Fascia Iliaca Compartment block using Ropivacaine 0.5% for Postoperative Analgesia in Lowerlimb Orthopaedic Surgeries

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ABSTRACT

Background and Objectives: *Conventional management of post-operative pain using routine analgesics in orthopaedic surgeries results in undesirable side effects especially in elderly population. Hence this study was designed to assess the effectiveness of Fascia iliaca compartment block in postoperative analgesia using Ropivacaine.*
Methods: *We performed Fascia iliaca compartment block with 30 ml of 0.5% Ropivacaine in 20 patients postoperatively, who underwent lowerlimborthopaedic procedures under General anaesthesia.*
Results: *The Verbal pain score(VPS) considerably decreased 1 hr after the block and the mean duration of analgesia was 4.85 ± 2.86 hrs.*
Conclusion: *Fascia iliaca compartment block is very useful method of postoperative analgesia in lower limb orthopaedic procedures.*

Keywords: *Fascia iliaca compartment block, Postoperative analgesia, Ropivacaine, Lower limb orthopaedic surgeries, Rescue analgesia.*

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INTRODUCTION

The incidence of road traffic accidents leading to fracture pelvis, femur and knee is very high in India. Most of the patients need surgical treatment. Similarly fall and osteoporosis induced fractures of these bones are common in old age, who also come for surgical management. Since these procedures are very painful, we conventionally manage postoperative analgesia with parenteral Nonsteroidal anti-inflammatory drugs (NSAIDs)(1), Opioids(2) and Epidural analgesia(3)(4). The complications and adverse effects are also common in these analgesic methods. Surgeries are performed usually under spinal or epidural anaesthesia which have got their own well known complications like hypotension, bradycardia, spinal hematoma and Postdural puncture headache (PDPH)(5).And also performing these techniques will be difficult in these patients due to difficulty in positioning, unco-operation and musculoskeletal changes of old age.(6) Some patients have contraindications for central neuraxial blockade such as patient refusal, anticoagulant therapy, local infection and associated spinal injuries.(5)

Fascia iliaca compartment block (FICB) is simple, by injecting the local anaesthetic beneath the iliacus fascia which effectively blocks the nerves of lumbar plexus such as femoral, obturator and lateral cutaneous nerve of thigh similar to "3 in 1" block(7)(8)(9)

Ropivacaine, a newer local anaesthetic agent, is enantiomer of bupivacaine with less cardiac and neurotoxic effects. It produces intense analgesia with less motor blockade compared to bupivacaine which is preferable in these patients for early mobilization. (10)(11)

In this study we assessed the effect of fascia iliaca compartment block using Ropivacaine 0.5 %, for surgeries involving hip, femur and knee after awakening the patient from general anaesthesia.

AIM

To assess the effect and duration of post operative analgesia following Fascia Iliaca Compartment Block using Ropivacaine 0.5% in hip, femur and knee surgeries.

MATERIALS AND METHODS

This is an observational descriptive study and was conducted in a tertiary care Medical College Hospital in Chennai for a period of 6 months from 2011 july to 2011 Dec. Twenty adults aged between 16 and 75 years assessed under American Society of Anaesthesiologists (ASA) classification I and II were included in this study after obtaining written informed consent and institutional ethical committee approval.

The patients planned for elective hip, femur and knee surgeries were enrolled for this study. Patients with cardiorespiratory ailments, psychiatric illness, neurological deficits, pregnancy, local anaesthetic allergy, local infection and anticoagulant therapy were excluded from the study.

All these patients were given general anaesthesia. Glycopyrrolate 10 µg/kg, fentanyl 2µg/kg and ranitidine 50mg were given as premedication through intravenous route. Patients were induced with 2mg/kg propofol and vecuronium 0.1mg/kg was used as skeletal muscle relaxant. Tracheal intubation was achieved using direct laryngoscopy with appropriate size endotracheal tubes(ETT). Anesthesia was maintained with nitrous oxide (N_2O) and oxygen(O_2), 66 % and 33% respectively . Isoflurane 1 % was used to knock off the awareness. Patients were monitored with electrocardiogram(ECG), noninvasive blood pressure(NIBP) and pulse oximetry(SpO_2). At the end of surgery, patients were reversed with neostigmine 50µg/kg and glycopyrrolate 10µg/kg. After awakening the patient, endotracheal tube was extubated and Fascia Iliaca Compartment Block (FICB) was performed in all patients using 30ml of 0.5% Ropivacaine (not to exceed 3mg/kg). A line was drawn from anterior superior iliac spine to the pubic tubercle. At a point 1 cm below the junction of medial two thirds and lateral one third of the above line, skin was anaesthetised with lignocaine and 18G Tuohy needle was inserted. After getting 2 pop off's due to the needle passing through the fascia lata and fascia iliaca, drug is deposited after aspiration for blood is negative.(12)(4)

Analgesia was assessed using Verbal Pain Score (0- No pain,1-Mild pain, 2-Moderate pain and 3-Severe pain) at prior to the block, 30 minutes , hourly upto 6 hrs, 2ndhrlyupto 12 hrs and at 24hr after the time of block. Variables such as time for first rescue analgesia, duration of pain relief were assessed over a period of 24 hrs from the time of block. The duration of analgesia was calculated from the time of block to the time for first rescue analgesic dose. Rescue analgesic ketorolac 30 mg was given intramuscularly, when the patients first complained of pain if the Verbal Pain Score(VPS) is 2 or more. All the patients were shifted to post anaesthesia care unit and other variables (vital parameters) such as pulse rate (PR), noninvasive Blood Pressure (NIBP) & percentage of oxygen saturation (SPO_2) were recorded.

STATISTICAL ANALYSIS

The variables and the data collected over 24 hrs were fed in excel sheet and analysed using SPSS software version 16.

RESULTS

The mean age of the patients was 40.20 ±13.49 yrs. The mean weight of the patients was 59.95±10.84 kgs. The mean duration of analgesia was 4.85 ± 2.86 hrs.

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%

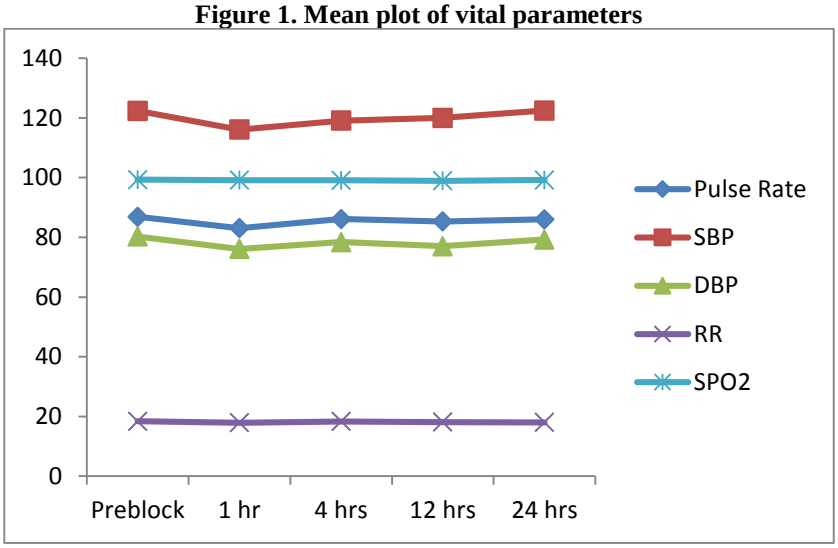
Table 2. Rescue analgesic requirements

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%)

Figure 1. Mean plot of vital parameters



DISCUSSION

Fracture pain is excruciating especially with movements which is very difficult to be abolished by analgesics.(8) Nerve blocks are really useful because they provide intense pain relief. FICB is one among them and scores over other methods since it is easy to perform and is devoid of nerve injuries as drug deposited into the compartment spreads and baths the nerves. Hauritz et al(13) in his study demonstrated that FICB is suitable method for acute pain relief in patients with hip fracture in whom the technique was performed by emergency dept. physician trainees. LT Jerrol B. Wallace et al did a comparison between FICB and 3 in 1 block in adults undergoing knee arthroscopy and meniscal repair and concluded that the FICB is unique because it is easy and no advanced equipment is needed to (14)studies have reported rare complications such as local hematoma, pneumoperitoneum, bladder injury, transient neuropathy. We didn't experience any such complication.(15)(16)(17)(18)

Also it blocks three nerves such as femoral,obturator and lateral cutaneous nerve of thigh in a single injection. FICB has been compared with three in one blocks by various studies.(7)(14)(9)(19) Comparison of 3-in-1 and fascia iliaca blocks in adults was done by Capdevila et al (20)who demonstrated that FICB is more effective than the 3-in-1 block in producing simultaneous blockade of the lateral femoral cutaneous nerve and femoral nerves and stated that the FICB is easy to perform, requires no expensive equipment and is accessed via a minimal risk approach.

In our study we used single bolus injection of 30 ml of 0.5% Ropivacaine. Ropivacaine produces excellent sensory block with less motor block which is very useful in early ambulation in the post-operative period and the cardiotoxic adverse effects are minimal compared to bupivacaine. This has been proved by an extensive trial on therapeutic use of ropivacaine in regional anaesthesia done by Markham et al. (21)

Elizabeth Dulaney-Cripe et al (22) demonstrated the benefits of a continuous fascia iliaca compartment block placed pre-operatively when combined with a comprehensive pain protocol as measured by pain score, opioid consumption, and hospital length of stay. Various other studies such as Stevens M et al (23)and Foss NB et al(24) have proved the morphine sparing effect of FICB in hip fracture patients.

In our study the mean duration of pain relief was 4.85± 2.86 hrs. The maximum duration of pain relief was for about 12 hrs in one patient. One patient required first rescue analgesic as early as 1 hr after the block which could have been due to block failure.

Prior to the block 85 % of the patients had significant pain with the VPS score of 2 and 3. But 1 hr after the block only 10 % of the patients had significant pain (VPS 2 or more) and required first rescue analgesia. At 4 hrs after the block only 35 % patients required rescue analgesia (VPS 2 or more). Even at 12 hrs after block 35 % of the patients didn't have significant pain (VPS less than 2). This implies that the FICB with a single bolus of 0.5 % Ropivacaine is very effective in providing considerale pain relief in majority of the patients in the first 4-6 hrs.

Vital parameters were monitored for 24 hrs at regular intervals and plotted in a line diagram. All the parameters were within acceptable range implying the block did not produce any hemodynamic compromise.

CONCLUSION

With this study we conclude that the FICB with a single bolus of 0.5 % Ropivacaine is very effective in providing considerale pain relief in majority of the patients in the first 4-6 hrs. Also it is simple to perform without serious adverse effects. More extensive trials in this technique in a large sample size would corroborate our results.

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