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Comparative Evaluation of Solitary Dose of Fentanyl & Fascia Iliaca Compartmental Block for Mitigating Pain During Positioning Before Subarachnoid Block as Well Postoperative Analgesia for Proximal Femur Fracture Surgery

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Abstract:-

- ***Background:***

Patient positioning for performing spinal blockade causes severe pain in hip and femur fracture. Adequate pain relief before administrating spinal blockade will increase patient's cooperation. This study was done to assess analgesic effect of fascia iliaca compartment block (FICB) for positioning for spinal anesthesia as well as postoperative analgesia in comparison with intravenous fentanyl.

- ***Materials and Methods:***

This was a randomized, double blind, controlled prospective study that included 66 patients of the American Society of Anesthesiologists physical statuses I to II, of either sex, between 30 and 70 years, posted for hip or proximal femoral surgery, with visual analogue scale (VAS) >4 in preoperative period. The two groups were assigned randomly. In Group A, patients received I/V Fentanyl 100mcg and in Group B, FICB was given half an hour before shifting the patients in operation theater with 30 ml of 0.25% bupivacaine. Each group included 33 patients. Thirty minutes after FICB, spinal anesthesia was given and patients' vitals were monitored before and after block, at the time of positioning for spinal anesthesia, intraoperative and postoperative periods.

- ***Results:***

At baseline and after I/V Fentanyl in group A and USG guided FICB Block in group B; VAS score was comparable as p>0.05. During positioning for subarachnoid block, mean VAS score was significantly increased in group A (7.43±.82) as compared to group B (3.91±.63) with highly significant difference as p<0.001.The time for first rescue analgesia was comparatively shorter (280±61.70min) in the patients who were administered i/v fentanyl (group A) as compared to ultrasound guided Fascia Iliaca Compartment Block (Group B) who experienced prolonged pain free period (400.00±61.70min) (P<0.01).

- ***Conclusion***

It is concluded that USG guided Fascia iliaca compartment block effectively provides analgesia for positioning before spinal anesthesia in the patients of proximal femur fractures. It also provides analgesia in postoperative period and reduces total consumption of analgesic agent required by patients. FICB is a safe procedure with remarkable safety profile.

I. INTRODUCTION

Pain is still a great challenge to the human kind and also the most common distressing factor which brings the patient to doctor. Long bone fractures are very painful. The definitive management of most fractures is operative intervention. Safe and effective management of fracture-related pain and anxiety will reduce patient's distress during initial evaluation and often allows definitive management of the fracture that is operative intervention. Most of the time anesthetists administer opioid or (NSAID) for better tolerance of pain during positioning for spinal anesthesia. Current strategies for pain management include oral and parenteral systemic analgesia, such as (NSAIDs), opioids (Fentanyl or Morphine), epidural and spinal anesthesia (SA), and peripheral nerve blocks.Besides, opioids may bring side effects, especially for the older adults, such as delirium, drowsiness, constipation, nausea, and even respiratory depression, which may affect prognosis of the patients. Recently peripheral nerve blockade or regional anesthesia has become an increasingly attractive option in delivering effective pain relief, with fascia iliaca compartment block (FICB) as a representative. Indications of FICB are surgical anesthesia to the lower extremity, management of cancer pain and pain owing to inflammatory conditions of the lumbar plexus, and amelioration of acute pain following trauma, fracture, and burn, while contraindications of FICB are

few. Hence forth in this study we tend to investigate whether FICB is as effective in alleviating pain during positioning for spinal anesthesia and also if their effectiveness prevails in the post-operative period.

➢ *Aims and Objectives*

Aim: The aim of the present study was to compare solitary dose of intravenous fentanyl with ultrasound guided fascia iliaca compartment block (FICB) for mitigating pain during positioning before subarachnoid block as well postoperative analgesia for proximal femur fracture surgery with following objectives.

- *Primary Objective:*

✓ To compare VAS score before and after fentanyl and FICB during positioning for subarachnoid block.
✓ To compare the duration of postoperative analgesia between the two groups.

- *Secondary Objectives:*

✓ To compare the total requirements of rescue analgesia in postoperative period between the two groups.

II. MATERIALS AND METHODS

The present study was conducted at Chhatrapati Shivaji Subharti Hospital of Subharti Medical College affiliated to Swami Vivekananda Subharti University Meerut (UP) after approval from Institutional Ethical Committee. This is a single center prospective randomized clinical study.

➢ *Inclusion Criteria*

Patients of either sex, posted for surgery of femur fracture under spinal anesthesia fulfilling the following criteria were included in the study. Age 30 - 70years. ASA grade I – II , Elective surgery of femur fracture under spinal anesthesia, weight 40-70 kgs.

➢ *Exclusion Criteria:*

Patient refusal, Emergency surgeries. Arthroplasty surgery, Patients with physical status higher than ASA-II Age more than 70 years and less than 30 years. Weight 70 kgs. Local Site infection and coagulation abnormalities. Allergy to local anesthetics. Pregnant women. Patients with psychiatric disorders, Patients on any kind of chronic analgesic medication or NSAIDS. Patients with peripheral neuropathy involving lower limb, Patients with a history of diabetes mellitus, Surgeries exceeding 150 minutes.

➢ *Study Sample Size:*

Sample size was calculated in consultation with statistician and using open epi software to estimate the difference in the duration of analgesia between the groups with assumption 95% confidence interval and 80% power. At least 30 patients were required in each group. Assuming a 10% error due to chance, block failure or dropout, a final sample size of 66 patients were included in the study.

➢ *Randomization Technique:*

The total adult consented 66 patients were randomized into two groups of patients 33 each using computer generated randomized number tables. Group A(n=33): Patients received Inj. Fentanyl I/V 100 mcg Group B(n=33): Patients received Fascia Iliaca Compartment Block (FICB) (30ml of 0.25% Bupivacaine.)

➢ *Anesthetic Technique*

The block technique FICB and the subarachnoid block was performed by anesthesiologist with prior experience of minimum 50 procedures. Before the commencement of subarachnoid block, all patients were instructed on the method of sensory and motor block assessments.

All patients were explained regarding the visual analogue scale (VAS) scoring system which consists of a 10 cm long horizontal paper strip (marked at 1cm interval) with two end points; 0- no pain and 10- worst possible pain.

Before positioning for subarachnoid block a base line VAS score was assessed.
As per groups the patients were administered fentanyl and FICB and VAS score was assessed for peak effect (10 mins and 30 mins respectively).

The patients were positioned for the subarachnoid block and VAS score was assessed as per the groups.
In Group A all patients were given Fentanyl 100µg I/V.
In Group B USG guided FICB was performed.

➢ *Statistical Analysis*

The study was successfully completed and data of all patients were included for statistical analysis to compare their clinical efficacy. The sample size was adequate to detect statistical significance. The demographic data for categorical variables were compared using chi square test. Statistical significance in mean difference between groups were compared using student ‘t‘ test. A p–value of <0.05 was considered statistically significant.

III. OBSERVATIONS AND RESULTS

Comparison between the two groups was done using student ‘t‘test at different time intervals i.e., Baseline, after i/v fentanyl/ FICB, during positioning for subarachnoid block, after SA block, immediate post-op, 1 hr,1.5 hr,2 hr,4hr,6hr,10th hr,12th hr,18th hr and lastly at 24 hours postoperatively.

At baseline and after the respective block in group A and group B; VAS score was comparable as $p>0.05$.

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During positioning for subarachnoid block, mean VAS score was significantly increased in group A (7.43±.82) as compared to group B (3.91±.63) with highly significant difference as p<0.001.

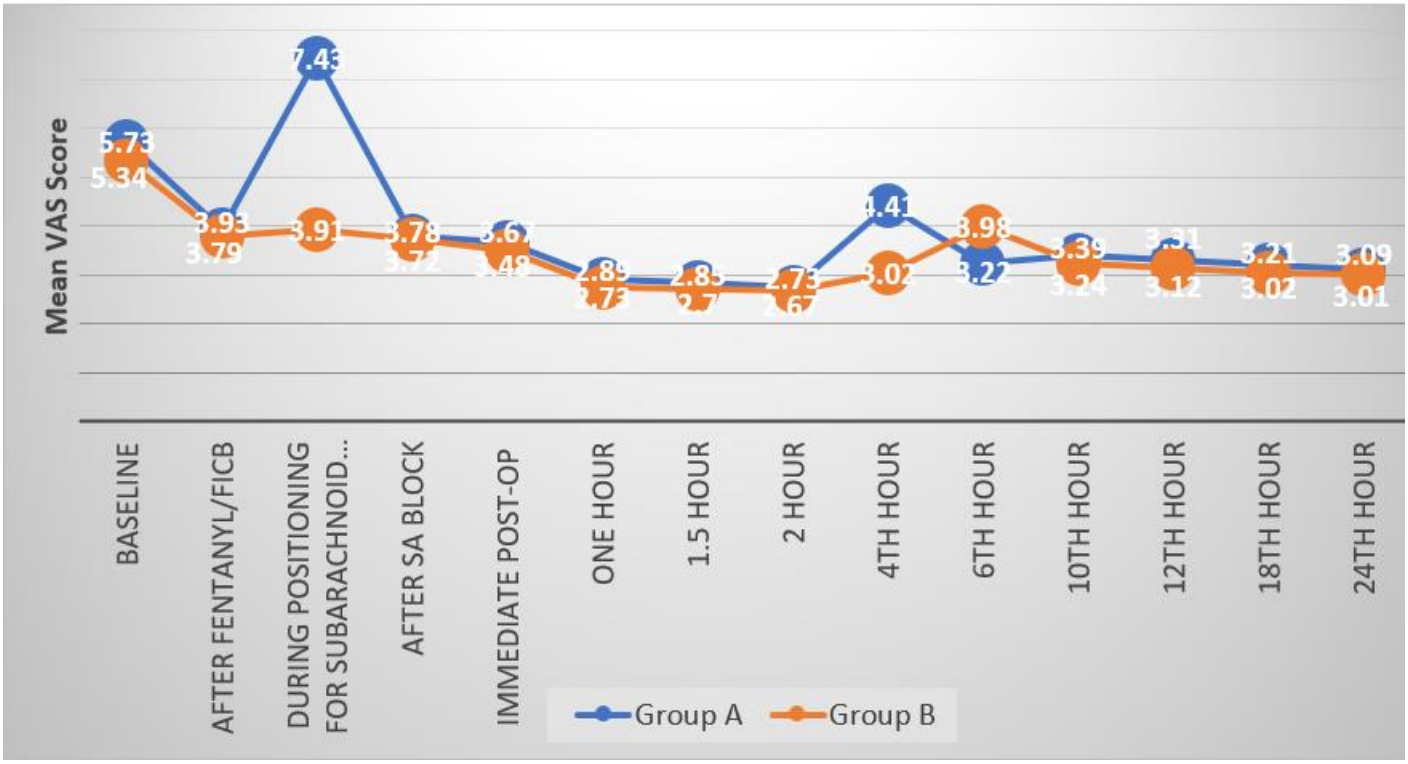
VAS score was comparable among both the groups after SA block till 2nd hour.

At 4thhour VAS score was experienced more by Group A patients as compared to group B patients with statistically significant difference as p<0.05(0.017).

At 6th hour VAS score was higher in Group B patients in comparison with Group A due to rescue analgesia was given in group A and fading effect of FICB in group B with significant difference in p<0.05(0.043).

Table 1 VAS Score at Different Time Intervals

Intervals: VAS	Group A Mean±SD	Group B Mean±SD	p value
Baseline	5.73±.77	5.34±.68	0.31
After Fentanyl/FICB	3.93±0.71	3.79±0.76	0.19
During positioning for subarachnoid block	**7.43±.82**	**3.91±.63**	**<0.001****
After SA Block	3.78±0.74	3.72±0.65	0.77
Immediate Post-op	3.67±.76	3.48±.68	0.27
One Hour	2.89±.78	2.73±.66	0.38
1.5 Hour	2.85±.74	2.70±.74	0.33
2 hour	2.73±.91	2.67±.79	0.28
4th Hour	**4.41±1.97**	**3.02±1.17**	**0.017***
6th Hour	**3.22±1.48**	**3.98±.91**	**0.043***
10th Hour	3.39±1.83	3.24±.98	0.17
12th Hour	3.31±0.78	3.12±.97	0.53
18th Hour	3.21±1.71	3.02±1.79	0.61
24th Hour	3.09±.88	3.01±.89	0.42



Graph 1. VAS Comparison at Different Time Intervals.

- *Time to first rescue analgesic and total tramadol consumption: -*

The time for first rescue analgesia was comparatively shorter (280±61.70min) in the patients who were administered i/v fentanyl (group A) as compared to ultrasound guided Fascia Iliaca Compartment Block (Group B) who experienced prolonged pain free period (400.00±61.70min) (P<0.01).

The superior block characteristics by the Fascia Iliaca Compartment Block were clearly evident from the lesser Tramadol consumption (104.86±43.22mg) in group B for postoperative analgesia as compared to fentanyl (group A) (146.67±56.74mg) (P<0.01).

IV. DISCUSSION

The present study evaluates the solitary dose of fentanyl and fascia iliaca compartmental block for mitigating pain during positioning before subarachnoid block as well postoperative analgesia For proximal femur fracture surgery.

Ghimire et al reported that preoperative FICB reduce pain score during positioning, shortens time to perform spinal anesthesia, better patient positioning and higher patient acceptance. FICB was more effective in reducing pain than i/v fentanyl which is similar to our study.

Rajashree Madabushi et al concluded that the FICB offers superior analgesia in comparison to I/V Fentanyl. The drop in VAS scores was significantly more in the FICB group in comparison to fentanyl. Which is similar to our study.

Melaku Bantie et al observed FICB reduce pain score during positioning, shorten time to perform spinal anesthesia in comparison to i/v fentanyl . Our study is also similar with this study.

Fujihara et al observed significant pain reduction after FICB in comparison to NSAIDs alone in postoperative period. In our study, we used Fentanyl instead of NSAIDS and found USG guided FICB to be superior.

It is clearly evident that FICB is more effective than any systemic analgesic whether it is ketamine, opioids or NSAIDS.

V. CONCLUSION

It is concluded that USG guided Fascia iliaca compartment block effectively provides analgesia for positioning before spinal anesthesia in the patients of proximal femur fractures. It also provides analgesia in postoperative period and reduces total consumption of analgesic agent required by patients. FICB is a safe procedure with remarkable safety profile.

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