



International Journal of Anesthesiology Research

E-ISSN: 2664-8857

P-ISSN: 2664-8849

www.anesthesiologyjournal.in

IJAR 2023; 5(1): 11-14

Received: 13-10-2022

Accepted: 24-12-2022

Rithwik Rajeev

Assistant Professor, Sree Gokulam Medical College and Research Foundation, Trivandrum, Kerala, India

Mohammed Iqbal

Junior Resident, Sree Gokulam Medical College and Research Foundation, Trivandrum, Kerala, India

Corresponding Author:

Mohammed Iqbal

Junior Resident, Sree Gokulam Medical College and Research Foundation, Trivandrum, Kerala, India

Fascia iliaca compartment block using ropivacaine 0.5% for postoperative analgesia in lowerlimb orthopaedic surgeries

Rithwik Rajeev and Mohammed Iqbal

DOI: <https://doi.org/10.33545/26648849.2023.v5.i1a.27>

Abstract

Background and Purpose: Conventional treatment of postoperative pain with routine analgesics during orthopaedic surgery leads to undesirable side effects, especially in the elderly. Therefore, this study was designed to evaluate the efficacy of compartment block of the fascia iliaca in postoperative analgesia with ropivacaine.

Methods: We performed compartment block of the fascia iliaca with 30 ml of 0.5% ropivacaine in 20 patients undergoing lower limb orthopaedic surgery under general anaesthesia.

Results: Verbal pain score (VPS) decreased significantly 1 hour after blockade, and the mean duration of analgesia was 4.85 ± 2.86 hours.

Conclusion: Compartmental block of the iliac fascia is a very useful method for postoperative analgesia in orthopaedic procedures of the lower limbs.

Keywords: Fascia iliaca compartment block, postoperative analgesia, ropivacaine, lower limb orthopaedic surgery, rescue analgesia

Introduction

The incidence of road traffic accidents resulting in pelvic, femoral and knee fractures is very high in India. Most of the patients require surgical treatment. Similarly, fractures of these bones due to falls and osteoporosis are common in old age and also require surgical treatment. Because these procedures are very painful, postoperative analgesia is usually provided with parenteral nonsteroidal anti-inflammatory drugs (NSAIDs) [1], opioids [2], and epidural analgesia [3, 4]. Complications and adverse effects are also common with these analgesic methods. Surgeries are usually performed under spinal or epidural anaesthesia, which bring their own known complications such as hypotension, bradycardia, spinal hematoma, and postdural puncture headache (PDPH) [5]. In addition, these techniques are difficult to perform in these patients due to positioning difficulties, non-operation, and age-related musculoskeletal changes [6]. Some patients have contraindications to central neuraxial blockade, such as patient refusal of anticoagulant therapy, local infection, and associated spinal injuries [5].

Fascia iliaca compartment block (FICB) is a simple procedure in which the local anaesthetic is injected under the fascia iliaca, effectively blocking the nerves of the lumbar plexus, such as the femoral nerve, obturator nerve, and lateral femoral cutaneous nerve, similar to a "3-in-1" block [7, 8, 9].

Ropivacaine, a newer local anaesthetic, is an enantiomer of bupivacaine with fewer cardiac and neurotoxic effects. It produces intense analgesia with less motor blockade than bupivacaine, which is preferable for early mobilisation in these patients. [10, 11].

In this study, we evaluated the effect of compartmental blockade of the fascia iliaca with ropivacaine 0.5% during hip, thigh, and knee surgery after the patient awoke from general anaesthesia.

Aim

Evaluation of the effect and duration of postoperative analgesia after fascia iliaca compartment block using ropivacaine 0.5% in hip, thigh, and knee surgery.

Materials and Methods

This was a descriptive observational study conducted in a tertiary medical university hospital in Trivandrum over a 6-month period from July 2022 to December 2022. Twenty adults between the ages of 16 and 75 years, classified according to the American Society of Anaesthesiologists classification I (ASA) and II, were enrolled in this study after obtaining written informed consent and approval from the institutional ethics committee

Patients scheduled for elective hip, thigh, and knee surgery were included in this study. Patients with cardiorespiratory conditions, psychiatric disorders, neurologic deficits, pregnancy, allergies to local anaesthetics, local infections, and anticoagulants were excluded from the study.

All of these patients received general anaesthesia. Glycopyrrolate 10 µg/kg, fentanyl 2µg/kg and ranitidine 50mg were administered intravenously as premedication. Patients were induced with 2mg/kg propofol and vecuronium 0.1mg/kg was used as skeletal muscle relaxant. Tracheal intubation was performed by direct laryngoscopy with an appropriately sized endotracheal tube (ETT). Anaesthesia was maintained with nitrous oxide (N2O) and oxygen (O2), 66% and 33%, respectively. Isoflurane 1% was used to eliminate consciousness. Patients were monitored with electrocardiogram (ECG), noninvasive blood pressure (NIBP), and pulse oximetry (SpO2). At the end of surgery, patients were anaesthetized with neostigmine 50µg/kg and glycopyrrolate 10µg/kg. After the patients woke up, the endotracheal tube was extubated and a fascia iliaca compartment block (FICB) with 30 ml of 0.5% ropivacaine (not more than 3 mg/kg) was performed in all patients. A line was drawn from the spina iliaca anterior superior to the pubic tuberosity. At a point 1 cm below the intersection of the medial two-thirds and lateral thirds of the above line, the skin was anaesthetized with lignocaine and an 18-G Tuohy needle was inserted. After the needle punctured the fascia lata and fascia iliaca 2 times, the drug was deposited after aspiration was negative for blood [12, 4].

Analgesia was assessed using the Verbal Pain Score (0 - no pain, 1 - mild pain, 2 - moderate pain, and 3 - severe pain) before blockade, 30 minutes, hourly up to 6 hours, every 2 hours up to 12 hours, and 24 hours after blockade. Variables such as time to first rescue analgesia and duration of pain relief were assessed over a 24-hour period after blockade. The duration of analgesia was calculated from the time of blockade to the time of first rescue analgesia. The rescue analgesic ketorolac 30 mg was administered intramuscularly when patients first complained of pain and the verbal pain score (VPS) was 2 or more. All patients were transferred to the postanesthesia care unit, and other variables (vital signs) such as pulse rate (PR), noninvasive blood pressure (NIBP), and percent oxygen saturation (SPO2) were recorded.

Statistical Analysis

Variables and data collected over 24 hours were entered into an Excel spreadsheet and analysed using SPSS version 16 software.

Results

The mean age of the patients was 40.20±13.49 years. The mean weight of the patients was 59.95±10.84 kg. The mean

duration of analgesia was 4.85±2.86 hours

Table 1: Agewise distribution

Age group (years)	Number of patients	Percentage %
20-30	6	30%
31-40	5	25%
41-60	9	45%
Total	20	100%

Table 2: Rescue analgesic requirements

Time interval	Dose in mg	Number of patients	Percentage %
0 -4 hrs	30	7	35%
4 -8 hrs	30	14	70%
8- 12 hrs	30	14	70%
12- 16 hrs	30	2	10%
16 – 20 hrs	30	14	70%
20 -24 hrs		4	20%

Table 3: VPS (Verbal pain score, 0- No pain, 1- Mild pain, 2- Moderate pain, 3- Severe pain)

VPS Score	Time				
	Preblock	First 1 hr	4 hrs	12 hrs	24 hrs
0	1(5%)	12(60%)	6(30%)	8(40%)	4(20%)
1	2(10%)	6(30%)	9(45%)	6(30%)	12(60%)
2	7(35%)	2(10%)	3(15%)	3(15%)	4(20%)
3	10(50%)	0(0%)	2(10%)	3(15%)	0(0%)
Total	20(100%)	20(100%)	20(100%)	20(100%)	20(100%)

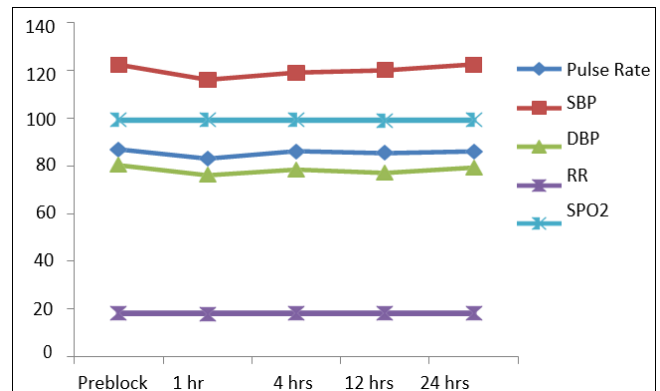


Fig 1: Mean plot of vital parameters

Discussion

Fracture pain is excruciating, especially with movement, and is difficult to eliminate with analgesics [8]. Nerve blocks are very useful because they provide intense pain relief. FICB is one of them and scores over other methods because it is easy to perform and does not cause nerve injury as the drug introduced into the compartment spreads and bathes the nerves. Hauritz *et al.* [13] demonstrated in his study that FICB is an appropriate method for acute pain relief in patients with hip fractures in whom the technique was performed by physicians in the emergency department. LT Jerrol B. Wallace *et al* compared FICB with 3-in-1 blockade in adults undergoing knee arthroscopy and meniscal repair and concluded that FICB is unique because it is simple and does not require advanced equipment to perform [14]. Studies have reported rare complications such as local hematoma, pneumoperitoneum, bladder injury, and transient neuropathy. We have not experienced any such complication [15, 16, 17, 18].

In addition, three nerves such as femoral nerve, obturator

nerve, and lateral cutaneous nerve of the thigh are blocked with a single injection. FICB has been compared with 3-in-1 blockade in several studies [7, 14, 9, 19]. Capdevila *et al.*, [20], compared 3-in-1 blockade with fascia iliaca blockade in adults and demonstrated that FICB is more effective than 3-in-1 blockade in simultaneously blocking the lateral femoral cutaneous nerve and the femoral nerves.

In our study, we used a single bolus injection of 30 ml of 0.5% ropivacaine. Ropivacaine results in excellent sensory blockade with less motor blockade, which is very useful for early mobility in the postoperative period, and cardiotoxic adverse effects are minimal compared with bupivacaine. This was demonstrated in a comprehensive study of the therapeutic use of ropivacaine in regional anaesthesia by Markham *et al.* [21].

Elizabeth Dulaney-Cripe *et al.*, [22] demonstrated the benefits of continuous preoperative fascial compartment blockade in combination with a comprehensive pain protocol measured by pain score, opioid consumption, and length of hospital stay. Several other studies such as Stevens M *et al.*, [23] and Foss NB *et al.*, [24] have demonstrated the morphine-sparing effect of FICB in patients with hip fractures.

In our study, the mean duration of pain relief was 4.85±2.86 hours. The maximum duration of pain relief was about 12 hours in one patient. One patient required an initial adjuvant analgesic as early as 1 hour after blockade, which could be due to blockade failure.

Before blockade, 85% of patients had significant pain with a VPS score of 2 and 3. However, 1 hour after blockade, only 10% of patients had severe pain (VPS 2 or more) and required first rescue analgesia. At 4 hours after blockade, only 35% of patients required rescue analgesia (VPS 2 or more). Even 12 hours after blockade, 35% of patients had no significant pain (VPS less than 2). This means that FICB with a single bolus of 0.5% ropivacaine is very effective in providing significant pain relief in the majority of patients in the first 4-6 hours.

Vital signs were monitored at regular intervals for 24 hours and recorded on a line graph. All parameters were within an acceptable range, indicating that the blockade did not cause hemodynamic impairment

Conclusion

With this study, we conclude that FICB with a single bolus of 0.5% ropivacaine is very effective in providing significant pain relief in the majority of patients in the first 4-6 hours. It is also simple to perform and without serious adverse effects. More extensive studies on this technique with a large sample would confirm our results.

Conflict of Interest

Not available

Financial Support

Not available

References

- Ballantyne JC. Use of nonsteroidal antiinflammatory drugs for acute pain management. *Probl Anesth.* 1998;10:23-36.
- Epstein FH, Stein C. The control of pain in peripheral tissue by opioids. *N Engl J Med.* 1995;332(25):1685-90.
- Liu S, Carpenter RL, ONEAL J. Epidural anesthesia and analgesia. Their role in postoperative outcome. 1995.
- Malti Pandya, Savita Jhanwar. Comparative study of fascia iliaca compartment block and three in one block for postoperative analgesia in patients undergoing lower limb orthopedic surgeries. *Indian J Pain;* c2014 Nov, 28(3).
- Ronald D. Miller. *Miller's Anesthesia.* 8th ed. Elsevier Saunders; c2015.
- Yun MJ, Kim YH, Han MK, Kim JH, Hwang JW, Do SH. Analgesia before a spinal block for femoral neck fracture: fascia iliaca compartment block. *Acta Anaesthesiol Scand.* 2009 Nov;53(10):1282-7.
- 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.
- Paria R, Surroy S, Majumder M, Paria B. Role of Preoperative Fascia Iliaca Compartment Block On The Side Of Femur Surgery.
- Deniz S, Atım A, Kürklü M, Çaycı T, Kurt E. Comparison of the postoperative analgesic efficacy of an ultrasound-guided fascia iliaca compartment block versus 3 in 1 block in hip prosthesis surgery. *Ağrı Ağrı Algoloji Derneğinin Yayın Organıdır J Turk Soc Algol.* 2014;26(4):151.
- Kuthiala G, Chaudhary G. Ropivacaine: A review of its pharmacology and clinical use. *Indian J Anaesth.* 2011;55(2):104.
- Greengrass RA, Klein SM, D'Ercole FJ, Gleason DG, Shimer CL, Steele SM. Lumbar plexus and sciatic nerve block for knee arthroplasty: comparison of ropivacaine and bupivacaine. *Can J Anaesth.* 1998;45(11):1094-6.
- Anaraki AN, Mirzaei K. The effect of fascia iliaca compartment block versus gabapentin on postoperative pain and morphine consumption in femoral surgery, a prospective, randomized, double-blind study. *Indian J Pain.* 2014;28(2):111.
- Hauritz RW, Gerlif C, Rønholm E. [Fascia iliaca block performed by emergency department physician trainees in hip fractures]. *Ugeskr Laeger.* 2009;171(7):515-8.
- Wallace JB, Andrade JA, Christensen JP, Osborne LA, Pellegrini JE. Comparison of fascia iliaca compartment block and 3-in-1 block in adults undergoing knee arthroscopy and meniscal repair. *AANA J.* 2012;80(4 Suppl):S37-44.
- Reavley P, Montgomery AA, Smith JE, Binks S, Edwards J, *et al.* Randomised trial of the fascia iliaca block versus the "3-in-1" block for femoral neck fractures in the emergency department. *Emerg Med J;* c2014. Emermed- 2013-203407.
- Blackford D, Westhoffen P. Accidental bladder puncture: a complication of a modified fascia iliaca block. *Anaesth Intensive Care.* 2009;37(1):140.
- Shelley BG, Haldane GJ. Pneumoretroperitoneum as a consequence of fascia iliaca block. *Reg Anesth Pain Med.* 2006;31(6):582-3.
- Atchabahian A, Brown AR. Postoperative neuropathy following fascia iliaca compartment blockade. *Anesthesiology.* 2001;94(3):534-6.
- Morau D, Lopez S, Biboulet P, Bernard N, Amar J, Capdevila X. Comparison of continuous 3-in-1 and fascia iliaca compartment blocks for postoperative

- analgesia: feasibility, catheter migration, distribution of sensory block, and analgesic efficacy. *Reg Anesth Pain Med.* 2003;28(4):309-14.
20. Capdevila X, Biboulet PH, Bouregba M, Barthelet Y, Rubenovitch J, d'Athis F. Comparison of the three-in-one and fascia iliaca compartment blocks in adults: clinical and radiographic analysis. *Anesth Analg.* 1998;86(5):1039-44.
 21. Markham A, Faulds D. Ropivacaine. *Drugs.* 2012 Oct 31;52(3):429-49.
 22. Dulaney-Cripe E, Hadaway S, Bauman R, Trame C, Smith C, Sillaman B, *et al.* A continuous infusion fascia iliaca compartment block in hip fracture patients: a pilot study. *J Clin Med Res.* 2012;4(1):45.
 23. Stevens M, Harrison G, McGrail M. A modified fascia iliaca compartment block has significant morphine-sparing effect after total hip arthroplasty. *Anaesth Intensive Care.* 2007;35(6):949-52.
 24. 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.

How to Cite This Article

Rajeev R, Iqbal M. Fascia iliaca compartment block using ropivacaine 0.5% for postoperative analgesia in lowerlimb orthopaedic surgeries. *International Journal of Advanced Research in Medicine.* 2023;5(1):11-14.

Creative Commons (CC) License

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.