



Original Research Article

ULTRASOUND GUIDED SUPRAINGUINAL VS INFRAINGUINAL APPROACH TO FASCIA ILIACA COMPARTMENT BLOCK FOR POSTOPERATIVE ANALGESIA IN GERIATRIC PATIENTS UNDERGOING PROXIMAL FEMUR NAILING

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ABSTRACT

Background: Fascia iliaca compartment block (FICB) is a commonly employed technique for providing postoperative analgesia in patients undergoing femur surgery. The study was aimed to compare ultrasonography (USG) guided suprainguinal vs infrainguinal approach for fascia iliaca compartment block in geriatric patients undergoing proximal femur nailing.

Material and Methods: 80 patients undergoing proximal femur nailing were randomized to two groups, Group S (suprainguinal FICB) or Group I (infrainguinal FICB). After spinal anaesthesia, patients received USG guided FICB using 40 ml of 0.2% ropivacaine with 8 mg dexamethasone with the approach as per group allocation. Postoperative visual analogue scale (VAS) score was assessed at 2,4,6,8,12,16, 20 and 24 hrs and rescue analgesia consumption (inj. Tramadol) was recorded.

Results: VAS score was significantly lower in group S in comparison to group I at 12 hrs. Tramadol consumption was significantly lower in group S. Duration of analgesia was significantly prolonged in group S.

Conclusion: Suprainguinal approach to FICB is superior to infrainguinal approach as it provides longer duration of analgesia, decreases rescue analgesia consumption and decreases pain severity.

Keywords: Analgesia, fascia iliaca compartment block, suprainguinal approach, infrainguinal approach, proximal femur nailing.

INTRODUCTION

Geriatric patients are prone to femur fractures due to age related osteoporosis. Commonly proximal femoral nailing (PFN) is done for hip fractures. PFN surgery is associated with significant pain and inability to ambulate with the patient postoperatively. Inability to ambulate is associated with increased incidence of postoperative complications like deep vein thrombosis. Epidural analgesia, fascia iliaca compartment block (FICB), IV paracetamol, NSAIDs and opioids are the available options for pain management. Epidural analgesia needs vigilant monitoring to detect accidental intrathecal or

intravascular injection. IV opioids are associated with respiratory depression, NSAIDs can affect renal function in elderly and IV paracetamol modestly reduces pain. Recent studies have shown promising results with FICB for postoperative analgesia following PFN surgery. Yet, there is a debate regarding ideal approach, suprainguinal or infrainguinal for FICB.

Ropivacaine is a newer local anaesthetic which is less cardiotoxic than bupivacaine and it produces less motor blockade. This helps in early ambulation of the patient. Addition of a steroid like dexamethasone prolongs analgesia.

There are few studies reporting suprainguinal approach to FICB is superior to infrainguinal approach. We hypothesized that suprainguinal approach for FICB may be superior to infrainguinal approach.

MATERIAL AND METHODS

Patients and Methods

After obtaining institutional ethical committee approval, the present study was carried out in a tertiary care teaching hospital. ASA grade II & III patients aged between 65-80 years undergoing elective PFN surgery were included in the study. Patients on anticoagulants, hypersensitivity to study drugs, history of surgery in inguinal region, moderate and severe cardiorespiratory diseases were excluded from the study. Patients were randomized into two groups using block randomization method with blocks of 8 in 1:1 ratio.

Based on the results of previous study, to detect a 25% difference in mean duration of analgesia, with 95% confidence interval and 90% power of study, we needed 25 patients in each group. To compensate for loss to follow-up, we included 40 patients in each group.

All patients underwent pre-anaesthetic checkup (PAC) and the procedure was explained to all patients. Written and informed consent was obtained from all the patients. All patients received tab. Ranitidine 150 mg HS on the night before surgery. On the day of surgery, patients were shifted to operation theatre and connected to ECG, NIBP and pulse oximetry. All patients received subarachnoid block under all aseptic and antiseptic precautions with 2.75 ml of 0.5% hyperbaric bupivacaine. After subarachnoid block, FICB block was administered using USG (Sonosite SII) with a high frequency 6-12 MHz linear probe as per group allocation.

Group S – received USG guided suprainguinal fascia iliaca compartment block

Group I – received USG guided infrainguinal fascia iliaca compartment block

For suprainguinal FICB, the transducer was placed along the spino umbilical line. Sartorius muscle, inguinal ligament, internal oblique and deep circumflex iliac artery were identified and needle was passed in plane to cross inguinal ligament,

piercing fascia iliaca to lie just below the deep circumflex iliac artery. After test for negative aspiration, 40 ml of 0.2% ropivacaine and 8 mg dexamethasone (2ml) – total 42 ml was administered. For infrainguinal FICB, the transducer was placed obliquely below the inguinal crease and femoral artery, femoral nerve, iliopsoas muscle and sartorius muscle were identified. The needle was passed in plane piercing fascia lata and fascia iliaca and 40 ml of 0.2 % ropivacaine and 8 mg dexamethasone (2ml) – total volume 42 ml was administered. After surgery, VAS score was recorded at 2,4,6,8,12,16, 20 and 24 hrs postoperatively. When VAS score was 4 and above, rescue analgesia (inj. Tramadol 1.5 mg/kg IV) along with inj. Ondansetron 4 mg IV was administered. Time duration from administration of FICB to the need for first rescue analgesia was calculated as duration of analgesia. Total consumption of tramadol in first 24 hrs following surgery was recorded. Any side effects such as nausea, vomiting. Patient follow-up was done on 7th postoperative day to detect infection at the site of block.

Statistical Analysis

Quantitative data was expressed as mean SD and compared using student's unpaired t test. Qualitative data was expressed as percentage or frequency and analysed using chi-square test. Data was entered in Microsoft excel and medcalc software was utilized. P value less than 0.05 was considered as statistically significant.

RESULTS

Demographic data such as age, sex and body mass index (BMI) and duration of surgery was comparable in both the groups. [Table 1]

VAS score was significantly less in group S at 12 hours postoperatively in comparison to group I (2.2±1.1 vs 3.8±1.2). [Table 2]

Duration of analgesia was significantly prolonged and total tramadol consumption in 24 hrs was significantly reduced in Group S in comparison to group I. [Table 3]

None of the patients had nausea, vomiting or infection at the site of block (as observed on 7th postoperative day).

Table 1: Demographic data and duration of surgery

	Group S	Group I	P value
Age (mean ± SD)	72.6 ± 3.8	71.8 ± 3.9	> 0.05
Sex (M/F)	16/24	18/22	> 0.05
BMI (kg/m ²) mean ± SD	22.3 ± 2.8	21.9 ± 2.6	> 0.05
Duration of surgery (in minutes) mean ± SD	110.6 ± 12.8	108.8±14.6	> 0.05

Table 2: VAS score

Time interval of VAS score (in hrs)	Group S Mean ± SD	Group I Mean ± SD	P value
2	0.26±0.3	0.28±0.4	> 0.05
4	0.5±0.4	0.48±0.5	> 0.05
6	1.28±0.8	1.31±0.7	> 0.05
8	1.81±0.9	1.78±0.8	> 0.05
12	2.2±1.1	3.8±1.2	<0.0001
16	3.8±1.9	3.6±2	> 0.05
20	2.4±1.6	2.6±1.5	> 0.05
24	2.2±1.4	2.3±1.3	> 0.05

Table 3: Duration of analgesia and tramadol consumption

Parameter	Group S	Group I	P value
Duration of analgesia (in hrs) Mean±SD	11.8 ± 3.2	8.3 ± 3.1	< 0.0001
Tramadol consumption in 24 hrs (in mg) mean ± SD	85.6 ± 12.8	108.4 ± 21.6	< 0.0001

DISCUSSION

In our study, the duration of analgesia was significantly prolonged and VAS score was significantly lower in group S in comparison to group I. Bansal K et al,^[1] observed similar prolongation of analgesia and reduced tramadol requirement in suprainguinal FICB group when compared to infrainguinal FICB group. Kumar et al,^[2] also reported superior analgesic efficacy and reduced morphine consumption in suprainguinal FICB group in comparison to infrainguinal FICB group. In our study, the duration of analgesia was almost twice that of study by Bansal K et al. this can be explained as we administered higher volume of local anaesthetic (40 ml in comparison to 30 ml 0.2% ropivacaine by Bansal k et al) and we added dexamethasone in both the groups. Dexamethasone as an adjuvant to local anaesthetics in regional blocks prolongs the duration of analgesia. Several mechanisms are postulated to explain the role of dexamethasone in prolongation of analgesia, though the exact mechanism is unknown. Dexamethasone stabilises neuronal membranes and inhibits sensitisation of nerves by regulating nuclear factor-kappa B (NF-kB). Systemic administration of dexamethasone reduces bradykinin and facilitates production of calcium dependent phospholipid binding proteins called annexins. Annexins inhibit phospholipase A2 and decrease prostaglandin production.

Vermeylen et al,^[3] observed that spread of drug following suprainguinal approach to FICB results in better spread of drug than infrainguinal approach.

Dexamethasone has antiemetic effects and this explains absence of nausea and vomiting in both the groups. Recent study by Corcoran et al,^[5] has evaluated the effect of single dose of dexamethasone on incidence of postoperative wound infection and has concluded that it doesn't increase the incidence of postoperative wound infection.

CONCLUSION

There are few limitations in the current study. We did not insert epidural catheter in fascia iliaca plane which would have benefited the patient. FICB block could have been administered before administering subarachnoid block as it facilitates easy positioning for spinal anaesthesia.

To conclude, suprainguinal approach to FICB is superior to infrainguinal approach to FICB as it prolongs the duration of analgesia, reduces tramadol consumption and reduces pain intensity.

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REFERENCES

1. Bansal K, Sharma N, Singh MR, Sharma A, Roy R, Sethi S. Comparison of suprainguinal approach with infrainguinal approach of fascia iliaca compartment block for postoperative analgesia. *Indian J Anaesth* 2022;66: S294-9.
2. Kumar K, Pandey RK, Bhalla AP, Kashyap L, Garg R, Darlong V, et al. Comparison of conventional infrainguinal versus modified proximal suprainguinal approach of Fascia Iliaca Compartment Block for postoperative analgesia in Total Hip Arthroplasty. A prospective randomized study. *Acta Anaesthesiol Belg* 2015; 66:95-100.
3. Vermeylen K, Desmet M, Leunen I, Soetens F, Neyrinck A, Carens D, et al. Supra-inguinal injection for fascia iliaca compartment block results in more consistent spread towards the lumbar plexus than an infra-inguinal injection: a volunteer study. *Reg Anesth Pain Med* 2019; 44:483-491.
4. Desmet M, Balocco AL, Van Belleghem V. Fascia iliaca compartment blocks: Different techniques and review of the literature. *Best Pract Res Clin Anaesthesiol* 2019; 33:57-66
5. Corcoran TB, Myles PS, Forbes AB, Cheng AC, Bach LA, O'Loughlin E, Leslie K, Chan MTV, Story D, Short TG, Martin C, Coutts P, Ho KM; PADDI Investigators; Australian and New Zealand College of Anaesthetists Clinical Trials Network; Australasian Society for Infectious Diseases Clinical Research Network. Dexamethasone and Surgical-Site Infection. *N Engl J Med*. 2021 May 6;384(18):1731-1741. doi: 10.1056/NEJMoa2028982. PMID: 33951362.