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Fascia Iliaca Compartment Block in the Emergency Room in Hip Fracture and Shaft of Femur Fractures

ADITYA CHANDRAMOHAN*, PADMAPRAKASH GANDHIRAJ†, ABDUL KHADER‡, JUDE VINOTH#

ABSTRACT

Fascia iliaca block, a well-established method of local anesthesia, is underused in the emergency department. This study aimed at assessing the efficacy, ease of administration by a junior doctor, and the reduction of opioid requirement in patients with fractures of hip and shaft of femur. In this prospective randomized blinded case-control study, 57 patients were randomly assigned into case and control groups to receive 0.25% ropivacaine and 0.9% normal saline (NS) in the fascia iliaca space, respectively, with fentanyl as on demand analgesia titrated to response in both groups. There was a significant difference between the two groups in the visual analog scale between 2 and 6 hours. The reduction in pain score was statistically significant in the case group (from its baseline) compared to the control group (from its baseline). The opioid requirement was also significantly reduced in the case group compared to the control group. The study was effective in demonstrating that fascia iliaca block was successful at reducing the need for opioid analgesia and that it could be performed without much complication by a relatively inexperienced clinician.

Keywords: Fascia iliaca block, hip fracture, fracture of shaft of femur, opioid need, analgesia

The fascia iliaca compartment block was first described by Dalens et al[1] using a landmark technique on children. It is a low-skill method to provide analgesia in patients with pain in the thigh and hip joint. Use of ultrasound can increase the rate of successful blocks. The nervous supply to the leg is through four nerves: sciatic nerve, femoral nerve, obturator nerve and lateral femoral cutaneous nerve, all of which arise from the lumbar and sacral plexus.

Hip fractures are among the common fractures sustained by the elderly. It is difficult for the emergency physician to give adequate analgesia, keeping in mind the multiple comorbidities these patients tend to have. However, analgesia is fast becoming top priority of patients and attendees presenting to the emergency department. It is this need that the present study aims to exploit, assessing the consistency of providing acceptable levels of pain relief for an adequate duration with minimal expertise, minimal side effects and complications.

The procedure followed for this study involves very little expenditure to the patient, is quick to perform and has a smooth learning curve.

The study is based on the hypothesis that use of local analgesia reduces the dose and need for systemic opioids, provides adequate duration of relief for investigative procedures, imaging and until splinting can be done. Good pain relief has been shown to reduce morbidity, duration of hospital stay and improve patient satisfaction. With the majority of hospitals embracing the concept of emergency departments, this procedure will be a useful tool to the budding emergency physician.

MATERIAL AND METHODS

Fifty-seven patients were randomly sorted into either a case or a control group by coin toss method. All patients were given 1 g IV paracetamol as initial analgesia. The patients in the case group were administered 50 mL of 0.25% ropivacaine (max 3 mg/kg) in the fascia iliaca compartment with fentanyl as the rescue drug. The same

*PG Trainee, Dept. of Emergency Medicine
†Consultant In-Charge, ICU
‡Senior Consultant Anesthetist
#Consultant In-Charge, Dept. of Emergency Medicine
Apollo Speciality Hospitals, Madurai, Tamil Nadu
Address for correspondence
Dr Aditya Chandramohan
Apollo Speciality Hospitals, Madurai, Tamil Nadu
E-mil: aditya.chandramohan@gmail.com

was done for patients in the control group replacing the ropivacaine with 0.9% normal saline (NS). The patient and nurse assessing the pain score were blinded to the agent administered in the fascia iliaca space.

The fascia iliaca block was administered as a blind procedure using the 2-pop technique with a blunt 21 gauge needle. The clinician administering the block were junior doctors after 6 months of training in the emergency department (Having observed at least 5 and assisted in 5 fascia iliaca block administrations).

The statistical analysis was performed by STATA 11.2 (College Station TX USA). Chi-square test was used to measure the association between diabetes, hypertension, chronic obstructive pulmonary disease (COPD), coronary artery disease (CAD) with treatment groups (Cases and Control), respectively, and is expressed as frequency and percentage. Heart rate, SpO_2, blood pressure and pain score were collected from baseline to 6 hours, Shapiro-Wilk test was used to check the normality. Student's *t*-test was used to find the significance of difference between the age, heart rate, SpO_2, blood pressure, pain score and total fentanyl with treatment groups (Cases and Control), respectively, and these parameters were reported as mean and standard deviation. $P < 0.05$ was considered as statistically significant.

RESULTS

In this study, mean age of patients was 68.23 for the case group and 68.73 for the control group (Fig. 1). Of the 31 patients in the case group, 13 were female. Of the 26 patients in the control group, 13 were female (Fig.2).

The average pain score at arrival was 7.42 in the case group and 6.73 in the control group. The pain score dropped significantly from 30 minutes to 1 hour. The reduction was more in the case group. The case group also showed a greater drop in pain score in each hour. The drop was sustained for 5 hours after which it started rising (Fig. 3).

Figure 4 gives a better idea of the drop in pain score by measuring the difference, on the visual analog scale (VAS), in pain score at each hour from the baseline. This shows that a significant reduction occurred by 30 minutes to 1 hour. The control group, in contrast, has not shown a major drop in pain score. The difference in pain score from baseline is also much lower in the control group compared to the case group.

The secondary objective of the study was to assess the amount of analgesics required to control the break-through pain. The case group on average required 79 µg

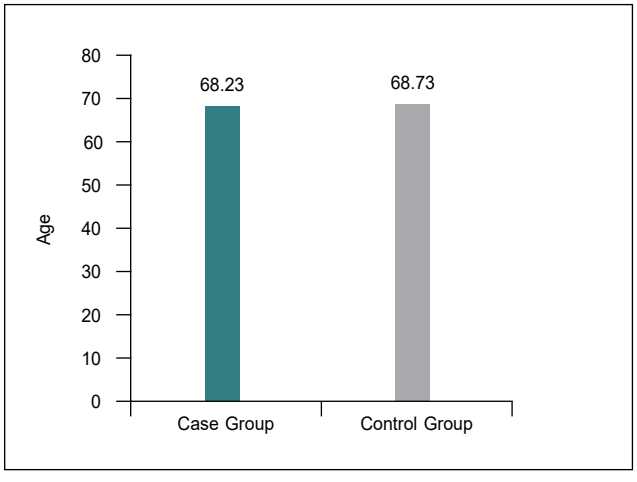

Figure 1. Demographics: Age.

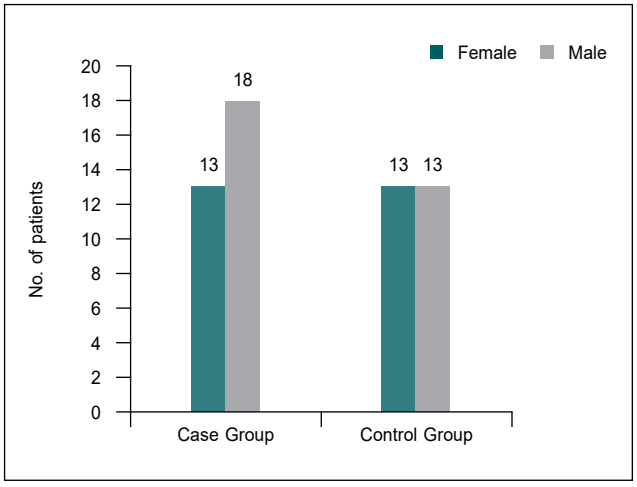

Figure 2. Demographics: Gender.

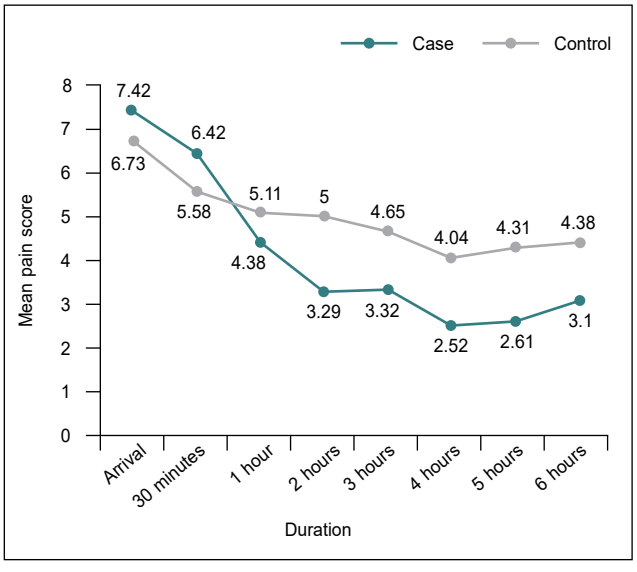

Figure 3. Pain score.

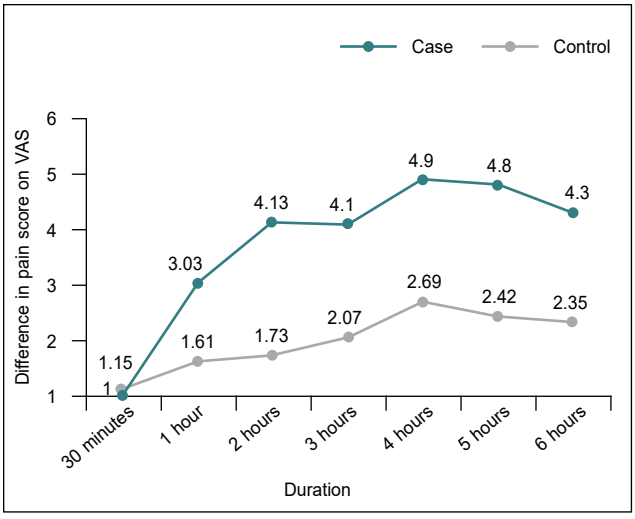

Figure 4. Pain score difference at each hour from baseline.

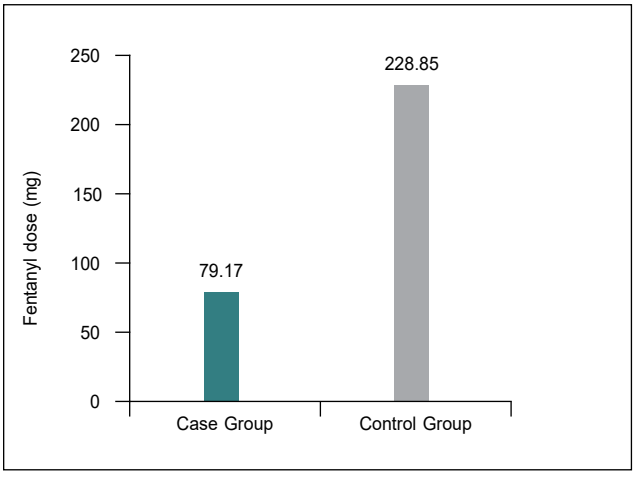

Figure 5. Total fentanyl requirement.

whereas the control group required significantly higher amounts of fentanyl (228 μg) to control the pain (Fig. 5).

DISCUSSION

Fascia iliaca blocks have been studied and practiced in the countries with well-developed emergency and pre-hospital care and worldwide in the operation theater by the anesthetists.

There have been many studies comparing fascia iliaca block with 3-in-1 block, systemic analgesia, etc.

The aim of this study was to assess the efficacy of the fascia iliaca block in the emergency department (ED) in an Indian setup when delivered by a junior resident. The study was done including all junior residents as procedure performing doctors.

The results of this study have been promising with quick onset and acceptable duration of pain relief. The pain relief has been consistent in majority of patients. Very few patients did not respond favorably in terms of pain score.

The study has been relatively inexpensive to the patient while offering considerable and consistent pain relief while in the ED. We would like to compare the results of this study with some of the earlier studies.

In 30 patients with hip fractures, a study found that pain reduced by a pain score of around 3 (by VAS) in 1 hour. It also allowed patients to sit up in bed (hip flexion) with less pain.[2] Our study has a similar onset of pain relief with comparable reduction in pain scores. The degrees of hip flexion post block were not studied in our patients but they were reportedly more comfortable than before, corresponding to the drop in pain score.

A study assessed pre-hospital analgesia with 20 mL of 1.5% lignocaine and epinephrine by the fascia iliaca technique. The study was done on 27 patients. Pain relief was assessed by a simplified pain score. Sensory blockade was assessed in the three compartments of the thigh. Fascia iliaca compartment block was found to be an effective method of pre-hospital analgesia for femoral shaft fracture.[3] The results of our study show that adequate relief was obtained with much lower doses of ropivacaine (50 mL of 0.25% ropivacaine).

In a study assessing fascia iliaca block in the ED, it was performed by the attending ED physician. Investigators reported average pain of 8.5 using the VAS prior to the block. At 15-minute post-injection, it averaged 2.9; at 2-hour post-injection, it averaged 2.3 and at 8-hour post-injection, it averaged 4.4.[4] The onset of relief was much faster and there was a steeper drop in their study compared to ours, which had a more gradual drop. But the duration of relief seems to be comparable; however, our study did not evaluate at the 8-hour mark.

A double-blind placebo-controlled trial was done which used morphine instead of fentanyl and mepivacaine instead of ropivacaine. They also measured pain both at rest and with 15 degrees leg lift.[5] They have reported a lower success rate of around 67%. But the successful blocks had comparable pain relief.

In a study involving a group of 20 patients with intact cognition and isolated hip fractures, ultrasound was used to guide their block placement. The procedure was done by emergency physicians after a short training. They reported a 76% drop in pain score from baseline at 2 hours after block placement.[6] In our study, there was 56-60% drop in pain score at 2 hours.

In a study assessing fascia iliaca block delivered by trained nurses in the ED, 35 patients were included. Thirty milliliters of 0.25% bupivacaine was the agent used to establish the block. Nearly 72.7% and 77.4% of the patients, respectively, had pain score ≤4 at 2-hour and 8-hour after the block, while 80% of the patients had that score at 24 hours.[7] Our study had a comparable pain relief at 2 and 6 hours. Our study did not follow the pain score beyond the 6-hour mark.

A study compared fascia iliaca block delivered by blind and ultrasound-guided techniques. Eighty patients posted for unilateral hip or knee joint replacement surgery were randomized into two groups. Both sensory and motor blockade of all three compartments of the thigh were assessed. Investigators found a greater incidence of sensory blockade of the medial compartment, and motor blockade of the femoral and obturator nerves in the group with ultrasound-guided block.[8] Our study did not consider sensory or motor blockade as markers of pain relief. But ultrasound guidance can enhance the rate of successful blockade in the ED.

In a case series of 3 cases who happened to be elderly individuals taking P2Y12 inhibitors, the patients had sustained a hip fracture and were posted for surgery. Investigators reported that the fascia iliaca block with 20 cc 0.5% ropivacaine + 15 cc 1.5% mepivacaine when coupled with deep sedation (low-dose propofol infusion) was effective enough for the surgery with no signs of respiratory/hemodynamic instability.[9]

LIMITATIONS

- The study was done in a single center with a limited number of patients.
- Pain score was assessed subjectively with a pain score at rest and no attempt was made to assess it with movement.

CONCLUSION

The fascia iliaca block can be used to effectively deliver anesthesia to patients with hip fractures and proximal femur fractures with few complications. It also brings down the requirement for opioid analgesia.

REFERENCES

1. Dalens B, Vanneuville G, Tanguy A. Comparison of the fascia iliaca compartment block with the 3-in-1 block in children. Anesth Analg. 1989;69(6):705-13.
2. Candal-Couto JJ, McVie JL, Haslam N, Innes AR, Rushmer J. Pre-operative analgesia for patients with femoral neck fractures using a modified fascia iliaca block technique. Injury. 2005;36(4):505-10.
3. Lopez S, Gros T, Bernard N, Plasse C, Capdevila X. Fascia iliaca compartment block for femoral bone fractures in prehospital care. Reg Anesth Pain Med. 2003;28(3):203-7.
4. Monzon DG, Iserson KV, Vazquez JA. Single fascia iliaca compartment block for post-hip fracture pain relief. J Emerg Med. 2007;32(3):257-62.
5. Foss NB, Kristensen BB, Bundgaard M, Bak M, Heiring C, Virkelyst C, et al. Fascia iliaca compartment blockade for acute pain control in hip fracture patients: a randomized, placebo-controlled trial. Anesthesiology. 2007;106(4):773-8.
6. Haines L, Dickman E, Ayvazyan S, Pearl M, Wu S, Rosenblum D, et al. Ultrasound-guided fascia iliaca compartment block for hip fractures in the emergency department. J Emerg Med. 2012;43(4):692-7.
7. Obideyi A, Srikantharajah I, Grigg L, Randall A. Nurse administered fascia iliaca compartment block for pre-operative pain relief in adult fractured neck of femur. Acute Pain. 2008;10(3-4):145-9.
8. Dolan J, Williams A, Murney E, Smith M, Kenny GN. Ultrasound guided fascia iliaca block: a comparison with the loss of resistance technique. Reg Anesth Pain Med. 2008;33(6):526-531.
9. Almeida CR, Francisco EM, Pinho-Oliveira V, Assunção JP. Fascia iliaca block associated only with deep sedation in high-risk patients, taking P2Y12 receptor inhibitors, for intramedullary femoral fixation in intertrochanteric hip fracture: a series of 3 cases. J Clin Anesth. 2016;35:339-45.

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Malnutrition Tied to Worse Outcomes After Heart Attack

Investigators in a large observational study from Spain have found a strong association between malnutrition and worse outcomes in acute coronary syndrome (ACS). Malnutrition was found to have a significant association with increased risk for all-cause death over a median of 3.6 years after hospitalization for heart attack - Controlling Nutritional Status (CONUT): adjusted HR 2.02 for moderate malnutrition (95% CI 1.65-2.49) and 3.65 for severe nutrition (95% CI 2.41-5.51); Nutritional Risk Index (NRI): adjusted HR 1.40 for moderate malnutrition (95% CI 1.17-1.68) and 2.87 for severe nutrition (95% CI 2.17-3.79); Prognostic Nutritional Index (PNI): adjusted HR 1.71 for moderate malnutrition (95% CI 1.37-2.15) and 1.95 for severe nutrition (95% CI 1.55-2.45). The findings were published in the *Journal of the American College of Cardiology…* (*Medpage Today*)