

Research Article**A prospective study to compare pericapsular nerve group (PENG) block versus fascia iliaca compartment block (FICB) for pain control in hip surgeries****Dr Manjushree P Babladi¹, Dr Harshita Muralidhar², Dr Amithkumar S K³**¹Assistant Professor, Department of Anesthesiology, Mahadevappa Rampure Medical College, Kalaburagi, India²Senior Resident, Department of Anesthesiology, Gulbarga Institute of Medical Sciences, Kalaburagi³Assistant Professor, Department of Anesthesiology, Mahadevappa Rampure Medical College, Kalaburagi**Abstract****Background**

Regional anesthesia techniques provide good postoperative analgesia leading to higher patient satisfaction and better outcomes. Fascia Iliaca compartment block (FICB) is a routinely used analgesic technique for hip surgeries but it does not provide enough analgesia. Hence, a novel block called Pericapsular nerve group (PENG) block is studied.

Aim : To compare the analgesic efficacy between PENG and FICB block.

Materials and methods

This prospective randomized study was conducted on 60 patients undergoing elective hip surgeries at Mahadevappa Rampure medical college between 2024-2025. Patients were randomly allocated into two groups of 30 each: Group A ($n = 30$) received PENG and Group B ($n = 30$) received FICB block. Pain scores (VAS), time to first rescue analgesia, opioid consumption and complications were noted.

Results

Both blocks provided effective postoperative analgesia. Mean VAS score significantly reduced in the PENG block group compared with the FICB group ($p = 0.034$; $p = 0.023$ respectively) at 15 minutes and 12 hours after block.

Conclusion

PENG block is an effective analgesic technique to provide postoperative analgesia in hip surgeries than FICB.

Key words: Hip surgeries, analgesia, Pericapsular nerve group block, Fascia iliaca compartment block

Introduction

Hip fracture patients suffer from severe pain upon arrival at the emergency department. Regional anesthesia techniques provide effective pain relief during preoperative and postoperative time period reducing opioid consumption and pain scores, leading to higher patient satisfaction and better outcomes.¹ It is known that the femoral nerve block and FICB are common regional analgesia techniques used to control pain in hip surgeries.^{2,3,4}

The Fascia Iliaca compartment (FICB) block is an effective analgesic technique for hip surgery, but analgesia from this block is only moderate.⁵ The literature suggests that the articular branches of obturator, the accessory obturator, and the femoral nerves that innervate anterior hip capsule are inconsistently blocked by this technique^{6,7,8,9}. A novel ultrasound-guided approach has been introduced recently as an effective analgesic technique of choice for hip surgeries which targets the articular branches of the hip, called PENG block.^{10,11,12} As there is limited literature on PENG effectiveness in hip fracture pain control, the current study was designed.

Materials and methods

Study design

A prospective, randomized, single blinded comparative study.

Study population

The study was conducted on 60 ASA grade I-II patients aged 18-60 years scheduled for elective hip surgeries at Mahadevappa Rampure medical college between 2024-2025.

Inclusion criteria

1. Elective hip surgeries (intertrochanteric fractures and femur neck fractures)
2. Age 18-60 years
3. ASA grade I-II patients

Exclusion criteria

1. Local site infections
2. Coagulopathy
3. Allergy to local anesthetics
4. Neuromuscular disorders
5. Mental illness

Groups

PENG group - Pericapsular nerve group block (30 patients)

FICB group – Fascia iliaca compartment block (30 patients)

Block technique

PENG block: The low-frequency (2–5 MHz) curvilinear ultrasound probe was placed parallel at the level of the anterior superior iliac spine. The iliopsoas muscle, femoral artery, and pectineus muscle was observed. 30ml of injection ropivacaine 0.25% was injected between the iliopsoas tendon and the superior pubis ramus in an in plane technique.

FICB block: A high-frequency (10–25 MHz) linear ultrasound probe was placed horizontally in the inguinal area. 30ml of injection ropivacaine 0.25% was injected between the iliac fascia and the iliopsoas muscle in an in plane technique.

Outcome

Primary outcome: VAS (visual analog scale) score was assessed before blocks procedure (baseline), 15 minutes, 30 minutes after blocks, at recovery room, and at 6 and 12 hours after block. 30 minutes after the block patients were placed in the sitting position for spinal anesthesia if they had $VAS \leq 3$.

Secondary outcome: Time to first rescue analgesia, total 24hr tramadol consumption and complications like nausea, vomiting, shivering, hypotension, and heart rate drop (more than 20% of baseline) were noted.

Statistical analysis

Data analyzed using IBM SPSS 20.0 version software, Student's t-test and Chi square test. Data presented as mean $\pm$ SD and $p < 0.05$ were accepted as statistically significant.

Results

Time	PENG group (n=30)	FICB group (n=30)	p-value
Baseline	4.44±0.78	4.58 ± 1.26	$p = 0.39$
15minutes after block	3.4 ± 0.45	3.68± 0.88	$p = 0.034$
30minutes after block	3.04 ± 0.52	3.16 ± 1.08	$p = 0.68$
At recovery room	3.75 ± 1.08	3.51 ± 1.05	$p = 0.076$
6hours after block	3.45 ± 1.37	3.43 ± 1.57	$p = 0.93$
12hours after block	3.03 ± 1.05	3.86 ± 1.38	$p = 0.023$
Total dose of tramadol consumption during 24 hours	52± 23.67	69.48 ± 16.57	$p = 0.007$
Side effects after surgery (%)	2/100	4/100	$p = 0.31$

15 minutes and 12 hours post block, VAS score was significantly reduced in the PENG block group when compared to FICB group ($p = 0.034$; $p = 0.023$ respectively). The total dose of tramadol consumption during 24 hours was significantly reduced in the PENG block group when compared to FICB group ($p = 0.007$). No significant differences were found between side effects of two groups.

Discussion

Hip fractures are common in elderly population requiring adequate postoperative analgesia and minimizing the need for opioids.¹³ Inadequate pain control impairs early rehabilitation and functional recovery of the patient after surgery.¹⁴ Regional analgesia techniques like fascia iliaca block and femoral nerve block used in hip fractures have limitations like motor weakness¹⁵. PENG block is a novel technique for hip analgesia whose efficacy is not well established yet. Hence, the current study was undertaken to compare efficacy between PENG and FICB block.

The anterior hip capsule is supplied by femoral, obturator and accessory obturator nerves^{10,16,17}. Though FICB has been commonly used for analgesia after different hip surgeries, there have been questions raised on the efficacy of FICB in blocking the obturator nerve.^{18,19}

The PENG block is an interfascial plane block where the local anesthetic is deposited beneath the iliopsoas tendon to target the articular branches of femoral nerve, obturator nerve and accessory obturator nerve. As it covers all articular branches of hip joint, it gives better sensory coverage than other traditional techniques potentially reducing opioid consumption. Since the landmarks of the PENG block namely, the anterior inferior iliac spine, the psoas tendon, and the

iliopubic eminence are easily identifiable on USG, it is technically easier to perform like other nerve blocks.²⁰

Conclusion

PENG block provides better analgesia than FICB in patients undergoing hip surgeries. Further studies are required to evaluate the efficacy and motor sparing ability of PENG block.

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