

EFFICACY OF ULTRASOUND GUIDED FEMORAL NERVE BLOCK VERSUS FASCIA ILIACA COMPARTMENT BLOCK FOR POSTOPERATIVE ANALGESIA IN PATIENTS WITH FEMUR FRACTURE: A HOSPITAL BASED COMPARATIVE STUDY.

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ABSTRACT:

Objectives: Femoral nerve block (FNB) is effective in providing analgesia for femur fractures. A Fascia Iliaca Compartment Block (FICB) is a modification of the femoral nerve block. The present study was to compare the efficacy of ultrasound guided femoral nerve block versus fascia iliaca compartment block for postoperative analgesia in patients with femur fracture. **Methods:** A total of 100 patients aged 18–65 years, American Society of Anesthesiologists (ASA) I or II, scheduled for elective unilateral proximal femur fracture surgery under spinal anesthesia were enrolled. All the patients were categorised into two groups (Group FICB and Group FNB). Group FICB (n = 50) received 25 ml and Group FNB (n = 50) got 15 ml of 0.25% bupivacaine under USG. Numerical rating scale (NRS) was recorded at 5, 8, 11, 14, 17, and 20 minutes. **Results:** At 5 minutes post block, Group FICB patients was lower NRS score as compared to Group FNB patients. While, it was not statistically significant difference (p=0.1566). At 8, 11 and 14 minutes post block, NRS score was significantly lower (p<0.05) in group FICB patients as compared to group FNB patients. At 17 and 20 minutes post block, NRS score in both group patients were same. At sitting position for SAB, group FICB patients was significantly (p<0.0001) lower NRS score as compared to group FNB patients. Time to first rescue analgesia was significantly longer (p<0.0001) in Group FICB patients (4.75±0.76 h) as compared with group FNB patients (2.68±0.84). Patient satisfaction score was significantly (p<0.0001) higher in group FICB as compared to group FNB. **Conclusions:** Ultrasound guided FICB is a relatively simple and less invasive technique. It provides effective postoperative analgesia and better comfort without increasing risk.

KEYWORDS: Femur fracture, FNB, FICB, Postoperative analgesia

INTRODUCTION

Femur fractures are complex injuries that often require surgical intervention, good analgesia and comprehensive rehabilitation. The distribution of these fractures is bimodal: young people (after high-energy motor trauma) and the elderly [1]. Although regional anaesthesia is the gold standard for semi-urgent surgical fixation of femoral fractures, its administration is often technically arduous due to difficulty in achieving optimal positioning secondary to severe pain. Proper positioning is crucial for the successful administration of a central neuraxial block; consequently, patients with femoral fractures present distinct technical challenges for the anaesthesiologist. Moreover, the associated pain-related physiological changes such as sympathetic activation leading to tachycardia, hypertension may be potentially dangerous for high ASA grade individuals. In addition, muscle spasms often occur around the fracture site as a protective mechanism, which can further complicate positioning [2]. Overall, administering spinal anaesthesia in patients with femoral fractures necessitates meticulous planning to alleviate pain, overcome muscle spasm, and prevent further injury, while ensuring safe and effective block placement.

Most commonly used non-opioid analgesics for the treatment of painful syndromes are non-steroidal anti-inflammatory drugs, which can cause damage to the gastrointestinal mucosa, renal tubules and platelet dysfunction, and can increase intra-operative bleeding [3].

Peripheral nerve blocks are localized and site-specific. Nerves and neural plexus blocks are efficient and depending upon the surgery, an alternative choice for postoperative analgesia [4].

Femoral nerve block (FNB) is effective in providing analgesia for femur fractures [5]. A fascia iliaca compartment block (FICB) is a modification of the femoral nerve block. It is performed by application of local anaesthetic beneath the fascia iliaca and provides a block of femoral nerve and lateral femoral cutaneous nerve and rarely of obturator nerve. In 1989, ultrasonography was first utilized to confirm the location of the needle and observe the spread of local anaesthetic while performing peripheral nerve blocks [6]. Objective

of the present study was to compare the efficacy of ultrasound guided femoral nerve block versus fascia iliaca compartment block for postoperative analgesia in patients with femur fracture at tertiary care hospital.

MATERIAL & METHODS

The present study was conducted in the Department of Anaesthesiology & Critical Care, VCSGGIMS&R, Srinagar, Uttarakhand, India during a period from January 2026 to July 2026.

A total of 100 patients aged 18–65 years, American Society of Anesthesiologists (ASA) I or II, scheduled for elective unilateral proximal femur fracture surgery under spinal anesthesia were enrolled. A total of 100 patients were categorised into two groups (Group FICB & Group FNB). Each group had 50 patients.

Group FICB (n = 50) received 25 ml and Group FNB (n = 50) got 15 ml of 0.25% bupivacaine under USG. Numerical rating scale (NRS) was recorded at 5, 8, 11, 14, 17, and 20 minutes. Time to rescue, vitals, adverse effects, and satisfaction were noted. Primary outcome includes analgesia. Secondary outcomes were included vitals, rescue time, side effects, and satisfaction.

STATISTICAL ANALYSIS

Data was analysed with the help of IBM SPSS software. Mean and standard deviations were observed. Independent t-test and chi-squared test were applied. P-value was taken less than or equal to 0.05 ($p \leq 0.05$) for significant difference.

RESULTS

We compared the mean age, sex and ASA grade between group FICB and group FNB patients. Mean age and mean weight were not statistically significant ($p > 0.05$). Out of total 100 patients, males were 71(71%) and females were 29(29%). And ASA grade was also not statistically significant difference ($p > 0.05$).

Table.1. Comparison of demographic and clinical parameters between group fascia iliaca compartment block and group femoral nerve block.

Variables	Group FICB (n=50)	Group FNB (n=50)	P-value
Mean age (years)	48.35±14.24	44.87±12.85	0.202
Sex			
Male (%)	36(72%)	35(70%)	-----
Female (%)	14(28%)	15(30%)	--
ASA			
Grade I (%)	21(42%)	22(44%)	0.111
Grade II (%)	29(58%)	28(56%)	0.840
Mean weight (kg)	58.49±10.34	59.52±12.42	0.653
Duration of surgery (min)	120.00	120.00	-

In the present study, Preblock NRS score of both group patients were same and it was not statically significant difference ($p = 1.0000$).

At 5 minutes post block, Group FICB patients was lower NRS score as compared to Group FNB patients. And it was not statistically significant difference ($p = 0.1566$). At 8, 11 and 14 minutes post block, NRS score was significantly lower in group FICB patients as compared to group FNB patients. At 17 and 20 minutes post block, NRS score in both group patients were same. And, it was not statistically significant difference ($p = 1.0000$). At sitting position for SAB, group FICB patients was significantly ($p < 0.0001$) lower NRS score as compared to group FNB patients.

Table.2. NRS Score

Analgesic efficacy (NRS scores)	Group FICB (n=50)	Group FNB (n=50)	P-value
Preblock NRS	8.7±0.78	8.7±0.65	1.0000
5 min postblock	6.56±1.08	6.84±0.87	0.1566
8 min postblock	4.46±0.52	5.88±1.12	<0.0001
11 min postblock	3.56±0.68	4.34±1.36	0.0005
14 min postblock	3.00±0.26	4.24±0.78	<0.0001
17 min postblock	2.94±0.03	2.94±0.01	1.0000
20 min post block	2.94±0.02	2.94±0.01	1.0000
At sitting position for SAB	2.94±0.34	4.35±1.26	<0.0001

In the present study, time to first rescue analgesia was significantly longer ($p < 0.0001$) in Group FICB patients (4.75±0.76 h) as compared with group FNB patients (2.68±0.84).

Patient satisfaction score was significantly ($p < 0.0001$) higher in FICB group patients as compared to FNB group patients. Adverse events such as nausea, vomiting, bradycardia, and hypotension were similar in both

groups with no significant difference ($P > 0.5$). No serious complications were seen.

Table.3. Comparison of time to request for first rescue analgesia and patient satisfaction score between the two groups (n=100).

Variables	Group FICB (n=50)	Group FNB (n=50)	P-value
Time to first rescue analgesia (h)	4.75±0.76	2.68±0.84	<0.0001
Patient satisfaction score (Likert)	2.92±0.79	1.92±0.74	<0.0001

DISCUSSIONS

Femur fractures are among the most common orthopedic emergencies, particularly in the elderly population, and are associated with severe pain, prolonged immobilization, and increased morbidity and mortality. Adequate postoperative analgesia is essential for early mobilization, reduction of stress response, and overall improvement in patient outcomes. Systemic opioids have traditionally been used for analgesia but are associated with adverse effects such as respiratory depression, nausea, vomiting, delirium, and constipation. Regional anesthesia techniques have therefore gained importance as part of multimodal analgesia strategies. Femoral nerve block (FNB) and fascia iliaca compartment block (FICB) provide effective analgesia for surgeries involving the hip and femur. With the advent of ultrasound guidance, these blocks can be performed with greater accuracy, improved success rates, and fewer complications. While FNB targets the femoral nerve directly, FICB allows spread of local anesthetic beneath the fascia iliaca to block the femoral nerve and lateral femoral cutaneous nerve, potentially offering broader analgesic coverage.

Peripheral nerve blocks not only provide excellent analgesia, they also reduce postoperative inflammatory response [7]. Various meta-analyses have been conducted on the role of different nerve blocks for postoperative analgesia in lower limb surgeries. However, most of them focused on the femoral nerve block, [8,9] sciatic nerve block and continuous peripheral nerve block, and the surgical procedures studied were mainly limited to total knee arthroplasty [10,11]. Therefore, it is important to evaluate the effect of different peripheral nerve blocks on other surgeries like fractured femur neck surgery.

In the present study, we compared the ultrasound-guided FICB and FNB for pre-spinal analgesia in patients undergoing surgery for proximal femur fractures. 100 patients were divided equally. Group-FICB received 25 ml and Group-FNB got 15 ml of 0.25% bupivacaine, 20 min before SAB.

Both groups had comparable demographics—age, sex, ASA grade, and weight. Similar studies by Jain et al. [12], Bansal et al. [13], and Sakya et al. [14] Preblock NRS scores were same, but FICB achieved NRS ≤ 3 earlier (14 vs. 17 mins).

During SAB positioning, Group-FICB showed significantly lower NRS (2.94±0.34) compared to FNB (4.35±1.26, $P < 0.0001$), indicating better pain relief [15,16]. This can be explained by broader nerve coverage in FICB.

Hemodynamics were mostly stable in both groups patient. HR and RR showed no major difference. However, MAP was consistently higher in Group-FNB postblock ($P < 0.05$), suggesting less sympathetic attenuation. SpO₂ stayed normal. These trends match with Fernandes et al., Rukerd et al., [17,18].

Satisfaction scores were significantly higher in FICB (2.92 vs. 1.92, $P < 0.0001$). Adverse events such as nausea, vomiting, bradycardia, and hypotension were minimal and it was not significant.

A Cochrane meta-analysis by Parker et al, in 2002 examined the effects of nerve blocks (inserted pre-operatively, intra-operatively or post-operatively) as part of the treatment for a hip fracture [19]. They concluded that nerve blocks resulted in a reduction of the quantity of parenteral or oral analgesia administered to control pain from the fracture or during surgery and a reduction in reported pain levels.

Singh ND et al., in their 2020 study, [15] comparing fascia iliaca compartment block and femoral nerve block similarly observed no significant hemodynamic changes before block, during block administration and while positioning. In a study by Madabushi R et al. [20] comparing intravenous fentanyl and fascia iliaca compartment block for analgesia during positioning for subarachnoid block, there was a decrease in pulse rate. This was accounted for as an exaggerated expected outcome of opioids in a geriatric population, while more stable hemodynamic were achieved with a peripheral nerve block.

CONCLUSIONS

The present study concluded that the NRS score is significantly lower in FICB patients as compared to FNB patients. Patient satisfaction score is significantly higher in FICB. Hence, the ultrasound guided FICB is a relatively simple and less invasive technique. It provides effective postoperative analgesia and better comfort without increasing risk.

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