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Original Research

To Compare 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
Aim: To compare 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.
Material And Method: This is a single center prospective randomized clinical study conducted at Department of Anaesthesiology and Critical Care. All patients were subjected to the pre-anesthetic assessment prior to enrollment in the study. 66 patients were distributed equally (33) into two groups using computer generated randomized number tables i.e. Group A (Inj Fentanyl I/V) and Group B (Fascia Iliaca Compartment Block (FICB). VAS score was assessed in pre-operative area before any procedure and also after infusion of Fentanyl and FICB in every interval of 15 min till 30 mins.
Results: The hemodynamic variables (mean systolic blood pressure, diastolic blood pressure, MAP and heart rate) were comparable in both the groups (P>0.05). At 6th hour VAS score was higher in group B patients in comparison with group A due to fading effect of FICB with significant difference in p<0.05(0.043). The superior block characteristics by the Fascia Iliaca Compartment Block (group B) was clearly evident from the lesser Tramadol consumption (104.86±43.22mg) for postoperative analgesia as compared to i/v fentanyl (group A) (146.67±56.74mg) (P=<0.01).
Conclusion: FICB is a safe procedure for mitigating pain during positioning before subarachnoid block as well postoperative analgesia for proximal femur fracture surgery with remarkable safety profile**.**
Keywords: Proximal Femur Fracture, Pain, Compartmental Block, Fentanyl, Fascia Iliaca

Introduction: Femur fracture is relatively common with an annual incidence of around 2.9 million worldwide, with the peak incidence of 34% between 15 and 44 years followed by 29% and 21% in between 5 and14 years and older than 60 years respectively[1,2]. Long bone fractures are very painful. The definitive management of most fractures is operative intervention. Preoperative analgesia is required to manage distress associated with fracture reduction and traction.[3] 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. The failure to effectively control the pain before surgery in femur fracture patients may lead to potential risks of cardiovascular events. Non-steroidal anti-inflammatory drugs and opioids are commonly used analgesics. However, these agents may cause undesirable side effects and complications[4]. Therefore, proper management of pain with the other choice is paramount. Spinal anesthesia is commonly utilized in lower extremity orthopedic surgery and has many advantages including easily performed, effective, avoiding airway related complications, reducing the incidence of deep venous thrombosis (DVT), reducing hospital mortality, minimizing hospitalization, and providing postoperative analgesia[5-7]. It has well-acknowledged beneficial effects of reducing pain, reduced opioid consumption, and improved quality of early recovery[18]. Despite the aforementioned advantages, the technique of performing spinal anesthesia in patients with a femoral fracture is difficult due to poor positioning secondary to pain. Correct positioning during spinal anesthesia is the prerequisite in order to perform spinal anesthesia successfully. However, it is extremely painful, causing major patient distress, accompanied by well-known

physiological squeal such as sympathetic activation causing tachycardia, hypertension, and increased cardiac work that may compromise high-risk cardiac patients[9]. Limb immobility and extreme pain are the deterrents for ideal positioning for this procedure[10]. Considering the particularity of this cohort, 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. FICB or fascia iliaca block (FIB), first proposed by Dalens et al. in 1989, is a means of blocking the three principal lumbar plexus nerves of the thigh with a single injection of local anesthetic delivered immediately dorsal to the fascia iliaca[11,12]. 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[13], while contraindications of FICB are few, including patients with coagulopathy, those who are taking antithrombotic medications, infection at the injection site, or history of femoral bypass surgery[14,15]. Besides, allergies to the anesthetic agents and crush injury at or near the injection site are set as absolute contraindications. Today IV fentanyl and FICB are proposed for perioperative analgesia in patients with a femoral fracture in order to facilitate spinal anesthesia by preventing pain secondary to positioning. But available literatures are not conclusive or no single best analgesic technique that is proved to be absolutely effective, fast onset, easy to apply, minimum side effect and accessible that will apply in patients with femoral fracture[16,17]. Therefore, this study aimed to compare analgesic effect of fentanyl & fascia iliaca compartmental block for mitigating pain during positioning before subarachnoid block as well postoperative analgesia for proximal femur fracture surgery.

Material And Method: This is a single center prospective randomized clinical study conducted at Department of Anaesthesiology and Critical Care. All patients were subjected to the pre-anesthetic assessment prior to enrollment in the study. A written informed consent was taken from each patient or his/her legally authorized relative after explaining the research protocol and all the possible complications related to the procedure in the language patient understands.

Inclusion Criteria

- Patients of either sex, posted for surgery of femur fracture under spinal anaesthesia fulfilling the following criteria were included inthe study.
- Age 30 - 70years.
- ASA grade I - II

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.
- Local Site infection and coagulation abnormalities.
- Allergy to local anaesthetics.
- 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.

Their detailed medical and surgical history was taken along with any previous anesthetic exposure with its outcome. The pre-anesthetic assessment was included general condition, built, weight and height, heart rate, ECG for heart rate, noninvasive arterial blood pressure, respiratory rate and presence of cyanosis, anemia, clubbing, jaundice, edema, lymphadenopathy and spinal column and neurological disorder such as poliomyelitis, kyphoscoliosis. A thorough airway and systemic examination was also done. The routine investigations including hematocrit levels, total leucocyte count, differential leucocyte count, coagulation profile, platelet count, blood sugar, blood urea with serum creatine and electrolytes was done for all patients.

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 26 patients were required in each group. A figure close to this was chosen as 30 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. The total adult consented 66 patients, 33 in each was randomized into two groups of patients each using computer generated randomized number tables. Group A (n=33): Patients received Inj Fentanyl I/V100 mcg
Group B (n=33): Patients received Fascia Iliaca Compartment Block (FICB). The anesthetist otherwise uninvolved in the study was inserted allocation papers into sealed envelopes, numbered according to random number table that was kept locked. The allocation was restricted to an equal number of participants in each group. The anesthetist opened envelopes in the pre anesthetic holding area and prepare the study medication and administer it before performing the FICB.

Anaesthetic Technique: The Block technique FICB and the subarachnoid block was performed by anesthesiologist with prior experience of minimum of 50 spinal anesthesia's. All patients scheduled for fracture femur surgery with open reduction internal fixation (ORIF) was kept fasting for at least 6 hours prior to the surgery. After arrival in the operation theatre, standard monitors for heart rate (HR), electrocardiogram (ECG), pulse oximetry (SpO2) and non-invasive arterial blood pressure (NIBP) were attached for monitoring of vital parameters. Intravenous line with 18G intracath was secured in the non- dominant forearm and they were given lactated Ringer solution at rate of 10 ml /kg over 15 minutes, before any active intervention of subarachnoid block. 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. VAS score was assessed in pre-operative area before any procedure and also after infusion of Fentanyl and FICB in every interval of 15 min till 30 mins. 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. Nausea and vomiting was treated with ondansetron 4mg intravenously, as required. Incidence of perineal pruritus, if any, was recorded.

Statistical analysis: Data so collected was tabulated in an excelsheet, under the guidance of statistician. The means and standard deviations of the measurementsper group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Difference between two groups was determined using student t-test as well as chi square test and the level of significance was set at $p<0.05$. **Results**: 66 patients were distributed equally (33) into two groups using computer generated randomized number tables i.e. Group A (Inj Fentanyl I/V) and Group B (Fascia Iliaca Compartment Block (FICB). For Group A, the mean age was 61.87±5.87years, mean weight was 66.03±10.78 kg and mean height was 168.23±6.55cm. The corresponding values of these parameters for Group AI were 63.94±5.93 years, 64.33±10.81kg and 166.53±6.55cm. The categorization as per American Society of Anesthesiologists physical status (I/II) was 17/16 forGroup A and 15/18 for Group B. The variations between the groups in respect of all the above demographic parameters were not statistically significant ($p>0.05$). Mean duration of surgery was 118.62±9.83 min in patients of Group A and 120.41±8.37 min in patients of Group B. At baseline and after the respective block in group A and B; VAS score was comparable as $p>0.05$. During positioning for subarachnoid block, pain was significantly increased in group A (7.43±.82) as compared to group B (3.91±.63) with highly significant difference as $p<0.001$. Pain was comparable among both the groups after SA block, immediate Post-op, at 1 hour-2 hour. At 4^{th}; pain was experienced more by Group A subjects as compared to group B subjects with statistically significant difference as $p<0.05$. After that pain was comparable in both the groups at 10^{th}, 12^{th}, 18^{th} and 24^{th} hour as $p>0.05$ (table 1).

Table 2: VAS comparison at different intervals among the study groups

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

**: highly statistically significant

The time for first rescue analgesia was comparatively shorter (280±61.70) in the patients who were administered fentanyl (group A) as compared to Fascia Iliaca Compartment Block (Group B) who experienced prolonged pain free period (400.00±61.70) (P=<0.01). The superior block characteristics by the Fascia Iliaca Compartment Block were clearly evident from the lesser Tramadol consumption (104.86±43.22) for postoperative analgesia as compared to fentanyl (group A) (P=<0.01) as shown in table 2.

Table 2: Time to first rescue analgesic and tramadol consumption among the study groups

Variables	Group A	Group B	p value
	Mean±SD	Mean±SD	
Time to first rescue analgesic (in min)	280±61.70	400.00±61.70	<0.01*
Tramadol consumption (in mg)	146.67±56.74	104.86±43.22	<0.01*

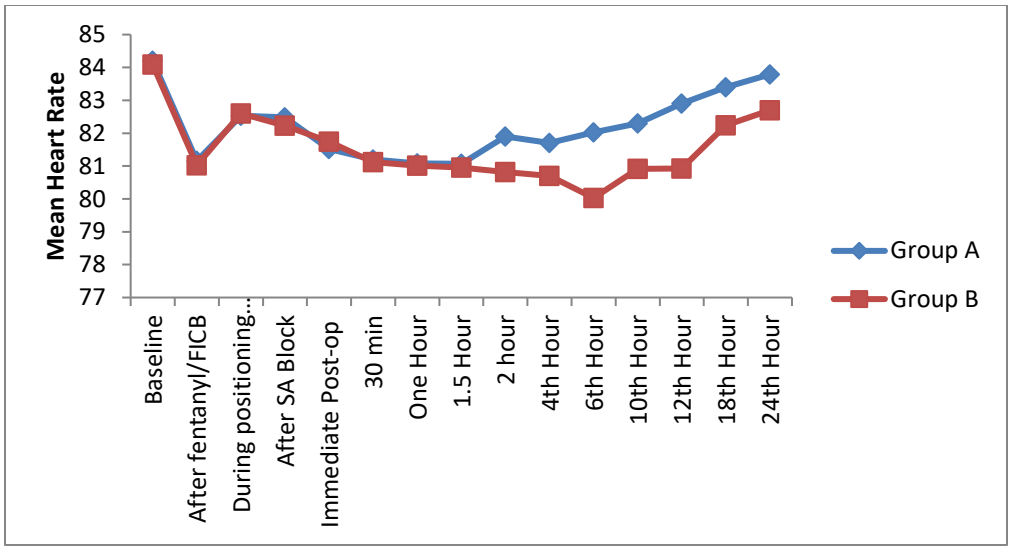
*: statistically significant

The mean MAP at baseline was 94.82±6.13 mmHg in patients of Group A and 94.40±5.66mmHg in patients of Group B. The mean MAP decreases in both the groups till 4th hour. Then MAP continues to upsurge in both the groups. MAP was comparable among both the groups at all the intervals as p>0.05 (table 3).

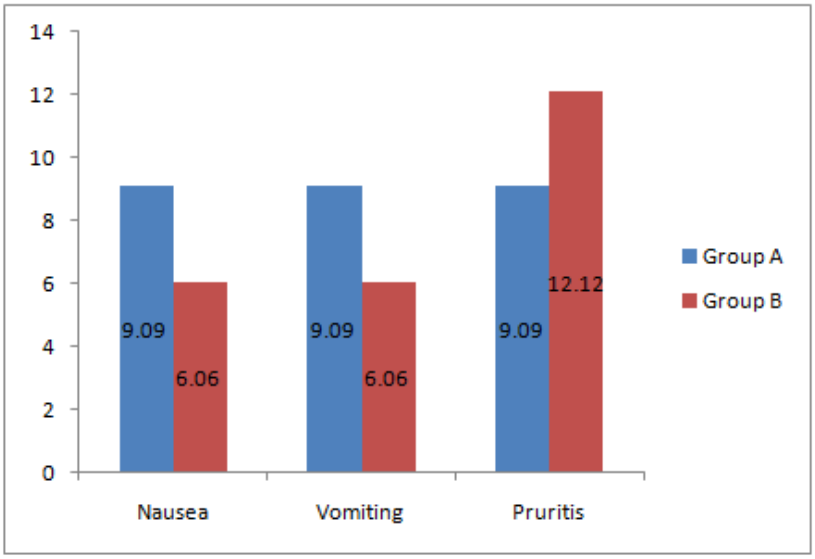
Table 3: MAP comparison at different intervals among the study groups

Intervals: MAP	Group A	Group B	p value
	Mean± S D	Mean± SD	
Baseline	94.82±6.13	94.40±5.66	0.69
After Fentanyl/FICB	90.38±6.05	90.16±5.80	0.81
During positioning for subarachnoid block	91.70±5.05	91.10±5.09	0.59
After SA Block	90.38±6.92	90.18±6.23	0.25
Immediate Post-op	90.30±5.45	90.17±5.74	0.66
30 min	90.03±4.87	89.92±5.45	0.74
One Hour	89.63±6.04	89.43±4.87	0.84
1.5 Hour	89.27±5.49	89.04±6.04	0.77
2 hour	88.70±5.25	88.27±5.49	0.17
4th Hour	88.17±5.71	88.05±5.25	0.51
6th Hour	88.92±5.74	87.17±5.75	0.23
10th Hour	89.58±5.12	87.08±5.70	0.10
12th Hour	90.83±4.94	88.38±5.12	0.23
18th Hour	91.18±5.19	89.83±4.94	0.09
24th Hour	92.67±5.74	91.43±5.19	0.24

Heart rate was comparable in both the groups at all the intervals as p>0.05 (graph 1). Graph 2 shows the comparative incidence of various side effects in both the groups which were observed in the intra-op and post-op period. All the side effects viz. nausea, vomiting and pruritis were comparable in both the groups as p>0.05.



Graph 1: Heart rate comparison at different intervals among the study groups



Graph 2: Side effects among the study groups

Discussion: The use of FICB has been shown to be effective in controlling pain in both fracture of femur and hip fracture. Multiple studies support this finding stating that FICBs following fracture of femur are effective and easily performed. So this study was designed to compare analgesic effect of fentanyl and FICB for mitigating pain during positioning before subarachnoid block as well postoperative analgesia for proximal femur fracture surgery[18]. At baseline and after the respective block in group A and B; VAS score was comparable as $p>0.05$. During positioning for subarachnoid block, pain 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 subarachnoid block, immediate post-op, at 1st hour and 2nd hour. At 6th hour VAS score was higher in group B patients in comparison with group A due to fading effect of FICB with significant difference in $p<0.05$(0.043). After that VAS score was comparable in both the groups till 24th hours in our study. **Ghimire et al[19]** reported that preoperative FNB and FICB reduce pain score during positioning, shortens time to perform spinal anesthesia, better patient positioning and higher patient acceptance in an elective femoral bone fracture surgery. FICB was more effective in reducing pain than i/v fentanyl which is similar to the present study. **Yun et al[20]** concluded that FICB with ropivacaine is more efficacious than IV alfentanil in terms of facilitating the lateral position for spinal anesthesia in elderly patients undergoing surgery for femoral neck fractures. **Hogg et al[21]** compared FICB to intravenous ketamine for pain

control before positioning for spinal anesthesia and found FICB to be superior. In our study, we used I/V Fentanyl instead of ketamine and found FICB to be superior. **Melaku Bantie et al**[2] in their study found preoperative FNB and FICB reduce pain score during positioning and, shorten time to perform spinal anesthesia, better patient positioning and higher patient acceptance in a patient undergoing elective femur fracture surgery. Our study is also similar with above studies. The time for rescue analgesia was comparatively shorter (280±61.70min) in the patients who were administered i/v fentanyl (group A) as compared to 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 (group B) were clearly evident from the lesser Tramadol consumption (104.86±43.22mg)in 24 hours for postoperative analgesia as compared to fentanyl (group A) (146.67±56.74mg) (P=<0.01). The single-shot FICB actually provided postoperative analgesia, which is especially advantageous in the elderly population where opioid analgesics are to be avoided. **Amarnath Naik Korra et al**[22] concluded that time for first rescue analgesic dose in FICB group was after 5.90±0.80 hrs compared to 1.65±0.60 hrs in i/v fentanyl group. (P<0.0001). Rescue analgesia requirement was less in the FICB group compared to intravenous fentanyl group, which is similar to our study. **Nerav Jentilal et al**[23] observed that the mean total duration of analgesia in group1(FICB) was 428.3 min after spinal anesthesia, whereas in Group 2(sham block), the mean total duration of analgesia was 240.1 min. There is increase in total duration of analgesia in postoperative period in patients of Group 1 in comparison to patients of Group 2 (P< 0.05). Similarly in our study the requirement of first rescue analgesic dose in FICB group is at 400.00±61.70min and in i/v fentanyl group is at 280±61.70min. The mean systolic blood pressure, diastolic blood pressure, MAP, and heart rate at all time intervals were comparable in both the groups. Hence, we concluded that FICB do not alter the hemodynamic profile of patients. **Nirav Jentilal Kacha et al**[23] and **Amarnath Naik Korra et al**[22] reported that FICB does not cause any hypotension. There was no statistically significant difference in systolic blood pressure, diastolic blood pressure, and mean pulse rate between Group 1 and Group 2 at the time of positioning for spinal anesthesia in patients, which is similar to our study. All the side effects viz. nausea, vomiting and perineal pruritis were comparable in both the groups as p>0.05 in our study. Incidence of all the side effects was low and easily manageable. **Melaku Bantie** et al[2] in their study found that there were no procedure-related complications like hypotension, bradycardia, adverse systemic toxicity, vomiting, respiratory depression, nerve injury and bleeding at the site of the block. FICB is considered as safe and effective procedure for providing analgesia with very few complications. In our study, we observed that there was no incidence of any serious complication, i.e., aspiration of blood in syringe during block, hematoma formation at injection site, postprocedural neurological deficit, signs of local anesthetic agent toxicity, failure of block, or infection at local site in postprocedural period. The FICB technique is associated with minimal risk because the puncture is made at a safe distance from the femoral artery and femoral nerve. Hence, there are less chances of vascular puncture, paresthesia, or intraneural injection of drug.

Limitation: There are various systems used for grading the severity of femur fractures. Patients with varying grades of fracture may experience pain according to severity of fracture so that a patient with a displaced fracture may be in more severe pain. This variable was not taken into account while comparing pain scores between the groups.

Conclusion: It is concluded that USG guided FICB 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 in the postoperative period. FICB is a safe procedure for mitigating pain during positioning before subarachnoid block as well postoperative analgesia for proximal femur fracture surgery with remarkable safety profile**.**

References

1. Agarwal-Harding KJ, Meara JG, Greenberg SL, Hagander LE, Zurakowski D, Dyer GS. Estimating the global incidence of femoral fracture from road traffic collisions: a literature review. JBJS. 2015;97(6):e31
2. Bantie M, Mola S, Girma T, Aweke Z, Neme D, Zemedkun A. Comparing Analgesic Effect of Intravenous Fentanyl, Femoral Nerve Block and Fascia Iliaca Block During Spinal Anesthesia Positioning in Elective Adult Patients Undergoing Femoral Fracture Surgery: a Randomized Controlled Trial. Journal of Pain Research. 2020;13:3139.
3. Kennedy RM, Luhmann JD, Luhmann SJ. Emergency department management of pain and anxiety related to orthopedic fracture care: A guide to analgesic techniques and procedural sedation in children. Paediatr Drugs. 2004;6:11–31.
4. Benyamin R, Trescot AM, Datta S, Buenaventura R, Adlaka R, Sehgal N, et al. Opioid complications and side effects. Pain Physician. 2008; 11 (2 Suppl): S105–20.
5. Pu X, Sun J-M. General anesthesia vs spinal anesthesia for patients undergoing total-hip arthroplasty: A meta-analysis. Medicine. 2019;98:16.

6. Van Waesberghe J, Stevanovic A, Rossaint R, Coburn M. General vs. neuraxial anaesthesia in hip fracture patients: a systematic review and meta-analysis. BMC Anesthesiol. 2017;17(1):87.
7. Lončarić-Katušin M, Mišković P, Lavrnja-Skolan V, Katušin J, Bakota B, Žunić J. General versus spinal anaesthesia in proximal femoral fracture surgery–treatment outcomes. Injury. 2017;48:S51– S5.
8. Johnson MZ J. Perioperative regional anaesthesia and postoperative longer-term outcomes. F1000Research. 2016;5.
9. Diakomi MPM, Mela A, Kouskouni E, Makris A. Preoperative fascia iliaca compartment block for positioning patients with hip fractures for central nervous blockade: a randomized trial. Reg Anesth Pain Med. 2014;39(5):394–398.
10. Jadon A, Kedia SK, Dixit S, Chakraborty S. Comparative evaluation of femoral nerve block and intravenous fentanyl for positioning during spinal anaesthesia in surgery of femur fracture. Indian J Anaesth. 2014;58(6):705–708. doi:10.4103/0019-5049.147146
11. Parkinson SK, Mueller JB, Little WL, Bailey SL. Extent of blockade with various approaches to the lumbar plexus. Anesthesia and analgesia. 1989 Mar 1;68(3):243-8.
12. Dalens B, Vanneuville G, Tanguy A. Comparison of the fascia iliaca compartment block with the 3-in-1 block in children. Anesthesia & Analgesia. 1989 Dec 1;69(6):705-13.
13. Jones MR, Novitch MB, Hall OM, Bourgeois AP, Jeha GM, Kaye RJ, Orhurhu V, Orhurhu MS, Eng M, Cornett EM, Kaye AD. Fascia iliaca block, history, technique, and efficacy in clinical practice. Best Practice & Research Clinical Anaesthesiology. 2019 Dec 1;33(4):407-13.
14. Pepe J, Madhani NB. Ultrasound-guided fascia iliaca compartment block. StatPearls Publishing LLC, Treasure Island, FL, USA, 2020.
15. Nagel EM, Gantioque R, Taira T. Utilizing ultrasound-guided femoral nerve blocks and fascia iliaca compartment blocks for proximal femur fractures in the emergency department. Advanced emergency nursing journal. 2019 Apr 1;41(2):135-44.
16. Faiz SHR, Derakhshan P, Imani F, Alebouyeh MR, Rahimzadeh P, Memarian A. A comparative study on the effect of femoral nerve block (FNB) versus fascia iliaca compartment block (FIC) on analgesia of patients with isolated femoral shaft fracture under spinal anesthesia. Trauma Monthly. 2018;23(5).
17. Ghimire A, Bhattarai B, Koirala S, Subedi A. Analgesia before performing subarachnoid block in the sitting position in patients with proximal femoral fracture: a comparison between fascia iliaca block and femoral nerve block. Kathmandu Univ Med J. 2015;13:152–155.
18. Wennberg P, Möller M, Herlitz J, Kenne Sarenmalm E. Fascia iliaca compartment block as a preoperative analgesic in elderly patients with hip fractures–effects on cognition. BMC geriatrics. 2019 Dec;19(1):1-8.
19. Ghimire A, Bhattarai B, Koirala S, Subedi A. Analgesia before performing subarachnoid block in the sitting position in patients with proximal femoral fracture: a comparison between fascia iliaca block and femoral nerve block. Kathmandu Univ Med J. 2015;13:152–155.
20. Hsu Y-P, Hsu C-W, Chu KCW, et al. Efficacy and safety of femoral nerve block for the positioning of femur fracture patients before a spinal block - A systematic review and meta-analysis. PLoS One. 2019;14(5):e0216337–e.
21. Hogg RM, Lappin EL, Stevenson M, Shields MO, Mirakhur RK. Comparison of fascia iliaca compartment block with conventional sedation to facilitate the positioning of patients with fractured neck of femur for spinal anaesthesia: 8AP5–4. European Journal of Anaesthesiology (EJA). 2010 Jun 12;27(47):138-9.
22. Korra AN, Brahmaroutu RK, Rao AK. Comparative evaluation between fascia iliaca compartment block and intravenous fentanyl administration for painless positioning during spinal Anaesthesia in fracture femur surgeries: A randomized controlled study. IJMA. 2020;3(1):306-10.
23. Kacha NJ, Jadeja CA, Patel PJ, Chaudhari HB, Jivani JR, Pithadia VS. Comparative study for evaluating efficacy of fascia iliaca compartment block for alleviating pain of positioning for spinal anesthesia in patients with hip and proximal femur fractures. Indian Journal of Orthopaedics. 2018 Apr;52(2):147-53.