

Comparative Study of 0.25% Levobupivacaine and 0.25% Ropivacaine in Ultrasound-Guided Fascia Iliaca Block for Positioning Elderly Patient with Femur Fracture

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Abstract: *Elderly patients with fractured femur present with severe pain that makes positioning for sub-arachnoid block challenging and physiologically stressful. Regional analgesic techniques, particularly fascia iliaca compartment block (FICB), can improve patient comfort and procedural conditions. This randomized, double-blind study compared the efficacy and safety of 0.25% levobupivacaine and 0.25% ropivacaine administered via ultrasound-guided FICB prior to positioning for spinal anaesthesia in 60 elderly patients with fractured femur, aged 60 years or above. Both study drugs demonstrated comparable reductions in pain scores, onset of sensory blockade, and optimum positioning quality without significant haemodynamic fluctuations. No serious adverse events were observed. These findings suggest that either agent can be safely and effectively used in elderly patients for FICB, with drug selection guided by availability and cost effectiveness.*

Keywords: Fascia iliaca compartment block; fracture femur; elderly patients; levobupivacaine; ropivacaine

1. Introduction

Fracture of the femur is a common cause of hospital admission among the elderly population and is commonly associated with intense pain, reduced mobility, and increased perioperative risk. In such patients, positioning for spinal anaesthesia often becomes a challenging step due to pain-induced movement restriction and sympathetic stimulation, which may precipitate adverse cardiovascular responses.

Effective analgesia before attempting to position the patient is therefore essential, particularly in geriatric patients with limited physiological reserve. Peripheral nerve blocks have emerged as valuable alternatives to systemic analgesics, offering targeted pain relief while minimizing opioid-related adverse effects. Among these, the fascia iliaca compartment block has gained popularity due to its simplicity, safety, and ability to provide analgesia to a large portion of the anterior thigh and hip region.

Levobupivacaine and ropivacaine are long-acting amide local anaesthetics developed to reduce the cardiotoxic and neurotoxic potential associated with racemic bupivacaine. While both agents are widely used in peripheral nerve blocks, comparative evidence regarding their performance in fascia iliaca block for facilitating spinal anaesthesia positioning is scarce. This study aims to inform clinical decision making by providing comparative data on two commonly used local

anaesthetics, particularly in a population vulnerable to analgesic complications.

2. Materials and Methods

Study Design

This was a prospective, randomized, double-blind clinical study conducted after approval from the institutional ethics committee.

Patient Selection

Patients aged 60 years and above, of either sex, belonging to ASA physical status I–III, and scheduled for elective fracture femur surgery. Patients with coagulopathy, infection at the injection site, severe systemic illness, morbid obesity, neurological disorders, or known allergy to study drugs were excluded.

Randomization and Blinding

Participants were randomly assigned into two groups using computer-generated random numbers. Drug preparation was carried out by an anaesthesiologist not involved in patient assessment or block performance.

All patients received ultrasound-guided fascia iliaca compartment block in the supine position via superficial inguinal approach.

Group L: 30 mL of 0.25% levobupivacaine

Group R: 30 mL of 0.25% ropivacaine

The block was administered about 15 minutes prior to positioning for spinal anaesthesia.

Pain intensity during positioning was measured using a visual analogue scale. The time to onset of sensory block, ease of patient positioning (graded by the attending anaesthesiologist), duration of analgesia, haemodynamic parameters, and any adverse effects were documented. The quality of patient positioning for spinal anaesthesia was recorded by the same anaesthesiologist blinded to the mode of analgesia with scores of 0-3. 0-Not satisfactory, 1-Satisfactory, 2- Good, 3-Optimal.

Statistical Analysis

Continuous variables were expressed as mean \pm standard deviation and compared using appropriate parametric tests. Categorical variables were analysed using chi-square testing. A p-value less than 0.05 was considered statistically significant.

3. Results

As shown in table 1, the Mean \pm SD of mean age in the group L and group R was 71.6 ± 7.39 years and 71.0 ± 8.17 years respectively. In the group L, 14 participants were male and 16 were females, and in the group R, males were 18 and females were 12 out of total 60 participants of study population. In group L, 2 were in the ASA grade I and 25 were in the ASA grade II and 3 participants were in ASA grade III out of total 30 participants in group L. Similarly, in group R, 4 were in the ASA grade I, 20 in ASA grade II and 6 in ASA grade III. There was no significant difference between the groups in terms of age, sex distribution or ASA grading.

Table 1: Demographic data in studied cases (N=60)

Parameters	Group L (n=30)	Group R (n=30)	P value
Mean Age (in years)	71.6 ± 7.39	71.0 ± 8.17	0.77
Sex	Male	14 (46.66%)	0.30
	Female	16 (53.34%)	
ASA	I	2 (6.66%)	0.33
	II	25 (83.33%)	
	III	3 (10.0%)	
BMI (kg/m ²)	27.5 ± 2.8	27.8 ± 2.8	0.68

The mean onset time of sensory blockade was similar in the levobupivacaine and ropivacaine groups, with no statistically significant difference.

Table 2: Mean VAS score at different time (N=60)

Time interval	Group L (n=30) (mean \pm SD)	Group R (n=30) (mean \pm SD)	P Value
Before FICB	8.63 ± 0.77	8.57 ± 0.93	0.78
After FICB	2.47 ± 0.50	2.80 ± 1.07	0.13
Before SAB	2.60 ± 0.49	2.57 ± 0.99	0.88

According to table 2, mean VAS score before FICB in group L was 8.63 ± 0.77 and in group R was 8.57 ± 0.93 . After FICB, Mean VAS score reduced to 2.47 ± 0.50 in group L and 2.80 ± 1.07 in group R, although group L showed lower VAS score, the difference is not statistically significant.

Table 3: Quality of positioning for SAB (N=60)

Quality of Position	Group L (n=30)	Group R (n=30)
1	8	11
2	11	9
3	11	10
TOTAL	30	30

Table 3 shows that in group L, 8 patients had a score of 1 (satisfactory), 11 patients had a score of 2 (good) and remaining 11 had a score of 3 (optimal), which is 26.66%, 36.66% and 36.66% of the total respectively. Similarly in group R, 11 patients had a score of 1, 9 had a score of 2 and 10 had a score of 3, which is 36.66%, 30% and 36.66% respectively of total 30 patients.

The quality of patient positioning was graded as satisfactory to excellent in the majority of cases in both groups. The duration of postoperative analgesia, assessed by time to first rescue analgesic requirement, did not differ significantly between groups. Throughout the study period, haemodynamic variables remained within acceptable limits, and no major adverse events were observed.

4. Discussion

Adequate pain control before spinal anaesthesia is a critical determinant of procedural success and patient safety in elderly individuals with fracture femur. This study highlights that fascia iliaca compartment block performed under ultrasound guidance provides effective analgesia for this purpose.

Both levobupivacaine and ropivacaine produced comparable reductions in pain intensity and allowed comfortable positioning without causing clinically significant hemodynamic disturbances. These observations are in agreement with previous studies that have reported similar analgesic efficacy of these agents in peripheral nerve blocks.

While levobupivacaine has been associated with a marginally longer duration of sensory blockade in some settings, this advantage did not translate into a statistically significant difference in the present study. Considering factors such as cost and availability, ropivacaine may therefore represent a pragmatic choice in routine clinical practice.

5. Conclusion

Ultrasound-guided fascia iliaca compartment block is an effective and safe technique for facilitating positioning for spinal anaesthesia in elderly patients undergoing surgery for fracture femur. Both 0.25% levobupivacaine and 0.25% ropivacaine provide comparable analgesia, onset characteristics, and duration, with minimal adverse effects. Selection between the two agents may be guided by institutional availability and economic considerations.

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