

Fascia Iliaca Compartment Block with Ropivacaine Versus Intravenous Fentanyl in Patients with Fracture Femur

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Abstract

Introduction: Fracture femur, a painful condition is common in the elderly patients with associated co-morbidities. Systemic NSAIDs increase the chances of epigastric pain, coagulation abnormalities where as opioids increases chances of delirium, altered sensorium, especially in this population [1]. Administration of block to overcome pain avoids the side effects of these analgesics. Proper patient positioning for regional anaesthesia is a challenge for the anaesthesiologists. In this study our aim is to compare perioperative analgesia and ease of patient positioning using fascia iliaca compartment block (FICB) and IV fentanyl. **Objective:** To compare the efficacy of FICB and IV fentanyl for perioperative analgesia, ease of positioning for spinal anaesthesia in patients with fracture femur, compare haemodynamic parameters. **Method:** A prospective double blind study was conducted on 60 ASA 1, 2 and 3 patients for 1 years in SRMS IMS, which were divided into 2 groups 30 patients in each group

Group 1: Received the Fascia Iliaca compartment block with 20 ml of 0.2% Ropivacaine 15 minutes before the Subarachnoid block.

Group 2: Received Intravenous fentanyl at 1 mcg/kg intravenously single dose 15 minutes before the Subarachnoid block.

VAS score, sitting quality and hemodynamic parameters were noted at regular time interval and were statistically analyzed.

Discussion and Conclusion: FICB provides better positioning of the patient for spinal anaesthesia as compared to IV fentanyl and it also prolongs the duration of first postoperative analgesia.

Keywords: Fascia Iliaca Compartment Block; IV Fentanyl; Positioning; Fracture Femur.

Introduction

Peripheral nerve blocks are widely being used for relieving pain for lower extremity surgical procedures. These injuries affect mainly elderly populations, who already have associated significant co morbidities on polypharmacy. Fracture femur involving neck, shaft or distal femur causes severe pain and distress.

Subarachnoid block is generally used in these patients to provide anaesthesia. However, positioning for spinal anaesthesia may be

troublesome because even a slight overriding of the fracture ends is intensely painful [1]. Analgesia is provided by conventional modes of pain relief like Non-steroidal anti-inflammatory drugs, which has the side effects of epigastric pain, coagulation abnormalities, nephrotoxicity, whereas opioids produce altered sensorium, delirium. Peripheral nerve blocks like the femoral nerve block, 3 in 1 block and the Fascia Iliaca compartment block (FICB) are being used to provide analgesia and to avoid side effects. Still there are very less studies to correctly find out which method of providing analgesia is better over the other.

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E.R. Viscusi et al. emphasized that pain left untreated may have significant physical and psychological effects on the patient, may delay operative management and complicate hospital stay [2].

L.J. White et al. in his studies reported that the pain management for limb fractures in the elderly is hugely sub-optimal with some suggesting that only 2% receive adequate analgesia [3-5].

Fascia iliaca blocks provide a safe, cheap and effective form of pain relief for patients with neck of femur fractures, and indeed for those with femoral shaft fractures [6-7]. It has been demonstrated that a FICB provides effective analgesia for fracture femur when given pre-operatively [8].

Fascia iliaca compartment block (FICB) is an anterior approach to the lumbar plexus and was first described by Dalens in 1989 [9]. FICB is administered in the suprainguinal part of the femoral course.

The major part of the femoral nerve lies in the psoas major muscle at the level of L₃₋₄. It then winds around the lateral aspect of the psoas border at approximately the junction of middle and lower one thirds to lie in front and lateral aspect of psoas at the level of inguinal ligament. The lateral femoral cutaneous nerve (LFCN) arises higher from the lateral part of the psoas major.

Aim and Objectives

1. To compare the efficacy of Fascia Iliaca Compartment Block with Ropivacaine versus intravenous fentanyl for analgesia to facilitate better positioning for spinal anaesthesia.
2. To compare the haemodynamic parameters in the two groups.
3. To compare the analgesic requirement in the first 24 hours post operatively in both groups.
4. Complications if any - of either the block or intravenous fentanyl.

Material and Method

Source of Data

After obtaining clearance from institutional ethical committee; a valid written informed consent was taken from 60 patients in the age group of 18- 80 years of either sex, ASA1, 2 and 3 undergoing surgery for fracture femur and were willing to be part of the study.

Patients who fulfilled the inclusion criteria were explained about the procedure in detail and were divided in Group1/Group2 by a computer-generated number sequence and were contained in sequentially numbered opaque envelopes to ensure blinding. We excluded patients with morbid obesity, hemorrhagic diathesis, peripheral neuropathy, psychiatric disorders, and infection at injection site. We also excluded patients with allergy to local anaesthetics, on previous opioid therapy, with polytrauma, patient refusal. A prospective double blind study was conducted among 60 healthy ASA 1, 2 and 3 patients for 1 years in SRMS IMS, which were divided into 2 groups with 30 patients in each group.

Pre anaesthetic checkup was done, routine and special investigations were carried out depending on the history and clinical examination of the patient. All the patients who gave consent were explained about the regional anaesthesia and VAS score preoperatively (and subjective response on the basis of patient satisfaction was noted). They were assessed by investigations e.g. CBC, RBS, S.Urea, S. Creatinine, LFT, PT/ APTT, ECG, CXR, 2 D Echo if required. Patients were kept NPO for 6 hrs prior to surgery. In O.T, after patient's arrival, standard monitor's e.g. ECG, SpO₂, NIBP, HR were attached. All patients were preloaded with RL 500ml, after putting large bore IV cannula. Inj ondansetron (0.15 mg/kg) intravenously was given as premedication to all the patients.

Group 1: Received the Fascia Iliaca compartment block with 20 ml of 0.2% Ropivacaine 15 minutes before the subarachnoid block.

Group 2: Received Intravenous fentanyl at 1 mcg/kg single dose.

Performing block: On the side of fracture femur landmarks were identified by palpating anterior superior iliac spine (ASIS) and the ipsilateral pubic tubercle. One finger was placed on each of these bony landmarks and an imaginary line was drawn between them. We marked this line into lateral 1/3 and medial 2/3 thirds using our index fingers and made a mark at the junction. Our insertion point was 1cm distal/caudal to this mark. The ipsilateral femoral pulse at the level of the planned injection site was palpable 1.5 to 2 cm medial to the intended injection point to ensure a safe distance from the femoral artery. Under all aseptic precautions painting and draping at the site of injection was prepared. The skin and subcutaneous tissue was infiltrated with 1% Lidocaine. A 22.5" gauge hypodermic beveled needle was pierced at a right angle to skin and advanced through two distinct

“pops” as it perforates first the fascia lata, then the fascia iliaca (the latter of which gives a more subtle “pop”). Then the angle between needle and skin surface is reduced to about 30 degrees and the needle is advanced further 1-2 mm. After negative aspiration, 20 ml of local anaesthetic was injected. There should be no resistance to injection. If there is, the needle tip is likely to be within iliacus muscle. In this case withdraw slightly until injection is easy. There should be no pain or paraesthesia on injection. It is common to observe some of the injected fluid coming back through the needle during syringe change. The following parameters were taken into consideration. Heart rates, NIBP, SpO₂, respiratory rate were recorded before the block or before Inj Fentanyl and at five minute intervals throughout the procedure. The analgesia provided by either of the modes was subjectively assessed by using Visual analogue scale scores before the block/IV analgesia and after the block/IV analgesia at 5 minutes and thereafter every 2 minutes upto 15 minutes. The quality of patient positioning for administering spinal anaesthesia was recorded by another anaesthesiologist who was blinded to the mode of

analgesia with scores of 0-3. (0 – Not satisfactory, 1 – satisfactory, 2 – good, 3 – optimal). Time to perform spinal anaesthesia was recorded (time from beginning of positioning to end of spinal anaesthesia block). Post operatively, analgesic requests, in the first 24 hours by the patient was also assessed and first analgesia in the postoperative period only on patient demand or VAS score of ≥ 4 .

Results

The observation and result of fascia iliaca compartment block and IV fentanyl was compared and statistical analysis was done. Data was managed in an excel spreadsheet. Quantitative values were assessed for approximately normal distribution. Each of those variables was summarized by mean and SD. For comparing the two main groups Paired t test was applied.

SPSS statistical software was used for data analysis. In this study p value <0.05 have been considered as statically significant.

Table 1:

	Group F	Group D	P Value
Age in years	44.6+17.12	42.4+15.16	0.05
Height in cm	154.22+3.8	155.7+3.08	0.78
Weight in Kg	61.3+6.02	62.8+7.08	0.77
BMI	24.7+6.05	24.99+5.14	0.33

Demographic datas in both groups are comparable because p value is not significant

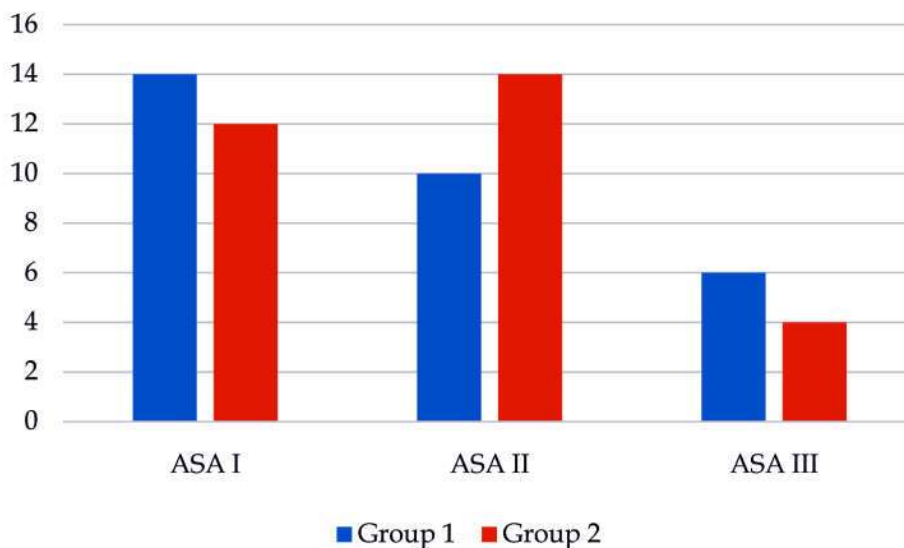


Fig. 1:

Table 2: Comparison of various surgeries performed in the two groups

Surgery	Group 1	Group 2	p value
PFN	12	14	0.6425
DHS	6	7	
IMNIL	8	4	
CC SCREW	4	5	

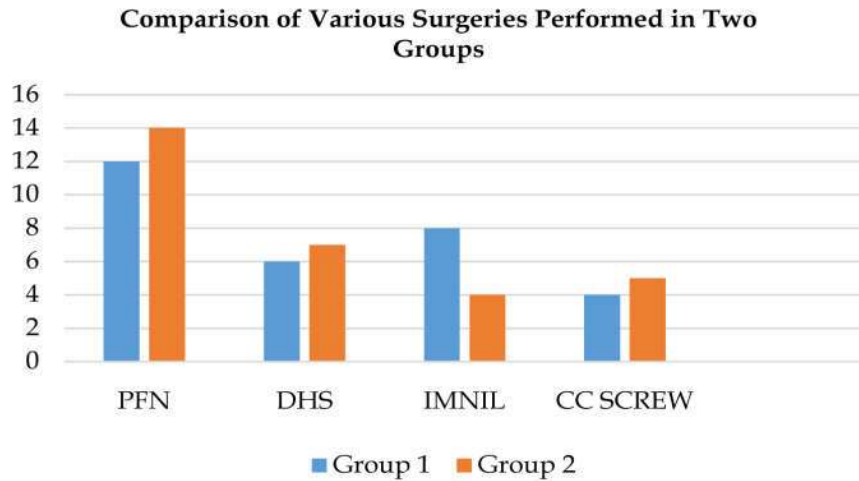


Fig. 2: Haemodynamic parameters

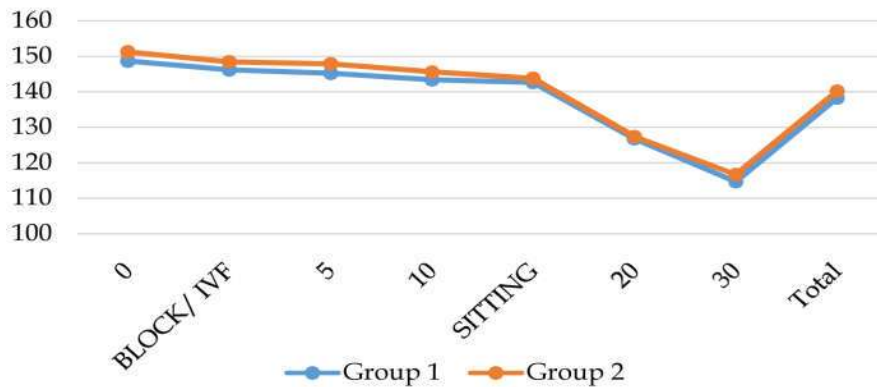


Fig. 3: Comparison of systolic blood pressure in two groups

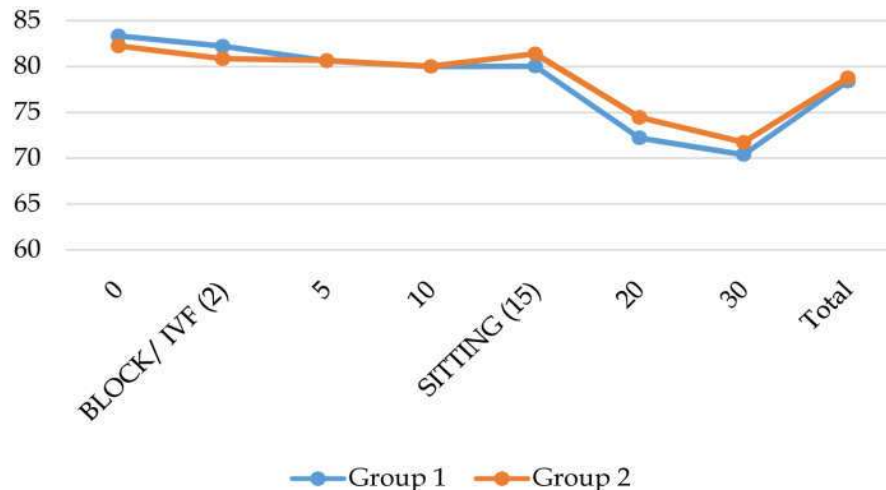


Fig. 4: Comparison of diastolic blood pressure in two groups

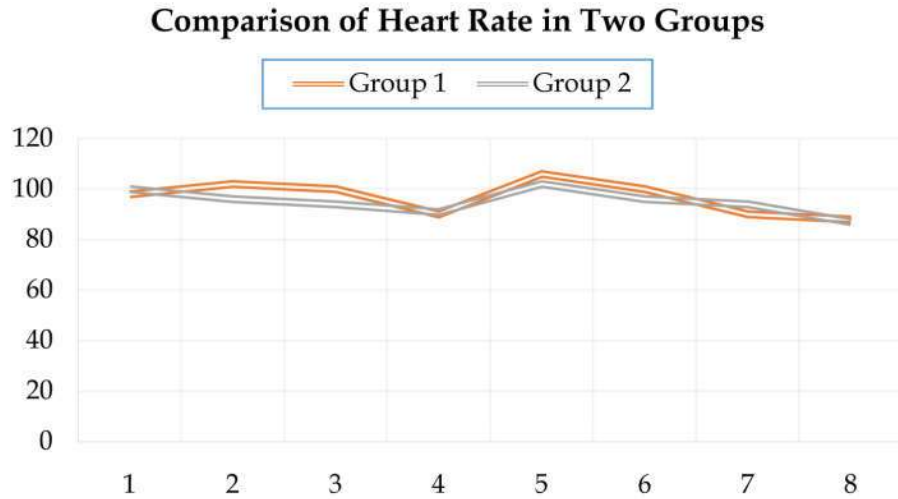


Fig. 5: Comparison of heart rate in two groups

Haemodynamic parameters were compared using student 't' test and no statistically significant difference was found in the two groups.

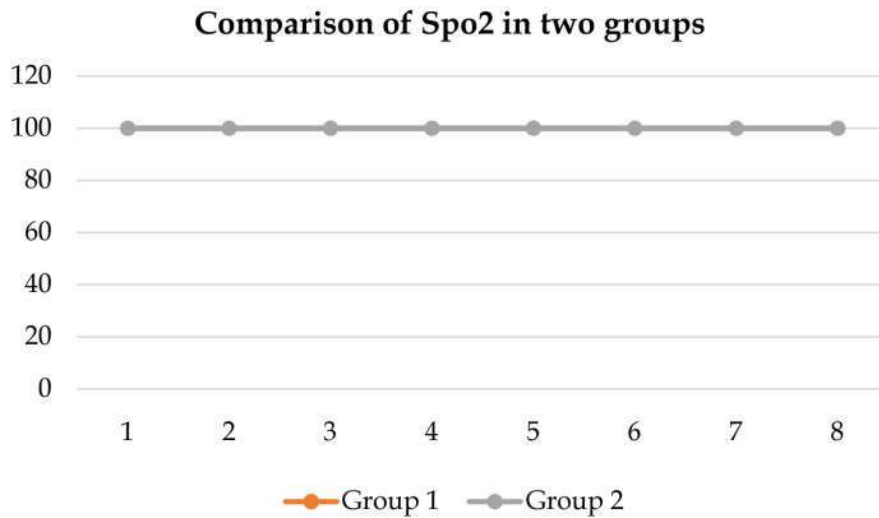


Fig. 6: Comparison of SpO2 in two groups

Table 3: Time taken for SAB in two groups

Groups	Mean Time	SD	P value
Group1	6.3	0.3	p= 0.0001
Group2	8.67	0.5	

Time taken to give SAB was compared in the two groups using student 't' test. And the difference in time was found to be statistically significant

Table 4: Comparison of difference in VAS in two groups

	Group 1	Group 2	p value
VAS	5.05±1.64	3±1.02	0.0001

Improvement in VAS score was compared in the two groups and was compared using student 't' test and the data was found to be statistically significant

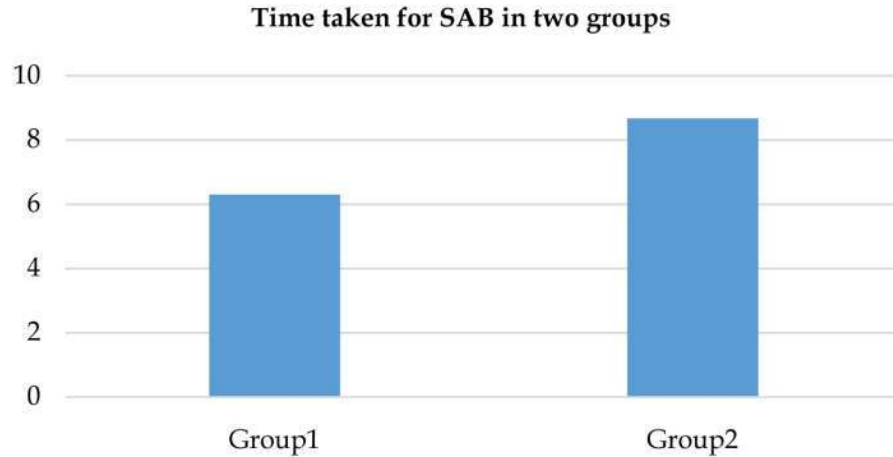


Fig. 7:

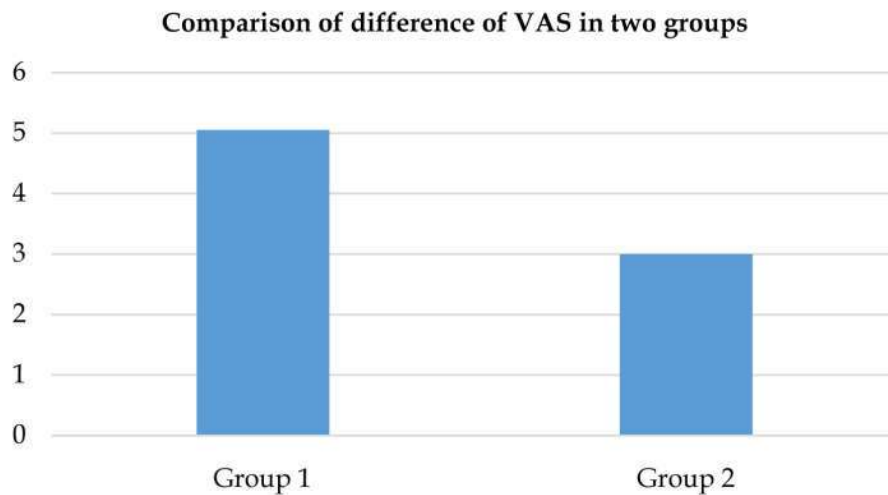


Fig. 8:

Table 5: Comparison of ease of positioning in two groups

Positioning Score	Group 1		Group 2		p value
0	0	0	3	10	0.0024
1	2	6.666667	5	16.66667	
2	12	40	18	60	
3	16	53.33333	4	13.33333	

Ease of positioning was determined on the basis of score given to each patient using chi square test; for statistical analysis positioning score 0 and 1 was combined into one group and the data was found to be statistically significant.

Time of post operative analgesia was determined on the basis of demand of rescue analgesia. The two groups were compared using students 't' test and was found to be statistically significant.

Table 6: Comparison of duration of post operative analgesia

Time in min	Group 1	Group 2	p value
	499±124	379±105	p=0.0002



Fig. 9:

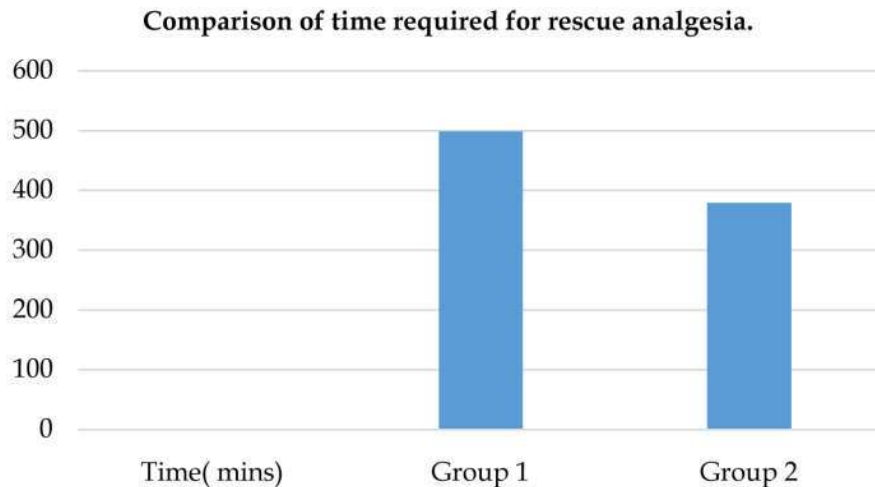


Fig. 10:

Discussion

Accidental application of fascia iliaca by Dalens in 1989 while trying to put block the lateral femoral cutaneous nerve helped anaesthesiologists to become aware about the technique. It was found to be more effective than 3 in 1 block, cheaper and easier to perform. Fracture femur is commonly associated with trauma more in the elderly due to coexisting osteoporosis and reduced bone mineral density but can occur in the young individuals as well. Irrespective of the etiology leading to the fracture femur; our prime concern is to relieve patient from this painful situation and to help in making position of patient for regional anaesthesia. Adequate analgesia is mandatory to be

administered to the patient in emergency room before shifting the patient and in the perioperative period before positioning and fixing the fracture as pain arises from the periosteum of the bone which is very sensitive and it causes spasm of the thigh muscles and displacement of the fracture ends worsens the pain further. Surgical fixation of the fracture is the definitive treatment and it also reduces pain. Adequate perioperative analgesia reduces morbidity and mortality further and thus helps in improving the quality of health care being provided. Regional anaesthesia is preferred over general anaesthesia for the fixation of fracture femur as it is associated with lesser incidence of postoperative pulmonary complications, lesser ICU stay and lesser morbidity. So in our study considering regional anaesthesia to be better than

general anaesthesia we tried to compare FICB with intravenous injection fentanyl (2mcg/kg) as to determine which is better in providing adequate perioperative analgesia and proper positioning of the patient. Demographically both the study groups were found to be comparable. The type of fracture and surgery performed in the two groups was also similar. The distribution of patient on the basis of ASA physical status was also comparable. Analgesic efficacy of the two techniques was determined on the basis of VAS score. DG Monzon et al. compared parenteral NSAIDS with fascia iliaca block in elderly patients and found FICB although rapid onset but for effective up to 8 hours to control post hip fracture pain(X1). Yun M.J. et al. in their study compared analgesia between FICB with a catheter Ropivacaine and IV Alfentanil before positioning the patient in lateral position for SAB. 60% patients got incomplete block, even 20 minutes after the block, there VAS scores ranged between 1 and 4 median 2 during positioning and they did not request supplementary analgesics. The mean VAS scores in FICB group was 2 versus 3.5 in the Alfentanil group and the difference in the two groups was statistically significant. In another study conducted by Sia S and colleagues; analgesic efficacy of femoral nerve block with lidocaine versus IV fentanyl before positioning for spinal anaesthesia in fracture shaft of femur only. They found a statistically significant reduction in VAS scores after femoral nerve block compared to IV fentanyl group. In our study the mean VAS score in both the groups of study was 7.9 and there was a drop in VAS Scores of both the groups after using FICB and IV fentanyl. This drop in VAS score was statistically significant in both the groups. Positioning was determined on the basis of use of a score of 0-3 depending on the ease or comfort with which the patient sat for SAB. The score was given by the anesthesiologist who was blinded for the technique being used. J.J.Candal et al., in their study used a novel sitting score, on a scale of 1-4 where a score of 1 was given to patient who were only able to lie flat or use a maximum pillow of two and a score of 4 to patients who could sit up independently. In their study the sitting score improved from 1.8 to 2.9 after the block. In our study there was improvement in sitting angle in both the groups; it was easier in patients who received FICB as compared to IV fentanyl and was statistically significant.

The patients in both the groups remained hemodynamically stable throughout the procedure. The rise in blood pressure during patient positioning was higher in iv fentanyl group as compared to FICB which could be due to better analgesia provided by

FICB. To determine the postoperative analgesia various studies have been conducted and shown the efficacy of single shot of FICB in postoperative analgesia. Wongswadiwat et. al, in their study found that a single shot of FICB provide good analgesia for the first 24 hours following arthroscopic knee surgery. In our study we found that the demand of postoperative rescue analgesia was faster and more in IV fentanyl group as compared to FICB making FICB a better alternative for perioperative analgesia as it is easy to perform and gives better results. FICB was not associated with any complication in our study. Patients receiving IV fentanyl had side effects like drowsiness and nausea but it was not clinically significant. Patients in both the groups were haemodynamically stable.

Conclusion

In this study we compared FICB with IV fentanyl for perioperative analgesic effect and patient positioning with fracture femur for SAB and FICB was considered to be more efficient than IV fentanyl. This was concluded on the basis of reduced VAS score, better sitting position, lesser time required to put SAB, and reduced demand of postoperative rescue analgesia. Thus we conclude FICB is better as an option over IV fentanyl in reducing pain in patients with fracture femur.

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