

Research Article

Comparative Study of Fascia Iliaca Block vs. Femoral Nerve Block for Postoperative Pain Management in Hip Fractures

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ABSTRACT

Introduction: An effective postoperative analgesia as part of hip fracture management is key in optimising the recovery of a patient. Of the available regional specific techniques of administration of Anesthesia, the Fascia Iliaca Compartment Block (FICB), and the Femoral Nerve Block (FNB) have become routine in regards to perioperative Anesthesia of Hip surgery. However, there is still a scholarly debate concerning the relative efficacy of the two procedures. For this reason the study that will be conducted aims to critically evaluate and compare the analgesic strength of the FICB and FNB when it comes to ensuring a postoperative pain relief of elective hip arthroplasty patients.

Methodology: It was a prospective, randomized, and comparative study done at Central Park Teaching Hospital, Lahore between June 10, 2024, and December 9, 2024. Eighty individuals coming to elective hip arthroplasty were recruited into two groups randomly: FICB and FNB. All subjects were given spinal anesthesia. The assessment of pain applying the Numeric Rating Scale (NRS) was conducted both prior to the nerve block operation and within the action of spinal anesthesia. The data are interpreted using SPSS version 25.0 with p-value of p 0.05.

Results: The score pain at the time of pre-block did not differ between the two groups (p=0.196). Nonetheless, the participants in the fascia iliaca compartment block (FICB) group reported significantly reduced pain scores during spinal anesthesia positioning (1.90 ± 0.74) when compared to those registered in the fascia neuraflex block (FNB) group (2.78 ± 0.83) post-the commencement of the procedure (p=0.001).

Conclusion: Comparison of fentanyl with caudal bupivacaine (FICB) with fascia iliaca nerve block (FNB) used in reducing preoperative pain during spinal anesthesia positioning in individuals undergoing hip arthroplasty inception showed a significant difference in the pain reduction (p<0.05) with FICB being more effective. It can, therefore, be concluded that FICB is the most optimal local anesthetic method that should be used in the preoperative pain management of hip fracture surgical procedures.

Keywords: Fascia Iliaca Block, Femoral Nerve Block, Hip Fracture, Postoperative Pain, Regional Anesthesia, Numeric Rating Scale.

INTRODUCTION

Femoral fractures are a common orthopedics trauma issue particularly among aged women. Arthroplasty nowadays is the dominant form of surgery in treating them. Hemiarthroplasty or total hip replacement is prone to complications, such as bleeding which requires general anesthetic, but spinal

anesthesia/subarachnoid block is preferred over the general anesthesia because the patient is conscious and responsive and can facilitate the early diagnosis and treatment of complications. These complications are allergies to bone cement and bone cement implantation syndrome which are all serious to patient health and recovery.¹⁻²

There are a number of other benefits of spinal anesthesia on the patient: effective postoperative analgesia, decreased intraoperative bleeding, and the possibility of deep vein thrombosis decreases. Such advantages notwithstanding, moderate to severe discomfort is encountered in up to 25 % of the individuals undergoing positioning and during the immediate postoperative existence of the use of the subarachnoid block. Discharging can trigger physical events of stress, such as excess bleeding, tachycardia, raised blood pressure, especially among the aged and patients with underlying cardiovascular diseases.³

Adequate analgesia and anesthesia are essential for the correct placement and positioning of a patient undergoing subarachnoid block, and they also contribute to the facilitation of the surgical procedure. In managing femoral fractures, using peripheral nerve blocks before repositioning patients is increasingly preferred over systemic opioids due to opioid side effects such as nausea, vomiting, pruritus, confusion, and the serious risk of respiratory depression.⁴⁻⁵

Extensive academic investigations have delved into the utilization of the fascia iliaca block and the femoral nerve block as innovative techniques aimed at facilitating optimal patient positioning and effectively managing postoperative pain following the surgical intervention of hip arthroplasty, thereby enhancing overall recovery outcomes and patient satisfaction.⁶⁻⁸ An investigation contrasting the efficacy of fascia iliaca compartment block versus femoral nerve block revealed that the fascia iliaca block yielded superior analgesia (pain score 1.0 ± 1.1) in comparison to the femoral nerve block (pain score 2.1 ± 0.8 ; $p=0.005$) prior to positioning patients for spinal anesthesia.⁶ Conversely, another research study demonstrated that the femoral nerve block offered enhanced pain management (pain score: 1.88 ± 0.83) relative to the fascia iliaca block (pain score: 2.40 ± 0.57 ; $p=0.013$) while positioning patients for spinal anesthesia.⁹

No regional investigations have been undertaken on this topic, and there exists a disparity within the current body of literature, thereby rendering it essential to perform a study in this context to determine the most advantageous analgesic approach for individuals in this geographical area, as this aspect has remained significantly unexamined. This research intends to evaluate the efficacy

of two different block techniques in patients undergoing hip surgical procedures.

METHODOLOGY

The study was conducted in the Orthopedics Operation Theatre at Central Park Teaching Hospital, Lahore, from June 10, 2024, to December 9, 2024. Ethical approval was obtained from the relevant authorities and the institutional ethics committee. Informed consent was secured from all patients prior to their participation. A total of 80 patients scheduled for elective hip arthroplasty were selected from the Orthopedic Department of Central Park Teaching Hospital. Patients were assigned to two groups of 40 each using a lottery method for randomization. Hospital registration numbers were documented for all participants.

The inclusion criteria comprised patients aged between 30 and 70 years, those classified as ASA-PS I, II, or III, individuals scheduled for hemiarthroplasty, and patients with a BMI of less than 30. Patients meeting specific criteria were included in the study. The calculation of the sample size for this particular study was conducted taking into account a significance level that was set at 5%, alongside a desired study power of 80%, while also incorporating mean pain scores that were recorded as 2.40 ± 0.57 for the fascia iliaca block procedure and 1.88 ± 0.83 for the femoral nerve block intervention.⁹

Each patient provided a detailed medical history and underwent a comprehensive clinical examination. Standardized intraoperative and postoperative care were delivered to all patients. The Datex Ohmeda anesthesia monitor was used for monitoring, including pulse oximetry, blood pressure measurement, and electrocardiography.

In this study, patients were divided into two groups for comparative analysis. Group A received a fascia iliaca compartment block before spinal anesthesia, ensuring optimal conditions. The block was administered using anatomical landmarks, with a needle inserted 1 cm below a specific point. Two "pop" sensations indicated successful placement through fascial layers. After a negative aspiration test, 0.3 ml/kg of 1.5% lignocaine-adrenaline solution provided analgesia. Group B underwent a femoral nerve block using a similar technique. The needle placement was lateral and inferior to the femoral artery, with the same dose administered for effective nerve block.

In order to precisely evaluate the pain levels of the participants, a Numeric Rating Scale (NRS) was employed to quantify pain prior to the administration of the nerve block and during the positioning for spinal anesthesia. The effectiveness of the nerve block was assessed at one-minute intervals through the application of pinprick and cotton-alcohol swabs to determine sensory blockage across various regions of the knee. Should the rating on the Visual Analog Scale (VAS) exceed 4, a dosage of 4 mg nalbuphine was administered for analgesic purposes.

Data was thoroughly captured on a standardized form and evaluated employing SPSS version 25.0. Continuous variables, such as age and pain scores, were represented as Mean $\pm$ S.D., whereas categorical variables, including gender and BMI, were displayed as frequencies and percentages. The data was stratified by age, gender, and BMI to account for potential confounding factors. Following this, an independent sample t-test was conducted to compare groups, and an unpaired t-test was employed to evaluate pain scores. A p-value of ≤ 0.05 was deemed significant.

RESULTS

Gender distribution was similar, with 52.5% males in the FICB group and 55.0% in the FNB group. The majority of patients were aged 51-70 years (67.5% in FICB, 70.0% in FNB), with mean ages of 57.33 ± 12.79 and 58.98 ± 11.78 years, respectively. Most patients had a normal BMI (62.5% in FICB, 67.5% in FNB), with mean BMI values of 23.84 ± 2.62 and 23.93 ± 2.33 , showing a comparable distribution between groups. Table 2 shows pain score comparisons between FICB and FNB groups. Before nerve block, mean pain scores were similar (FICB: 5.83 ± 1.08 , FNB: 6.10 ± 0.77 , $p=0.196$). However, during SAB positioning, FICB group had significantly lower pain scores (1.90 ± 0.74) than FNB group (2.78 ± 0.83 , $p=0.001$), indicating superior pain relief with FICB. Table 3 shows the analysis of pain scores during positioning for spinal anesthesia by gender, age groups, and BMI for FICB and FNB groups. Results reveal that the FICB group had significantly lower pain scores in all categories, proving its effectiveness in reducing pain during spinal anesthesia positioning.

Table-1: Comparison of Distribution of Different Variables between Groups

Variables		Groups	
		FICB	FNB
Gender	Male	21(52.5%)	22(55.0%)
	Female	19(47.5%)	18(45.0%)
Age groups	30-50 years	13(32.5%)	12(30.0%)
	51-70 years	27(67.5%)	28(70.0%)
	Mean $\pm$ S.D	57.33 ± 12.79	58.98 ± 11.78
BMI	Normal	25(62.5%)	27(67.5%)
	Overweight	15(37.5%)	13(32.5%)
	Mean $\pm$ S.D	23.84 ± 2.62	23.93 ± 2.33

Table-2: Comparison of Pain Scores between Groups

Variables	Groups		p-value
	FICB	FNB	
Pain score before nerve block	5.83 ± 1.08	6.10 ± 0.77	0.196
Pain score during positioning for SAB	1.90 ± 0.74	2.78 ± 0.83	0.001

Table-3: Stratification of Pain Score between Groups with Respect To Different Variables

Variables	Outcome variable	FICB	FNB	p-value
Gender				
• Male	Pain score during positioning for SAB	2.00±0.63	2.82±0.85	0.001
• Female		1.79±0.85	2.72±0.82	0.002
Age groups				
• 30-50 years	Pain score during positioning for SAB	1.85±0.68	2.75±0.86	0.008
• 51-70 years		1.93±0.78	2.79±0.83	0.001
Body mass index				
• Normal	Pain score during	2.16±0.62	2.93±0.82	0.001

• Overweight	positioning for SAB	1.47±0.74	2.46±0.77	0.002
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DISCUSSION

The investigation revealed that the administration of femoral nerve block (FICB) and fascia iliaca nerve block (FNB) enhances the positioning required for spinal anesthesia during surgical interventions for femoral fractures. Notably, FICB demonstrated superior efficacy compared to FNB, evidenced by a more pronounced decrease in pain scores associated with FICB relative to FNB. This discrepancy may be elucidated by the anatomical innervation of the hip region, which is supplied by both the sciatic and superior gluteal nerves—nerve pathways not targeted by FNB—resulting in diminished analgesic outcomes for patients receiving FNB. Comparable outcomes have been documented by other researchers, indicating that FICB offers outstanding analgesia for the facilitation of positioning for SAB.¹⁰⁻¹² A significant observation to highlight in the current research is that the initial pain Visual Analog Scale (VAS) in subjects from both groups is approximately 7, which corresponds with findings reported by the majority of other researchers.¹⁰⁻¹³ A previous investigation has indicated a lower initial Visual Analog Scale (VAS) in comparison to our research findings.¹⁴ The delayed arrival at the healthcare facility, the subsequent rescheduling of surgical procedures, and the administration of analgesic agents are likely factors contributing to this variance. The improved analgesia and, thus, enhanced positioning achieved through the FICB is demonstrably indicated by the time required for performing the SAB. In the present study, the duration for conducting SAB with FICB was approximately thirty seconds less than that of FNB. The time taken for the FNB component of our investigation is comparable to the duration.¹⁴

Nonetheless, an extended duration of SAB performance lasting nearly seven minutes has been documented subsequent to FICB.¹⁵ In this study, pre-block mean pain scores did not significantly differ between the FICB group (5.83 ± 1.08) and FNB group (6.10 ± 0.77) with $p=0.196$. However, during SAB positioning, FICB group exhibited significantly lower pain scores (1.90 ± 0.74) compared to the FNB group (2.78 ± 0.83 , $p=0.001$), indicating superior pain relief with FICB during SAB positioning.

The utilization of the Fascia iliaca block in conjunction with the femoral nerve block has

been examined in relation to patient positioning and postoperative pain management in subjects undergoing hip arthroplasty.⁶⁻⁸ A thorough study compared the effectiveness of fascia iliaca block and femoral nerve block in optimizing patient positioning for spinal anesthesia. Results showed fascia iliaca block had superior pain relief with a pain score of 1.0 ± 1.1 , significantly better than femoral nerve block's 2.1 ± 0.8 ($p=0.005$). This study contributes to regional anesthesia literature, highlighting fascia iliaca block's potential as a more effective analgesic intervention, warranting further research.⁶

A detailed study showed that using a femoral nerve block (average pain score 1.88 ± 0.83) was significantly better than a fascia iliaca block (average pain score 2.40 ± 0.57), validated by a p-value of 0.013, indicating femoral nerve block's superior pain relief efficacy for pre-administration of spinal anesthesia.⁹ Despite the challenges arising from different definitions of performance time, the consistent decrease in SAB performance time following FICB administration is evident. Plausible reasons for the improved comfort during positioning include effective analgesia and muscle paralysis, such as in the quadriceps, after FICB administration.¹⁵

CONCLUSION

The results indicate that the fascia iliaca compartment block (FICB) demonstrates greater efficacy compared to the femoral nerve block (FNB) in alleviating discomfort during the positioning for spinal anesthesia in individuals scheduled for hip arthroplasty. In light of its enhanced analgesic properties, FICB ought to be regarded as the preferred regional anesthetic technique for preoperative pain alleviation in surgeries pertaining to hip fractures.

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