a short bevel needle, penetration of the fascia lata and fascia iliaca layers is appreciated by feeling two "pops." Bupivacaine 2mg/kg is the local anesthesia which was used for FICB.

The pain assesments for pain scores was made using a visual analogue scale (VAS) after the fascia iliac compartment block was administered. The pain score was asked by each patient who enrolled in the study (either group A or B) to assess his or her pain immediately at 0 min. The pain sore was also recorded after 15 min, after 2 hour and after 6 hours preoperatively of each patient in both group after FICB. The length of postoperative hospitalization as well as the usage of analgesics before surgery were measured and reported.

The lead investigator was responsible for recording all of the data on a proforma that had been developed in

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advance. Additionally, the measures to reduce the likelihood of confounding and bias were carried out by strictly adhering to the inclusion and stratification criteria. SPSS version 27 was used in order to carry out the data analysis. Shapiro-Wilk test was used in order to determine whether or not quantitative variables were normal. In this study, categorical data such as gender, residency, side of fracture, ASA status, hypertension, and diabetes were provided in the form of frequencies and percentages. Continuous variables, such as age, fracture duration, pain ratings at different intervals, analgesic consumption, and length of hospital stay, were reported as mean ± standard deviation (SD) or median (IQR), depending on the distribution of the data. For the purpose of comparing the levels of pain experienced by the various groups, appropriate statistical methods such as the Student's t-test and the Mann-Whitney U test were used. For the purpose of controlling possible effect modifiers, stratification was used, and a p-value that was less than or equal to 0.05 was deemed statistically significant.

RESULTS

The Table 1 presents a comparison between patients who received fascia iliaca compartment block (FICB) and those who did not (NO FICB), highlighting demographic and clinical characteristics. In terms of gender, a higher proportion of female patients received FICB (56.5%) compared to males (43.5%), whereas the NO FICB group had more males (61.3%) than females (38.7%). When analyzing residence, both groups had more patients from urban areas, with urban dwellers accounting for 71% of the FICB group and 67.7% of the NO FICB group. Rural representation was slightly higher in the NO FICB group (32.3%) compared to the FICB group (29%), indicating a consistent urban dominance across both groups.

The side of fracture distribution was identical between both groups, with right-sided fractures observed in 37.1% and left-sided in 62.9%, suggesting no side-related bias in FICB administration. ASA status shows a major contrast in the third category: 12.9% of patients in the FICB group were classified as ASA 3, whereas there were none in the NO FICB group. ASA 2 comprised the majority in both groups 64.5% in FICB and 77.4% in NO FICB indicating most patients had mild systemic disease. ASA 1 patients made up 22.6% in both groups.

A notable difference emerged in hypertension status: only 38.7% of FICB recipients had hypertension compared to 82.3% in the NO FICB group. This substantial difference might suggest a preference for avoiding FICB in hypertensive patients, potentially due to clinical considerations. Regarding diabetes mellitus, its prevalence was higher in the FICB group (75.8%) than in the NO FICB group (66.1%), although the difference was less dramatic.

Analgesia consumption patterns showed a clear distinction. All FICB patients had either no analgesia intake (69.4%) or required only one dose (30.6%), while in the NO FICB group, none had zero analgesia consumption. Instead, the majority required multiple doses: 56.5% took two and 32.3% took three, while only 11.3% needed just one dose. This highlights the analgesic effectiveness of FICB, with markedly reduced need for supplemental pain relief among its recipients.

The Table 2 compares clinical and pain-related outcomes between patients who received fascia iliaca compartment block (FICB) and those who did not. Age distribution was similar across both groups, with a slightly higher mean age in the FICB group (66.39 years) versus the NO FICB group (65.55 years), though this difference was not statistically significant (p=0.088), indicating comparable age profiles.

Pain assessment using the Visual Analog Score (VAS) at rest revealed that baseline scores were similar between groups (around 7.5), with no significant difference (p=0.766). However, post-procedural pain reduction was notably superior in the FICB group. At 15 minutes, 2 hours, and 6 hours, FICB patients consistently reported lower pain scores 4.71, 2.69, and 3.19 respectively compared to 5.63, 4.06, and 3.69 in the NO FICB group. All these differences were statistically significant, highlighting the early and sustained analgesic benefits of FICB.

VAS scores during movement followed a similar trend. At baseline, both groups had high scores, above 8.5, indicating severe pain with no significant difference (p=0.253). Post-intervention, FICB patients again showed markedly better pain control. Scores at 15 minutes, 2 hours, and 6 hours were significantly lower for the FICB group (5.76, 3.73, and 4.23) than for the NO FICB group (6.58, 5.06, and 4.58), with p-values indicating meaningful analgesic efficacy. Analgesic consumption prior to surgery starkly contrasted between groups. The FICB group required fewer doses, with a mean of 0.31 compared to 2.21 in the NO FICB group (p<0.001). This difference underscores the potent analgesic effect of FICB, reducing reliance on additional pain medication.

Lastly, length of hospital stay was significantly shorter for FICB recipients, averaging 2.81 days versus 3.45 days in the NO FICB group (p<0.001), suggesting better recovery trajectories or improved perioperative pain management facilitating earlier discharge. Overall, these results illustrate the clinical advantage of FICB in managing fracture-related pain and its broader impact on healthcare utilization.

This Table 3 presents a comparison of mean changes in Visual Analog Scale (VAS) scores for pain, both at rest and during movement, between patients receiving fascia iliaca compartment block (FICB) and those who did not. Across all time points, pain relief was significantly more pronounced in the FICB group, indicating superior analgesic effectiveness of the intervention.

For pain at rest, the mean score reduction from baseline to 15 minutes was 2.82 in the FICB group, compared to only 1.98 in the NO FICB group (p<0.001). This reflects an early and notable improvement in pain control for FICB patients. At the 2-hour mark, pain reduction further increased to 4.84 for the FICB group versus 3.55 for the NO FICB group (p<0.001), sustaining the analgesic benefit. By 6 hours, the mean reduction remained higher in the FICB group at 4.34 versus 3.92 in the control group, with the difference still statistically significant (p=0.032), suggesting enduring efficacy over time.

Pain during movement followed a similar trend. At 15 minutes, the FICB group showed a mean VAS score reduction of 2.97, compared to 1.92 in the NO FICB group (p<0.001), denoting rapid onset of pain relief even during

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mobilization. At 2 hours, the FICB group maintained a higher level of comfort with a 5.00-point reduction versus 3.44 points in the NO FICB group (p<0.001). At 6 hours, the FICB group experienced a 4.50-point drop, still significantly better than the 3.92-point reduction in the NO FICB group (p=0.004).

Overall, these findings confirm that FICB not only provides early analgesia but also sustains meaningful pain reduction both at rest and with movement for up to six hours post-intervention. The consistent statistical significance across all time intervals supports its role as an effective pain management strategy in this clinical setting.

Table 1

Demographic and Clinical Characteristics of the Patients

Variables		FICB	NO FICB
Gender	Male	27(43.5)	38(61.3)
	Female	35(56.5)	24(38.7)
Residence	Rural	18(29)	20(32.3)
	Urban	44(71)	42(67.7)
Side of fracture	Right	23(37.1)	23(37.1)
	Left	39(62.9)	39(62.9)
ASA Status	1	14(22.6)	14(22.6)
	2	40(64.5)	48(77.4)
	3	8(12.9)	0(0)
Hypertension	Yes	24(38.7)	51(82.3)
	No	38(61.3)	11(17.7)
Diabetes Mellitus	Yes	47(75.8)	41(66.1)
	No	15(24.2)	21(33.9)
Consumption of Analgesia	0	43(69.4)	0(0)
	1	19(30.6)	7(11.3)
	2	0(0)	35(56.5)
	3	0(0)	20(32.3)

Table-2

Comparative Analysis of Clinical and Pain Related Parameters between Study Groups

Variables	FICB	NO FICB	P-value
Age in years	66.39±4.20; 67(7)	65.55±4.76; 66(6)	0.088
Visual Analog Score at rest			
At baseline	7.53±0.62; 8(1)	7.61±0.68; 7.5(1)	0.766
At 15 minute	4.71±0.81; 5(1)	5.63±0.97; 6(1)	<0.001*
At 2 hours	2.69±0.66; 3(1)	4.06±1.12; 4(2)	<0.001*
At 6 hours	3.19±0.72; 3(1)	3.69±0.71; 4(1)	0.001*
Visual Analog Score at moment			
At baseline	8.73±0.89; 9(1)	8.50±1.11; 8.50(2)	0.253
At 15 minute	5.76±0.67; 6(1)	6.58±0.95; 7(1)	<0.001*
At 2 hours	3.73±0.65; 4(1)	5.06±1.25; 5(2)	<0.001*
At 6 hours	4.23±0.63; 4(1)	4.58±0.64; 4.5(1)	0.009*
Analgesic Consumption before surgery	0.31±0.46; 0(1)	2.21±0.63; 2(1)	<0.001*
Length of stay in days	2.81±0.39; 3(0)	3.45±0.50; 3(1)	<0.001*

*Data was presented as Mean±SD; Median(IQR) Mann-Whitney test was applied *Statistically significant at p<0.05*

Table 3

Comparison of Mean Changes in Vas Scores at Rest and During Moment

Variables	FICB	NO FICB	P-value
Visual Analog Score at rest			
0 to 15 min	2.82±1.07; 3(1)	1.98±0.89; 2(2)	<0.001*
0 to 2 hours	4.84±0.92; 5(1)	3.55±1.08; 3.5(1)	<0.001*
0 to 6 hours	4.34±1.02; 4(1)	3.92±0.96; 4(2)	0.032*
Visual Analog Score at moment			
0 to 15 min	2.97±1.10; 3(2)	1.92±1.06; 2(0)	<0.001*
0 to 2 hours	5.00±1.13; 5(2)	3.44±1.21; 3(1)	<0.001*
0 to 6 hours	4.50±1.05; 5(1)	3.92±1.20; 4(2)	0.004*

Data was presented as Mean±SD; Median(IQR), Mann-whitney test was applied, **Statistically significant at p<0.05*

DISCUSSION

It is common for patients who have suffered a hip fracture to experience excruciating pain, especially during the posture changes that are associated with the diagnostic and treatment process. During the pre-operative and post-operative periods of hip fracture patients, pain management is of the utmost importance. Thus, effective pain management has the potential to significantly enhance patient outcomes.[30]

During the acute period that follows hip fractures, it is crucial and important to offer senior patients with enough pain management. This helps them do activities like as moving about in bed, using a bedpan, and obtaining preoperative preparations.[31,32] Inappropriate use of opioids may also result in a significant risk of adverse effects, including hypotension, sedation, and even respiratory depression.[33]

Epidural anaesthesia is the kind of anaesthesia that is most often used in conventional surgical procedures for hip fractures. Epidural analgesia following surgery is effective in providing pain relief; nevertheless, it has become less popular in recent years due to the fact that anticoagulants and early ambulation are often seen as essential. In order to facilitate a speedy recovery of hip function, early postoperative analgesia is of utmost importance.[34]

Due to the fact that the puncture is performed at a safe distance from both the femoral artery and the femoral nerve, the fascia iliaca compartment block (FICB) approach is associated with a low level of risk. It has been established that even a modest dosage may provide considerable pain relief within a few hours after first administration.[35]

The results of a number of randomized controlled trials (RCTs) gave the impression that the analgesic effect of FICB is superior to that of opioids. First-line analgesics, often known as nonsteroidal anti-inflammatory drugs (NSAIDs), are an alternative to opioids. Recent studies have also compared the analgesic impact of FICB with that of NSAIDs.[31]

In our study, the gender distribution showed that most of the FICB recipients were female while in the NO FICB group more patients were male. ASA 3 patients were exclusively in the FICB group, while ASA 2 dominated both groups, and ASA 1 was equal. Diabetes mellitus was more prevalent in the FICB group than in the NO FICB group. Analgesic consumption was significantly lower among FICB recipients, 9.4% needed no analgesia and 30.6% required one dose, versus 0% needing no analgesia in the NO FICB group, where 11.3% needed one dose, 56.5% two doses, and 32.3% three doses.

Pain scores at rest dropped more rapidly and were lower in the FICB group at all post-intervention time points: 4.71 vs. 5.63 at 15 minutes (p<0.001), 2.69 vs. 4.06 at 2 hours (p<0.001), and 3.19 vs. 3.69 at 6 hours (p=0.032). Movement-associated pain followed a similar trend: at 15 minutes, VAS decreased by 2.97 in the FICB group vs. 1.92 in NO FICB (p<0.001); at 2 hours, 5.00 vs. 3.44 (p<0.001); and at 6 hours, 4.50 vs. 3.92 (p=0.004). Mean analgesic dose prior to surgery was significantly lower 0.31 in FICB vs. 2.21 in NO FICB (p<0.001). Length of hospital stay was shorter for FICB patients, averaging 2.81 days vs. 3.45 days in NO FICB (p<0.001), highlighting both improved pain

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control and potential efficiency in care pathways associated with the use of FICB.

The research conducted by Norio Yamamoto compared the effects of intravenous acetaminophen and FICB on patients who had undergone hip fracture surgery. The results showed that patients who got FICB reported much reduced pain with movement seven days following the procedure.[36]

Ma et al.[37] conducted an investigation on the efficacy of FICB in treating hip fractures in extremely elderly patients (those who were over 80 years old), using a conventional approach as a control. In terms of the outcomes, it was found that the VAS pain scores under various phases in patients who had received FICB were significantly lower than those of the controls. This was the case for scores at rest and in the morning of the day of surgery, as well as scores for passive movement at one hour after analgesia at the time of admission and in the morning of the day of surgery. In addition to randomized controlled trials (RCTs), a non-RCT also shown that FICB is an effective pain treatment method for individuals who have fractures of the proximal femur, when compared to non-steroidal anti-inflammatory drugs (NSAIDs).[38]

A systematic review was carried out by Steenberg and colleagues. Individuals who were given FICB had greater analgesia during movement than individuals who were given opioids. There were 538 patients who got medication. At rest, FICB did not perform significantly better than other analgesic modalities. There was inadequate information to draw any conclusions about the frequency of delirium, length of stay (LOS), or death, despite the fact that FICB looked to be safe.[39]

Hospitals must take into account a number of factors, including the length of stay and problems that may arise after hip fractures. Patients place a high level of value on the length of their stay.[10] Magaziner et al. demonstrated in their prospective study that a prolonged hospital stay had a significantly negative impact on the recovery of hip fracture patients in terms of their ability to perform physical and instrumental activities of daily living one year after surgery. This finding highlights the importance of prompt discharge from the hospital.[40]

In their prospective randomized controlled study that was conducted in 2020, Thompson et al. revealed that individuals who got a preoperative FICB saw a 98% decrease in the amount of morphine that they needed to treat severe pain.[41] In a randomized controlled experiment that was carried out in 2019 by Hao et al., a total of 85 patients participated. Of those patients, 44 were given a fascia iliaca block, whereas 46 patients were not. The administration of a fascia iliaca block led to a considerable reduction in the amount of infentanyl that was used, which in turn led to a reduction in the incidence of delirium (13.9% vs 35.7%, P =0.018).[42]

CONCLUSION

The findings of this research indicate that fascia iliaca compartment block has the ability to give superior preoperative short-term analgesic impact both when the patient is at rest and at movement. As well as reduces the requirement of nonsteroidal and opioid analgesia consumption and reducing hospital stay.

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