

Original Research Article

The effect of 0.25% levobupivacaine and 0.25% ropivacaine in fascia iliaca block in elderly patients with fracture femur given before positioning for subarachnoid block

Neetu Gupta*, Pooja Jain, M. Kapadia, Sadhana Sanwatsarkar,
Dipti Saxena, Meghna maheshwari

Department of Anaesthesiology, Sri Aurobindo Medical College, Indore, Madhya Pradesh, India

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*Correspondence:

Dr. Neetu Gupta,

E-mail: gupta.neetu@yahoo.com

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ABSTRACT

Background: Positioning of elderly patients with fracture femur for subarachnoid block (SAB) is a challenging task, both for the patient and anesthesiologist. Severe pain not only adds to the morbidity but also alters the success rate of SAB as appropriate positioning becomes difficult. Fascia iliaca compartment block (FICB) is a simple, rapid, effective and safe method for achieving excellent pain relief. The purpose of this study is to compare the efficacy of 0.25% of levobupivacaine and 0.25% ropivacaine in FICB on reducing preoperative and postoperative pain and analgesic consumption in lower limb surgery.

Methods: 60 elderly patients of ASA class I-III scheduled for elective fracture femur surgery were enrolled in the study and randomly divided into two groups. Group L received 30ml 0.25% levobupivacaine in FICB while Group R received 0.25% ropivacaine in FICB 15min before SAB. Parameters recorded were blood pressure, heart rate, visual analogue scale (VAS), quality of positioning and time to first rescue analgesia. VAS was noted before and after performing FICB and at the time of positioning for subarachnoid block (SAB).

Results: The VAS score at different time interval and time to first rescue analgesia were comparable ($P > 0.05$). Quality of positioning was also similar in both the groups ($P > 0.05$).

Conclusions: The study demonstrates that levobupivacaine and ropivacaine produce comparable preoperative and postoperative analgesia when used for FICB.

Keywords: FICB, Ropivacaine, Levobupivacaine, SAB, VAS

INTRODUCTION

Fracture of femur following trauma is a significant cause of morbidity and mortality especially in the elderly. It has been shown that regional anaesthesia is associated with lesser morbidity and mortality compared to general anaesthesia.^{1,2} Nerve blocks like the femoral nerve block the three in one block and the fascia iliaca compartment block (FICB) are used not only to provide analgesia for fracture femur, but also to facilitate adequate positioning in the pre-operative period and provide post-operative

analgesia.³⁻⁸ In geriatric patients, the effect of pain on the cardiovascular system may be detrimental (due to increased catecholamine's release, leading to tachycardia and hypertension).⁹ Thus, this study was planned to compare the efficacy of levobupivacaine and ropivacaine in FICB in geriatric patients.

METHODS

After ethics committee approval 60 ASA class I-III patients, Aged 60 and above, planned for surgery of

fracture femur were recruited for the study. Patients who were less than 60 years, unwilling to participate in the study, allergic to local anaesthetics, suffering from peripheral neuropathy, bleeding diathesis, previous femoral bypass surgery, inguinal hernia, inflammation or infection at injection site and morbidly obese patients were excluded from study.

Selected patients were randomized by using a computer generated random number table into two groups. FICB was performed using 20 G tuohy needle. The point of insertion was 1cm below the junction of medial two-third and lateral one-third of the line joining the anterior superior iliac spine and pubic tubercle. After local infiltration, the needle was used to feel for the 2 "pops" as it passed through the fascia lata and fascia iliaca. Just following the second pop and negative aspiration, the local anaesthetic drug was deposited in the fascia iliaca compartment. Patients in group L received 30ml of 0.25% levobupivacaine while patients in group R received 30ml of 0.25% ropivacaine.

Sub arachnoid block (SAB) was performed 15 minutes after FICB. The quality of patient positioning for SAB was recorded by same anaesthesiologist blinded to the mode of analgesia with scores of 0-3. Not satisfactory, 1- Satisfactory, 2- Good, 3-Optimal.

Time to perform spinal anaesthesia defined as the time from beginning of positioning to the end of performing the procedure. The dose of spinal used was 15-16mg of 0.5% bupivacaine heavy. Hemodynamic variables like heart rate, NIBP were recorded. Analgesia was assessed by Visual analogue scale (VAS) just before the block, after the block, at the time of SAB and postoperatively. Rescue analgesia was provided when VAS score exceeded 4.

Statistical analysis

In the present study, the data was collected and entered into the Excel Sheet and then transferred to Statistical Package Mini Tab Version 17.0 for final analysis. Mean comparison between the groups was done using Students Unpaired 't' test. A "P" value of <0.05 was considered as statistically significant. The final data is represented in the form of tables.

RESULTS

Table 1 shows the demographic parameters. The mean age in group L was 69.97±8.16 years and in the group R it was 69.67±9.46 years (p>0.05) which is statistically not significant. In the group L, majority 19 (63.33%) were males and 11 (36.67%) were females, while in the group R, majority 16 (53.33%) were females and 14 (46.67%) were male. Majority of patients in both the groups, belongs to ASA class II. Fracture IT femur and fracture neck of femur were the most common fractures diagnosed in both the groups.

Table 1: Demographic parameters.

	Group L (n=30)	Group R (n=30)
Age in yrs. (Mean ±SD)	69.97 ± 8.16	69.67 ± 9.46
M/F	19/ 11	14/16
ASA class I/ II/ III	4/17/9	0/24/6

Table 2 shows the mean VAS score in both the groups at different time intervals. The mean VAS score in the group L before FICB was 9.06±1.11, after FICB was 2.30±1.34 and before SAB was 2.07±1.26. While in the group R the mean VAS score before FICB was 9.43±0.82, after FICB was 2.83±1.09 and before SAB was 2.53±1.11. The P value obtained at all-time intervals was >0.05, which is statistically not significant. Thus, there was no difference in the mean VAS score before FICB, after FICB and before SAB in both the groups. Thus, the effectiveness of both the drugs was similar.

Table 2: Mean VAS score at different time intervals.

Time interval	Group L (n=30) (mean ± SD)	Group R (n=30) (mean ±SD)	P value
Before FICB	9.06 ± 1.11	9.43 ± 0.82	0.151
After FICB	2.30 ± 1.34	2.83 ± 1.09	0.096
Before SAB	2.07 ± 1.26	2.53 ± 1.11	0.132

*p value < 0.05 significant

Table 3 shows the distribution of quality of Position in both the groups. In the group L quality of Position 1 was seen in 5 (16.67%), 2 was seen in 13 (43.33%) and 3 was seen in 12 (40%) patients. While in group-2, quality of position 1 was seen in 9 (30%), 2 was seen in 9 (30%) and 3 was seen in 12 (40%) patients.

Table 3: Quality of positioning for SAB.

Quality of position	Group L		Group R	
	No.	%	No.	%
1	5	16.67	9	30.00
2	13	43.33	9	30.00
3	12	40.00	12	40.00
Total	30	100.00	30	100.00

Table 4 shows the mean time for SAB in both the groups. The mean time for SAB in group L was 8.60±2.67 min and in group R it was 8.37±1.87min (p=0.696), which is statistically not significant.

Table 4: Mean time for SAB.

	Group L N (mean ± SD)	Group R N (mean ±SD)	P value
Time for SAB	30 (8.60±2.67)	30 (8.37±1.87)	0.696

*p value < 0.05 significant

Table 5 shows the mean time to first rescue analgesia in both the groups. The mean time to first rescue in group L was 572.00±269.2min and in group R it was 534.55±166.90min. (p=0.576) which is statistically not significant.

Table 5: Mean time to first rescue analgesia.

	Group L	Group R	P value
	N (mean±SD)	N (mean ± SD)	
First rescue analgesia	25 (572.0±269.2)	22(534.55±166.90)	0.576

DISCUSSION

Fracture of femur is a common cause of morbidity and mortality especially in the elderly patients. In this study we compared the analgesic efficacy of levobupivacaine and ropivacaine in FICB for the positioning of the patients for SAB and for postoperative analgesia. There was no difference in the mean VAS score before FICB, after FICB and before SAB in both the group (Table-2). There was no significant difference in the improvement in quality of positioning in both the groups (Table-3). The mean time to first rescue analgesia in group L was 572.00 min and in group R was 534.55min from the onset of block, which is statistically not significant (p>0.05) (Table-5). Thus, the analgesic efficacy of both the drugs was similar. We did not observe any complication during this study.

Uncontrolled pain in elderly patients can lead to many complications like myocardial infarction, pulmonary infections, paralytic ileus, urinary retention, thromboembolism, impaired immune functions, impaired patient's rehabilitation, and prolonged hospitalization.⁹ The traditional approach of pain treatment in this subgroup of patients with intravenous administration of NSAID's and opioids are related to an increased impact of side effects (GI ulceration and hemorrhage, kidney injury, respiratory depression, constipation, disorientation and delirium).^{3,10,11}

Several studies which compare nerve blocks and intravenous opioids for better positioning and for postoperative analgesia for fracture femur have proven the supremacy of nerve blocks in elderly patients.^{3,7,12}

FICB has been found to be more consistent in blocking all the three nerves simultaneously in adults as compared to femoral nerve blocks and the three in one block.¹⁴ Fascia iliaca block is a modification of femoral nerve block. It was originally described in children by Dalen et al.¹³ It has gained popularity in recent times due to its ease of administration with double-pop technique.¹⁵ The fascia iliaca block is a landmark based technique which requires less expertise to provide analgesia in perioperative period for condition involving the thigh, hip joint, and femur.

On reviewing literature, no study comparing analgesic efficacy of levobupivacaine and ropivacaine in FICB could be found. In a study conducted by Marie Hanna and Paul Sloan et al the perioperative analgesia and overall satisfaction provided by ropivacaine 0.5% and levobupivacaine 0.5% in patients undergoing shoulder arthroscopy in interscalene blocks, and patients undergoing ACL reconstruction in femoral nerve blocks was found to be similar.¹⁶

In the study conducted to compare the efficacy of levobupivacaine, ropivacaine, and bupivacaine for combined psoas compartment-sciatic nerve block in patients undergoing total hip arthroplasty and the study comparing the Ultrasound guided single dose injection of 0.5% levobupivacaine or 0.5% ropivacaine for a popliteal fossa nerve block in unilateral hallux valgus surgery also revealed the similar clinical profile of both the drugs.^{17,18}

Kopacz DJ et al compared 0.75% epidural levobupivacaine with 0.75% racemic bupivacaine for lower abdominal surgery and Capogna G et al compared the 0.25% of each local anesthetic for labor analgesia also did not found significant differences in the quality of analgesia, sensory block, or motor block.^{19,20}

In the present study also both the drugs were comparable in terms of efficacy and duration. However, the fascia iliaca block is an easily learnable procedure and may be routinely employed as a part of multi- modal analgesia following femur fracture.

CONCLUSION

FICB is extremely useful in reducing the pain in patients with fracture femur while positioning and it also increases the duration of postoperative analgesia. Ropivacaine and levobupivacaine both are comparable in terms of efficacy and duration. Ropivacaine being more cost effective and easily available than levobupivacaine can be a good choice for FICB.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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