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Influence of PENG Block and Supra-Inguinal Fascia Iliaca Compartment Block on Spinal Anaesthesia Positioning, Rescue Analgesic Requirement, and Pain Scores in Hip Surgery Patients.

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Abstract

Background: Effective perioperative analgesia in hip surgery facilitates comfortable positioning for spinal anaesthesia, improves postoperative pain control, and reduces opioid consumption. The Pericapsular Nerve Group (PENG) Block has emerged as a motor-sparing regional analgesic technique that may provide superior analgesia compared with the Supra-Inguinal Fascia Iliaca Compartment Block (SFICB). The present study compared the influence of these two regional blocks on spinal anaesthesia positioning, postoperative pain scores, and rescue analgesic requirement in patients undergoing hip surgery. ***Methods:*** This prospective, randomized, comparative study included 60 patients undergoing hip surgery under spinal anaesthesia. Patients were randomly allocated into two groups: PENG Block (n=30) and Supra-Inguinal Fascia Iliaca Compartment Block (SFICB) (n=30). Ease of positioning for spinal anaesthesia, positioning pain score, postoperative Visual Analogue Scale (VAS) pain scores, time to first rescue analgesia, total rescue analgesic requirement, diclofenac consumption, opioid requirement, and perioperative characteristics were recorded and compared. Statistical analysis was performed using Student's t-test, Chi-square test, and Fisher's exact test where appropriate. A p-value <0.05 was considered statistically significant. ***Results:*** Baseline demographic and perioperative characteristics were comparable between the two groups (p>0.05). The PENG group demonstrated significantly lower positioning pain scores (2.3±0.9 vs. 3.9±1.1; p<0.001), shorter positioning time (3.8±0.8 vs. 5.1±1.0 minutes; p<0.001), and a higher proportion of excellent spinal positioning (73.3% vs. 36.7%; p=0.016). Postoperative VAS scores were significantly lower in the PENG group at all assessment intervals from the immediate postoperative period to 24 hours (p<0.05). The mean time to first rescue analgesia was significantly longer in the PENG group (10.9±2.1 vs. 7.2±1.9 hours; p<0.001). Patients receiving the PENG block required fewer rescue analgesic doses, lower total diclofenac consumption, and significantly less opioid rescue analgesia than those receiving the SFICB (p<0.05). ***Conclusion:*** The Pericapsular Nerve Group Block provided superior analgesia compared with the Supra-Inguinal Fascia Iliaca Compartment Block by improving patient comfort during spinal anaesthesia positioning, reducing postoperative pain scores, prolonging analgesic duration, and decreasing rescue analgesic and opioid requirements. The findings support the use of the PENG block as an effective motor-sparing regional analgesic technique for patients undergoing hip surgery.

Keywords: Pericapsular Nerve Group Block (PENG). Supra-Inguinal Fascia Iliaca Compartment Block. Hip Surgery.

INTRODUCTION

Hip surgeries such as total hip arthroplasty, hemiarthroplasty, fixation of femoral neck fractures, and intertrochanteric fracture surgeries are associated with severe perioperative pain. Effective pain management is essential not only to improve patient comfort but also to facilitate optimal positioning for spinal anaesthesia, reduce perioperative stress responses, decrease opioid consumption, and promote early postoperative rehabilitation. Despite advances in multimodal analgesia, achieving adequate analgesia without compromising motor function remains a significant challenge in patients undergoing hip surgery.[1]

Regional anaesthesia techniques have become an integral component of enhanced recovery protocols for hip surgeries. Conventional techniques such as femoral nerve block and fascia iliaca compartment block (FICB) provide satisfactory analgesia but may produce quadriceps weakness because of femoral nerve involvement. Motor weakness may delay

postoperative mobilization, increase the risk of falls, and interfere with rehabilitation. Consequently, newer motor-sparing regional blocks have been developed to improve analgesic efficacy while preserving lower limb muscle strength.[2]

The Supra-Inguinal Fascia Iliaca Compartment Block (SFICB) is an ultrasound-guided modification of the fascia iliaca block that enables wider spread of local anaesthetic toward the femoral nerve, lateral femoral cutaneous nerve, and occasionally the obturator nerve. Compared with the infra-inguinal approach, SFICB provides superior analgesia for hip surgeries and is widely incorporated into perioperative analgesic protocols. However, significant quadriceps weakness may still occur because of femoral nerve blockade.[3]

The Pericapsular Nerve Group (PENG) block, first described by Girón-Arango et al., is a relatively recent ultrasound-guided interfascial plane block targeting the articular branches of the femoral nerve, accessory obturator nerve, and obturator nerve supplying the anterior hip capsule. Since these branches are predominantly sensory, the PENG block has been proposed as a motor-sparing technique that provides effective analgesia while preserving quadriceps muscle strength. Better preservation of motor function may improve patient cooperation during positioning for spinal anaesthesia and facilitate early postoperative mobilization.[4]

Adequate analgesia before neuraxial blockade is particularly important because patients with hip fractures or degenerative hip disorders often experience severe pain during sitting or lateral positioning for spinal anaesthesia. An effective regional block before spinal anaesthesia may improve positioning quality, reduce patient discomfort, shorten procedure time, and enhance the success of neuraxial blockade. Furthermore, prolonged postoperative analgesia may reduce rescue analgesic requirements, opioid-related adverse effects, and postoperative pain scores.[5]

Although both PENG block and SFICB are increasingly used in hip surgeries, evidence comparing their influence on spinal anaesthesia positioning, postoperative pain scores, and rescue analgesic requirements remains limited. Comparative evaluation of these outcomes is clinically relevant for selecting the optimal regional analgesic technique. Therefore, the present study was undertaken to compare the effectiveness of PENG block and Supra-Inguinal Fascia Iliaca Compartment Block with respect to ease of spinal positioning, postoperative pain intensity, and rescue analgesic consumption in patients undergoing hip surgery. The findings may contribute to improved perioperative pain management strategies and enhanced recovery after hip surgery.[6]

AIM

To compare the influence of Pericapsular Nerve Group (PENG) Block and Supra-Inguinal Fascia Iliaca Compartment Block on spinal anaesthesia positioning, postoperative pain scores, and rescue analgesic requirement in patients undergoing hip surgery.

OBJECTIVES

1. To compare the ease of patient positioning for spinal anaesthesia following PENG Block and Supra-Inguinal Fascia Iliaca Compartment Block.
2. To compare postoperative pain scores between the two groups using the Visual Analogue Scale (VAS).
3. To compare the timing and total requirement of rescue analgesics during the first 24 postoperative hours between the two groups.

MATERIALS AND METHODS

Source of Data

The data were collected from patients admitted to the Department of Anaesthesiology in collaboration with the Department of Orthopaedics who underwent elective or emergency hip surgeries. Eligible patients satisfying the inclusion criteria were recruited after obtaining written informed consent.

Study Design

The study was conducted as a prospective, randomized, comparative analytical study.

Study Location

The study was conducted in the Department of Anaesthesiology and Critical Care Medicine at a tertiary care teaching hospital.

Study Duration

The study was conducted over a period of 24 months.

Sample Size

A total of 60 patients were included in the study.

- Group P (PENG Block): 30 patients
- Group S (Supra-Inguinal Fascia Iliaca Compartment Block): 30 patients

Patients were randomly allocated into the two groups using a computer-generated randomization sequence.

Inclusion Criteria

- Patients aged 18 years and above.
- Patients belonging to ASA Physical Status I–III.
- Patients scheduled for elective or emergency peri-articular hip surgeries under spinal anaesthesia.
- Patients willing to provide written informed consent.

Exclusion Criteria

- Patient refusal.
- Allergy to local anaesthetic drugs.
- Infection at the injection site.
- Coagulopathy or anticoagulant therapy contraindicating regional block.
- Neurological disorders affecting lower limbs.
- Severe hepatic or renal dysfunction.
- Cognitive impairment preventing pain assessment.
- Failed regional block or failed spinal anaesthesia requiring conversion to general anaesthesia.

Procedure and Methodology

After obtaining Institutional Ethics Committee approval and written informed consent, eligible patients underwent pre-anaesthetic evaluation including medical history, physical examination, airway assessment, laboratory investigations, and ASA grading.

Patients were randomized into Group P (PENG Block) and Group S (SFICB).

Standard monitors including ECG, pulse oximetry, and non-invasive blood pressure were attached, and baseline vital parameters were recorded. Under strict aseptic precautions and ultrasound guidance, the allocated regional block was performed using 30 mL of 0.2% ropivacaine with 8 mg dexamethasone. Following completion of the block, patients were assessed for pain relief and subsequently positioned for spinal anaesthesia. The ease of positioning was assessed using an appropriate positioning score. Subarachnoid block was administered using hyperbaric bupivacaine according to institutional protocol. During surgery, haemodynamic parameters were continuously monitored. Postoperatively, pain intensity was assessed using the Visual Analogue Scale (VAS) at predetermined intervals (0, 2, 4, 6, 12, and 24 hours).

Rescue analgesia was administered whenever VAS ≥4 or whenever requested by the patient according to institutional analgesic protocol.

The following outcome variables were recorded:

- Ease of spinal positioning
- Time required for spinal positioning
- Postoperative VAS scores
- Time to first rescue analgesia
- Number of rescue analgesic doses
- Total rescue analgesic consumption during 24 hours
- Block-related complications

Sample Processing

Clinical observations were recorded on a predesigned Case Record Form immediately after patient recruitment. All perioperative and postoperative variables were entered into a master data sheet. The collected data were verified for completeness, coded appropriately, and entered into Microsoft Excel before statistical analysis.

Statistical Methods

Data were analysed using SPSS software version 26.0.

Continuous variables were expressed as Mean ± Standard Deviation (SD).

Categorical variables were expressed as frequency and percentage.

Comparisons between groups were performed using:

- Independent Student's t-test for continuous variables.
- Chi-square test or Fisher's Exact test for categorical variables.

- Repeated measures ANOVA for comparison of VAS scores over time.

A p-value <0.05 was considered statistically significant.

Data Collection

The following variables were collected:

- Age
- Gender
- BMI
- ASA grade
- Diagnosis
- Type of hip surgery
- Duration of surgery
- Baseline haemodynamic parameters
- Ease of spinal positioning score
- Time for spinal positioning
- Intraoperative haemodynamic variables
- Postoperative VAS scores
- Time to first rescue analgesia
- Number of rescue analgesic doses
- Total analgesic consumption within 24 hours
- Adverse events and complications.

RESULTS

Table 1: Baseline demographic and perioperative characteristics of study participants

Variable	PENG (n=30)	SFICB (n=30)	Test of significance	95% CI	p value
Age (years), Mean±SD	58.9±12.6	60.8±14.1	t=0.55	-4.95 to 8.75	0.583
Male	17 (56.7%)	18 (60.0%)	χ^2=0.07		0.793
Female	13 (43.3%)	12 (40.0%)			
BMI (kg/m²), Mean±SD	25.2±3.4	25.8±3.8	t=0.64	-1.29 to 2.49	0.523
ASA I	8 (26.7%)	7 (23.3%)	χ^2=0.53		0.768
ASA II	18 (60.0%)	19 (63.3%)			
ASA III	4 (13.3%)	4 (13.3%)			
Neck of femur fracture	14 (46.7%)	13 (43.3%)	χ^2=0.48		0.923
Intertrochanteric fracture	11 (36.7%)	12 (40.0%)			
THA/AVN	5 (16.6%)	5 (16.7%)			
Duration of surgery (min), Mean±SD	91.6±16.2	94.8±18.5	t=0.71	-5.73 to 12.13	0.482

Table 1 compares the baseline demographic and perioperative characteristics of patients in the PENG and Supra-Inguinal Fascia Iliaca Compartment Block (SFICB) groups. The mean age of participants was comparable between the PENG group (58.9±12.6 years) and the SFICB group (60.8±14.1 years), with no statistically significant difference (t=0.55, 95% CI: −4.95 to 8.75, p=0.583).

Male patients constituted 56.7% of the PENG group and 60.0% of the SFICB group, while females accounted for 43.3% and 40.0%, respectively, showing similar gender distribution (χ^2=0.07, p=0.793). The mean BMI was also comparable between the groups (25.2±3.4 vs. 25.8±3.8 kg/m²; t=0.64, 95% CI: −1.29 to 2.49, p=0.523). Most patients in both groups belonged to ASA Grade II (60.0% vs. 63.3%), with no significant difference in ASA classification (χ^2=0.53, p=0.768).

The distribution of surgical diagnoses, including neck of femur fractures (46.7% vs. 43.3%), intertrochanteric fractures (36.7% vs. 40.0%), and total hip arthroplasty/avascular necrosis (16.6% vs. 16.7%), was comparable (χ^2=0.48, p=0.923). Similarly, the mean duration of surgery was not significantly different between the PENG (91.6±16.2 minutes) and SFICB (94.8±18.5 minutes) groups (t=0.71, 95% CI: −5.73 to 12.13, p=0.482).

Table 2: Comparison of ease of patient positioning for spinal anaesthesia

Variable	PENG (n=30)	SFICB (n=30)	Test of significance	95% CI	p value
Positioning pain score (0–10), Mean±SD	2.3±0.9	3.9±1.1	t=6.17	1.08 to 2.12	<0.001*
Time required for positioning (minutes), Mean±SD	3.8±0.8	5.1±1.0	t=5.57	0.83 to 1.77	<0.001*
Excellent positioning	22 (73.3%)	11 (36.7%)	χ^2=8.26		0.016*
Good positioning	7 (23.3%)	14 (46.7%)			
Poor positioning	1 (3.4%)	5 (16.6%)			
Patient required assistance for positioning	4 (13.3%)	12 (40.0%)	χ^2=5.45		0.020*

Table 2 compares the ease of patient positioning for spinal anaesthesia between the two study groups. The PENG group demonstrated significantly lower positioning pain scores compared to the SFICB group (2.3±0.9 vs. 3.9±1.1), indicating superior analgesia during positioning (t=6.17, 95% CI: 1.08–2.12, p<0.001). Patients receiving the PENG block also required significantly less time for positioning (3.8±0.8 minutes) than those receiving the SFICB (5.1±1.0 minutes), with a highly significant difference (t=5.57, 95% CI: 0.83–1.77, p<0.001). Excellent positioning was achieved in 73.3% of patients in the PENG group compared with 36.7% in the SFICB group, whereas poor positioning was observed in only 3.4% and 16.6% of patients, respectively (χ^2=8.26, p=0.016). Furthermore, only 13.3% of patients in the PENG group required assistance during positioning compared to 40.0% in the SFICB group (χ^2=5.45, p=0.020).

Table 3: Comparison of postoperative pain scores (VAS)

Variable	PENG (n=30)	SFICB (n=30)	Test of significance	95% CI	p value
VAS immediately postoperative	1.5±0.7	2.0±0.8	t=2.58	0.11 to 0.89	0.012*
VAS 2 hours	1.9±0.8	2.9±0.9	t=4.55	0.56 to 1.44	<0.001*
VAS 4 hours	2.4±0.8	3.8±1.0	t=5.95	0.93 to 1.87	<0.001*
VAS 6 hours	2.9±0.9	4.3±1.1	t=5.39	0.88 to 1.92	<0.001*
VAS 12 hours	3.4±0.8	4.6±1.0	t=5.12	0.73 to 1.67	<0.001*
VAS 24 hours	2.8±0.7	3.6±0.8	t=4.12	0.41 to 1.19	<0.001*

Table 3 presents the comparison of postoperative pain intensity assessed using the Visual Analogue Scale (VAS) between the PENG and SFICB groups. Immediately after surgery, patients in the PENG group reported significantly lower pain scores than those in the SFICB group (1.5±0.7 vs. 2.0±0.8; t=2.58, 95% CI: 0.11–0.89, p=0.012). This difference became more pronounced at 2 hours (1.9±0.8 vs. 2.9±0.9; t=4.55, p<0.001), 4 hours (2.4±0.8 vs. 3.8±1.0; t=5.95, p<0.001), and 6 hours postoperatively (2.9±0.9 vs. 4.3±1.1; t=5.39, p<0.001). Similarly, significantly lower pain scores were observed in the PENG group at 12 hours (3.4±0.8 vs. 4.6±1.0; t=5.12, p<0.001) and 24 hours (2.8±0.7 vs. 3.6±0.8; t=4.12, p<0.001).

Table 4: Comparison of timing and rescue analgesic requirement

Variable	PENG (n=30)	SFICB (n=30)	Test of significance	95% CI	p value
Time to first rescue analgesia (hours), Mean±SD	10.9±2.1	7.2±1.9	t=7.13	2.66 to 4.74	<0.001*
Patients requiring first rescue analgesia	18 (60.0%)	29 (96.7%)	χ^2=11.04		0.001*
Patients requiring second rescue analgesia	6 (20.0%)	17 (56.7%)	χ^2=8.53		0.003*
Total rescue analgesic doses (24 hrs), Mean±SD	1.3±0.5	2.1±0.7	t=5.11	0.49 to 1.11	<0.001*
Total diclofenac consumption (mg/24 hr), Mean±SD	93.3±38.6	148.3±46.2	t=5.02	33.2 to 76.8	<0.001*
Patients requiring opioid rescue analgesia	2 (6.7%)	9 (30.0%)	χ^2=5.46		0.019*

Table 4 compares the timing and overall rescue analgesic requirements between the PENG and SFICB groups during the first 24 postoperative hours. The mean time to first rescue analgesia was significantly longer in the PENG group (10.9±2.1 hours) compared to the SFICB group (7.2±1.9 hours), indicating prolonged analgesic efficacy (t=7.13, 95% CI: 2.66–4.74, p<0.001). A significantly smaller proportion of patients in the PENG group required first rescue analgesia (60.0%)

compared with the SFICB group (96.7%) (χ^2=11.04, p=0.001). Likewise, the requirement for second rescue analgesia was significantly lower in the PENG group (20.0%) than in the SFICB group (56.7%) (χ^2=8.53, p=0.003). Patients receiving the PENG block required significantly fewer total rescue analgesic doses during the first 24 hours (1.3±0.5 vs. 2.1±0.7 doses; t=5.11, 95% CI: 0.49–1.11, p<0.001). Correspondingly, the total diclofenac consumption was substantially lower in the PENG group (93.3±38.6 mg) than in the SFICB group (148.3±46.2 mg), with a statistically significant difference (t=5.02, 95% CI: 33.2–76.8, p<0.001). Additionally, opioid rescue analgesia was required in only 6.7% of patients in the PENG group compared to 30.0% in the SFICB group (χ^2=5.46, p=0.019).

DISCUSSION

In the present study, baseline demographic and perioperative variables were comparable between the PENG and SFICB groups. Mean age, sex distribution, BMI, ASA grade, type of hip pathology, and duration of surgery did not differ significantly between groups, indicating that both groups were well matched. This comparability was similar to studies by Jadon et al. (2021)[1], Aygun et al. (2023)[2], and Bauiomy et al. (2024)[3], where patients receiving PENG block and fascia iliaca-based blocks had comparable baseline characteristics before assessment of analgesic outcomes. Comparable baseline profiles strengthen the validity of the present findings because differences in positioning comfort, VAS scores, and analgesic requirement were less likely to be influenced by demographic imbalance.

The present study showed significantly better ease of positioning for spinal anaesthesia in the PENG group. Positioning pain score was lower in the PENG group than in the SFICB group, and the time required for positioning was also significantly shorter. Excellent positioning was achieved in 73.3% of patients receiving PENG block compared with 36.7% in the SFICB group. These findings are consistent with Alrefaey et al. (2020)[4], who reported that PENG block provided effective analgesia for positioning during spinal anaesthesia in hip fracture patients. Similarly, Jadon et al. (2021)[1] found that PENG block provided better pain relief and easier positioning during spinal anaesthesia compared with supra-inguinal fascia iliaca block. Bauiomy et al. (2024)[3] also reported that PENG block achieved greater analgesic effect and easier spinal positioning than S-FICB in hip fracture surgery patients. This may be explained by the more selective blockade of articular branches supplying the anterior hip capsule, which is the major pain-generating region during hip movement.

Postoperative VAS scores were significantly lower in the PENG group at all observed time points from immediate postoperative period to 24 hours. The maximum difference was observed between 4 and 12 hours postoperatively, suggesting sustained early analgesic benefit. These findings are in agreement with Li et al. (2024)[5], who concluded that PENG block reduced postoperative pain and pain during spinal positioning in hip fracture patients. Aygun et al. (2023)[2] also observed significant reduction in pain scores during positioning and better recovery scores following PENG block. Baran et al. (2025)[6] reported that continuous PENG block reduced opioid requirement and provided better control of pain during movement after total hip arthroplasty. In contrast, SFICB, although effective, may produce less selective anterior capsular analgesia and may not consistently block the obturator and accessory obturator articular branches.

The present study also found that the time to first rescue analgesia was significantly longer in the PENG group, while the number of patients requiring first and second rescue analgesia was significantly lower. Total rescue analgesic doses and diclofenac consumption over 24 hours were also significantly reduced in the PENG group. Similar opioid- and analgesic-sparing effects were reported by Baran et al. (2025)[6], Yang et al. (2025)[7], and Li et al. (2025)[8], who observed lower postoperative analgesic consumption with PENG-based blocks. Amin et al. (2023)[9], in a meta-analysis comparing PENG block with fascia iliaca compartment block, also reported better analgesic efficacy with PENG block for hip surgery-related pain. These findings support the present observation that PENG block provides more prolonged and clinically effective analgesia during the first postoperative day.

Although SFICB remains a useful regional analgesic technique, especially because of its broader spread to femoral and lateral femoral cutaneous nerves, its motor involvement may limit early movement and positioning comfort. Studies by Ali et al. (2024)[10], Nidgundi et al. (2023)[11], and Safa et al. (2024)[12] showed that supra-inguinal fascia iliaca block provides effective analgesia and facilitates neuraxial positioning or postoperative pain control. However, when directly compared with PENG block, several recent studies have suggested that PENG block may offer superior positioning analgesia, lower postoperative pain scores, and reduced rescue analgesic need. Overall, the present findings support the growing evidence that PENG block is a more selective, motor-sparing, and effective analgesic technique for hip surgery patients.

CONCLUSION

The present study demonstrated that the Pericapsular Nerve Group (PENG) Block provided superior perioperative analgesia compared with the Supra-Inguinal Fascia Iliaca Compartment Block (SFICB) in patients undergoing hip surgery. Patients receiving the PENG block experienced significantly less pain during positioning for spinal anaesthesia, resulting in easier and faster positioning with fewer patients requiring assistance. The PENG group also exhibited consistently lower

postoperative Visual Analogue Scale (VAS) pain scores throughout the first 24 postoperative hours. Furthermore, the duration of analgesia was significantly prolonged, as evidenced by a longer time to first rescue analgesic, reduced total rescue analgesic consumption, lower diclofenac requirement, and decreased need for opioid rescue analgesia. Baseline demographic and perioperative characteristics were comparable between the two groups, confirming that the observed differences were attributable to the analgesic technique. Overall, the PENG block proved to be an effective motor-sparing regional analgesic technique that enhanced patient comfort during spinal anaesthesia positioning while providing superior postoperative pain control and reducing analgesic requirements compared with the Supra-Inguinal Fascia Iliaca Compartment Block.

LIMITATIONS OF THE STUDY

1) The study was conducted at a single tertiary care centre, which may limit the generalizability of the findings.
2) The sample size was relatively small (60 patients), reducing the power to detect uncommon adverse events.
3) Postoperative follow-up was limited to the first 24 hours, preventing assessment of long-term pain relief and functional recovery.
4) Quadriceps muscle strength and early ambulation were not evaluated using objective functional outcome measures.
5) Different types of hip surgeries were included, which might have introduced variation in postoperative pain intensity despite randomization.
6) Patient satisfaction and quality-of-recovery scores were not assessed.
7) The study did not evaluate long-term opioid consumption, rehabilitation outcomes, hospital stay, or cost-effectiveness of the two regional blocks.

REFERENCES

1. Jadon A, Mohsin K, Sahoo RK, Chakraborty S, Sinha N, Bakshi A. Comparison of supra-inguinal fascia iliaca versus pericapsular nerve block for ease of positioning during spinal anaesthesia: a randomised double-blinded trial. Indian J Anaesth. 2021;65(8):572-8.
2. Aygun H, Thomas DT, Tulgar S, et al. Effect of ultrasound-guided pericapsular nerve group block on pain during positioning for spinal anesthesia in patients with hip fracture. BMC Anesthesiol. 2023;23:305.
3. Bauiomy H, Abdelhady M, Abd El-Rahman A, et al. Comparison between pericapsular nerve group and suprainguinal fascia iliaca compartment block for spinal anaesthesia positioning in hip fracture surgery. Egypt J Anaesth. 2024;40(1):210-7.
4. Alrefaey AK, Abouelela MA, Elkahwagy MS. Pericapsular nerve group block for analgesia of positioning pain during spinal anesthesia in patients with hip fracture. Egypt J Anaesth. 2020;36(1):234-9.
5. Li S, Luo W, Wu C, et al. Efficacy and safety of pericapsular nerve group block for hip surgery: a systematic review and meta-analysis. J Orthop Surg Res. 2024;19:178.
6. Baran O, Ekinci M, Ciftci B, et al. Comparative analysis of continuous pericapsular nerve group block and suprainguinal fascia iliaca block after total hip arthroplasty. J Orthop Surg Res. 2025;20:640.
7. Yang F, Zhang Y, Liu J, et al. Pericapsular nerve group block combined with lateral femoral cutaneous nerve block for hip surgery: systematic review and meta-analysis. Front Pain Res. 2025;6:1723417.
8. Li F, Liao T, Huang J, Xu R. Effects of pericapsular nerve group block and fascia iliaca compartment block on postoperative analgesia and early rehabilitation in elderly patients undergoing total hip arthroplasty. BMC Surg. 2025;25:188.
9. Amin SRM, Abd El-Aziz MA, Elsharkawy H, et al. Comparison between pericapsular nerve group block and fascia iliaca compartment block for hip surgery analgesia: a meta-analysis. Egypt J Anaesth. 2023;39(1):403-12.
10. Ali FM, Mohamed SA, Abdelwahab HH, et al. Ultrasound-guided suprainguinal fascia iliaca block to position the patient for neuraxial anaesthesia in acetabular fracture surgery. Anaesthesiol Intensive Ther. 2024;56(1):32-8.
11. Nidgundi N, Goudar SS, Hiremath VR, et al. Ultrasound-guided preoperative fascia iliaca compartment block for pain relief during positioning for spinal anesthesia in patients with hip fracture. Cureus. 2023;15(12):e50633.
12. Safa B, Gollish J, McCartney CJL, et al. Ultrasound-guided suprainguinal fascia iliaca compartment block and early postoperative analgesia after total hip arthroplasty: a randomised controlled trial. Br J Anaesth. 2024;133(2):329-37.
13. Bali C, Ergenoglu P, Akin S, et al. Supra-inguinal fascia iliaca block in older-old patients for hip fracture surgery: postoperative analgesic efficacy. Braz J Anesthesiol. 2023;73(4):421-7.
14. Girón-Arango L, Peng PWH, Chin KJ, Brull R, Perlas A. Pericapsular nerve group block for hip fracture. Reg Anesth Pain Med. 2018;43(8):859-63.