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Timing of suprainguinal fascia iliaca block in hip hemiarthroplasty: impact on QoR-15 scores– a prospective randomized study

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Abstract

Background Suprainguinal Fascia Iliaca Compartment Block (SFICB) is a widely utilized technique for managing postoperative pain in hip surgery. The timing of its administration, either preoperative or postoperative, plays a crucial role in influencing patient outcomes. This study aims to compare the effects of preoperative versus postoperative SFICB on postoperative recovery in patients undergoing hip hemiarthroplasty (HHA).

Methods In this prospective randomized trial, 60 patients scheduled for HHA were randomly assigned to two groups: Group PreS (preoperative SFICB) and Group PostS (postoperative SFICB). SFICB was performed under ultrasound guidance using 0.20% bupivacaine. The primary outcome was assessed using the Quality of Recovery-15 (QoR-15) score at 24 h postoperatively. Secondary outcomes included the Nursing Delirium Screening Scale (N-DSS), postoperative nausea/vomiting (PONV), and opioid consumption.

Results Demographic variables were comparable between groups ($p > 0.05$). Spinal anesthesia duration was shorter in Group PreS ($p = 0.005$), while surgery and total procedure times were similar ($p > 0.05$). QoR-15 scores improved in both groups, with significant increases in moderate ($p = 0.004$, $p = 0.047$) and severe pain ($p < 0.001$, $p = 0.028$). At T1, total QoR-15 ($p = 0.034$) and severe pain score ($p < 0.001$) were significantly better in Group PreS. Preoperative fentanyl need was lower in Group PreS ($p < 0.001$). Although first rescue analgesia time was longer in Group PostS ($p = 0.026$) morphine equivalent consumption ($p = 0.564$) was similar. N-DSS, delirium incidence, and PONV showed no differences ($p > 0.05$). No complications were observed.

Conclusions Preoperative SFICB improved postoperative QoR-15 scores compared to postoperative SFICB in elderly HHA patients, but optimal timing and perioperative settings require further research.

Trial registration ClinicalTrials.gov (ID NCT05965544). The clinical trial was prospectively registered on July 20, 2023.

Keywords Fascia iliaca compartment block, Hip hemiarthroplasty, QoR-15, Pain management, Postoperative recovery

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Introduction

Hip fractures represent a major trauma, particularly in the elderly population, with rising incidence rates that profoundly impact quality of life. Moderate to severe pain is commonly observed after major hip surgeries, adversely affecting early recovery and patient satisfaction [1]. In older adults, hip fractures most frequently present as femoral neck fractures. Hip hemiarthroplasty (HHA), the standard treatment for such fractures, improves mobility but may hinder functional rehabilitation due to perioperative pain and associated cognitive impairments. Therefore, early and effective pain control following HHA is crucial for patient recovery [2].

Fascia Iliaca Compartment Block (FICB) is an effective regional anesthesia technique performed with an anterior approach to the lumbar plexus [3]. FICB has been shown to reduce postoperative opioid consumption and improve recovery quality in hip surgeries. Specifically, Suprainguinal Fascia Iliaca Compartment Block (SFICB) targets not only the femoral nerve and lateral femoral cutaneous nerve but also the obturator nerve, covering a significant portion of hip innervation and thereby reducing pain scores [4].

SFICB can be administered either preoperatively or postoperatively. When performed preoperatively, it offers the advantage of improved patient comfort during positioning for spinal anesthesia [5]. Conversely, postoperative administration provides prolonged analgesia benefits. Both timing strategies have been reported to reduce pain scores and enhance recovery quality. However, there is limited data in the literature regarding the optimal timing of SFICB administration [6].

This study aims to compare the effects of preoperative and postoperative SFICB on postoperative recovery, evaluated using the Quality of Recovery-15 (QoR-15) scores, in patients undergoing HHA. Secondary outcomes, including the Nursing Delirium Screening Scale (N-DSS), the incidence of postoperative nausea and vomiting (PONV), and opioid consumption, will also be assessed.

Materials and methods

Study design

This prospective randomized trial was conducted following ethical approval from the Başakşehir Çam and Sakura City Hospital Ethics Committee (KAEK/2023.06.259) and was registered on ClinicalTrials.gov (ID: NCT05965544). All participants provided written and verbal informed consent before joining the study. The clinical trial was prospectively registered on July 20, 2023. This manuscript adheres to the applicable CONSORT guidelines and the Declaration of Helsinki.

The trial evaluated the effects of preoperative versus postoperative SFICB on postoperative recovery quality as a supportive care measure in patients undergoing HHA. The study employed a parallel-group interventional design with random allocation and assessor-blinding to ensure methodological rigor.

All consecutive patients who fit the inclusion criteria were randomly assigned to two groups—preoperative SFICB (Group PreS) and postoperative SFICB (Group PostS)—using a computer-generated random number table. To maintain allocation concealment, numbered and sealed envelopes were employed. Pre- or post-operative SFICB and spinal anaesthesia procedures performed by the same anesthesiologists (E.M.) The clinicians responsible for assessing the QoR-15 scores and following up patients after spinal anaesthesia were double-blind participants in the study. This approach minimized bias and enhanced the reliability of the results.

Participants

The study included 60 patients aged 65 years or older with American Society of Anesthesiologists (ASA) physical status I–III, scheduled for HHA due to femoral neck fractures. Exclusion criteria were contraindications to regional anesthesia, cognitive dysfunction, previous hip surgery, severe organ dysfunction, chronic opioid use, allergy to any drug used in the study, infection at the treatment site, a BMI ≥ 30, or refusal to participate. Patients were randomized into two groups via computer-generated randomization and sealed envelopes.

Preoperative preparation

All patients followed an 8-hour fasting protocol before surgery. Upon arrival in the operating room, monitoring was initiated, including electrocardiography (ECG), non-invasive or invasive blood pressure (NIBP/IBP), and peripheral oxygen saturation (SpO_2). Routine premedication included 20 mg of intravenous ketamine.

Interventions

Spinal anesthesia

Patients were positioned in the lateral decubitus position with the fractured side elevated. Patients who experienced pain during positioning were given rescue fentanyl 0.5 mcg/kg intravenously. Under aseptic conditions, a 26-gauge pencil-point needle was inserted at the L3-L4 or L4-L5 intervertebral space. A mixture of 10 mg of 0.5% isobaric bupivacaine and 20 mcg fentanyl was injected intrathecally.

Suprainguinal fascia iliaca compartment block (SFICB)

After patients were placed in the supine position and aseptic conditions were ensured, the fascia iliaca was identified beneath the femoral artery and vein and above the nerve. Using an 8–12 MHz linear probe, the probe was moved laterally to trace the fascia. Medially, the probe was advanced along the inguinal ligament

toward the xiphoid process until a characteristic "hourglass" pattern was observed over the anterior inferior iliac spine [7]. At the point where the sartorius aponeurotic extensions intersected with the internal abdominal aponeurotic extensions, the deep circumflex artery was identified.

The fascia covering the iliacus muscle was visualized, and the block was performed using the in-plane technique under ultrasound guidance. A 0.5 mL/kg dose of 0.20% bupivacaine was administered for the block. There was no surgical infiltration of local anesthetic in either group, particularly in the posterior areas. In Group PreS, the block was applied before spinal anesthesia, whereas in Group PostS, it was performed postoperatively in the post-anesthesia care unit (PACU).

Key parameters evaluated included demographic data, operation time, perioperative sedation requirements, postoperative 24-hour QoR-15 and N-DSS scores, incidence of PONV, opioid consumption and complications.

Perioperative management

During surgery, patients received oxygen via a mask at 3 L/min and a dexmedetomidine infusion (0.2–0.7 mcg/kg/h) to achieve a Ramsay Sedation Scale (RSS) score of 2–3. The target RSS scores were 2 or 3. If the RSS score was 1, the dexmedetomidine infusion rate was increased by 0.1 mcg/kg/h. If the RSS score exceeded 3, the dexmedetomidine infusion rate was decreased by 0.1 mcg/kg/h. Perioperative cumulative dexmedetomidine was recorded.

The time from the patient's arrival in the operating room to the administration of spinal anesthesia was defined as the spinal anesthesia duration, while the time from the initiation of spinal anesthesia to the completion of surgery was recorded as the surgical duration. After surgery, patients were transferred to the PACU for postoperative monitoring and recovery.

Postoperative management

QoR-15

The QoR-15 questionnaire evaluated postoperative recovery with 15 items scored from 0 (poor) to 10 (excellent). Scores before group allocation were designated as T0, while scores at the 24th postoperative hour were designated as T1. Higher scores indicated better recovery.

Delirium assessment

Delirium was screened using the N-DSS, a practical five-item tool evaluating disorientation, inappropriate behavior, inappropriate communication, hallucination, and psychomotor retardation at 24 h postoperatively. Each item was scored from 0 to 2, with a total possible score ranging from 0 to 10. Delirium was defined as an N-DSS score of ≥ 2.

Postoperative nausea and vomiting (PONV)

The frequency of PONV was evaluated using the Numeric Rank Score (NRS), which ranged from 0 to 3 at 24 h postoperatively. Scores were defined as follows: 0 points for no nausea or vomiting, 1 point for nausea without vomiting, 2 points for one vomiting episode, and 3 points for two or more vomiting episodes. Patients scoring above 3 received 4 mg of intravenous ondansetron.

Analgesic consumption

Total opioid consumption (morphine equivalents) in the first 24 h postoperatively was recorded. All patients routinely received 3 × 5–10 mg/kg of paracetamol. PCA (patient-controlled analgesia) with tramadol (2 mg/mL in a 250 mL infusion) was set to deliver a bolus of 5 mL, with a lockout period of 15 min and no continuous infusion. Postoperative pain was also measured using the Visual Analog Scale (VAS). If resting VAS scores remained ≥ 4 despite PCA, rescue analgesia with intravenous tenoxicam (20 mg) was administered.

Outcomes

Primary outcome

Postoperative recovery quality was assessed using the QoR-15 score at 24 h.

Secondary outcomes

Secondary outcomes included N-DSS scores, the incidence and severity of PONV, and total analgesic consumption.

Statistical analysis

Sample size calculations were based on a clinically significant difference of 8.0 in QoR-15 scores, with an assumed standard deviation from previous studies [8]. With a Type I (Alpha) error of 0.05 and a Type II (Beta) error of 0.20 (corresponding to 80% power), a total of 30 patients per group were required. Data were analyzed with IBM SPSS version 27.0. Continuous variables were tested for normality using the Kolmogorov-Smirnov test or Shapiro-Wilk test. Normally distributed data were analyzed using independent t-tests, while non-normally distributed data were analyzed with the Mann-Whitney U test. Categorical variables were compared using chi-square or Fisher's exact tests. Within-group differences were assessed using the Wilcoxon signed-rank test or paired t-test. Cohen's d was used to assess the effect size between the two groups. Data are presented as mean ± SD, median [IQR], or n (%). Statistical analysis was performed using SPSS (Mac OS, version 27.0), with significance set at $p < 0.05$.

Results

Baseline demographic characteristics, such as age, gender, BMI, ASA classification, and spinal anesthesia levels, were similar across both groups, with no significant differences ($p > 0.05$) (Fig. 1). The duration of spinal anesthesia administration was shorter in Group PreS (excluding block time) compared to Group PostS (7.63 ± 2.82 min vs. 10.03 ± 3.51 min; $p = 0.005$). However, surgical durations (68.50 ± 16.61 min vs. 69.00 ± 15.44 min; $p = 0.904$) and total procedure times (92.00 ± 18.08 min vs. 93.33 ± 17.23 min; $p = 0.771$) were similar between the groups (Table 1).

Primary outcome– QoR-15 scores

When evaluating intra-group changes between T0 and T1

Moderate pain score (Q11) showed a significant increase from 6.00 (3.00) to 8.00 (2.00) in the Group PreS ($p = 0.004$) and from 6.00 (2.00) to 7.00 (2.00) in the Group PostS ($p = 0.047$). Severe pain score (Q12) showed a significant increase from 6.50 (3.00) to 9.00 (1.00) in the Group PreS ($p < 0.001$) and from 7.00 (3.00) to 7.00 (3.00) in the Group PostS ($p = 0.028$). Total Qor-15 score showed a significant increase from 93.50 (16.00) to 101.50 (9.00) in the Group PreS ($p = 0.002$) and from 93.50 (14.00) to 98.00 (12.00) in the Group PostS ($p = 0.001$).

In terms of inter-group comparisons

Moderate pain scores (Q11) were similar between groups at T0 ($p = 0.863$ and SMD 0.05, 95% CI -0.45 to 0.56) and T1 ($p = 0.061$ and SMD 0.57, 95% CI 0.05 to 1.09). While severe pain score (Q12) was similar between groups at T0 ($p = 0.621$ and SMD 0.17, 95% CI -0.34 to 0.68), it was significantly higher in the Group PreS compared to the Group PostS at T1 ($p < 0.001$ and SMD 1.15, 95% CI 0.60 to 1.69). While Total QoR-15 score was similar between groups at T0 ($p = 0.336$ and SMD 0.33, 95% CI -0.18 to 0.84), it was significantly higher in the Group PreS compared to the Group PostS at T1 ($p < 0.034$ and (SMD 0.58, 95% CI 0.06 to 1.09)) (Table 2).

Secondary outcomes

Nursing delirium screening scale (N-DSS)

Postoperative N-DSS scores were similar between the groups (9.00 (1.00) in Group PreS vs. 9.00 (1.00) in Group PostS; $p = 0.360$ and SMD 0.23, 95% CI -0.28 to 0.73). Delirium was detected in six patients in Group PreS and seven patients in Group PostS ($p = 0.754$).

Postoperative nausea and vomiting (PONV)

There were no significant differences in PONV scores between the groups ($p = 0.710$).

Analgesic consumption

Preoperative fentanyl requirement was significantly lower in Group PreS compared to Group PostS during spinal positioning (5 vs. 12 patients; $p < 0.001$). Additionally, the dexmedetomidine dose did not differ significantly between the groups (44.50 (26.00) in Group PreS vs. 47.50 (32.00) in Group PostS; $p = 0.286$ and SMD – 0.27, 95% CI -0.78 to 0.23).

The time to first rescue analgesia was significantly longer in Group PostS compared to Group PreS (400.00 (82.50) vs. 435.00 (85.00) minutes, respectively; $p = 0.026$ and SMD – 0.63, 95% CI -1.15 to -0.11). However, the total analgesic consumption via PCA over 24 h (175.00 (62.50) in Group PreS vs. 170.00 (52.50) in Group PostS; $p = 0.661$ and SMD – 0.14, 95% CI -0.65 to 0.37) and total morphine equivalent consumption (17.50 ± (6.03) in Group PreS vs. 17.00 ± (5.38) in Group PostS; $p = 0.564$ and SMD – 0.18, 95% CI -0.69 to 0.33) were similar between the groups (Table 3). The need for rescue analgesia (tenoxicam) was comparable between the groups ($p = 0.688$). No complications were observed.

Discussion

This study investigates the comparative impact of preoperative versus postoperative SFICB on recovery quality in elderly patients undergoing HHA. The findings suggest that preoperative SFICB is associated with better overall recovery quality during the perioperative period, particularly evident in QoR-15 scores assessed at 24 h postoperatively. This may be attributed to the potential of preoperative SFICB to prevent central sensitization more effectively and to alter cytokine release patterns differently compared to postoperative administration. However, there were no significant differences between the groups regarding postoperative N-DSS, PONV rates, or opioid consumption. To the best of our knowledge, no prior clinical studies have directly compared preoperative and postoperative SFICB.

FICB is a safe and effective analgesic technique for elderly patients with hip fractures, reducing pain severity and opioid consumption [9, 10], lowering nausea rates [11] and shortening hospital stays [12, 13]. It has demonstrated significant opioid-sparing effects during the first 24 h after bipolar HHA as part of multimodal analgesia [3].

Positioning for spinal anesthesia poses challenges for both patients and anesthetists, potentially leading to severe pain, inadequate pain control, and increased cardiac workload [14]. Peripheral nerve blocks improve positioning and provide perioperative analgesia [15]. FICB, targeting the anterior capsule innervation responsible for hip fracture pain, improves patient positioning, success and time to perform spinal anaesthesia, and ensures greater comfort for the patients [16–19]. In our

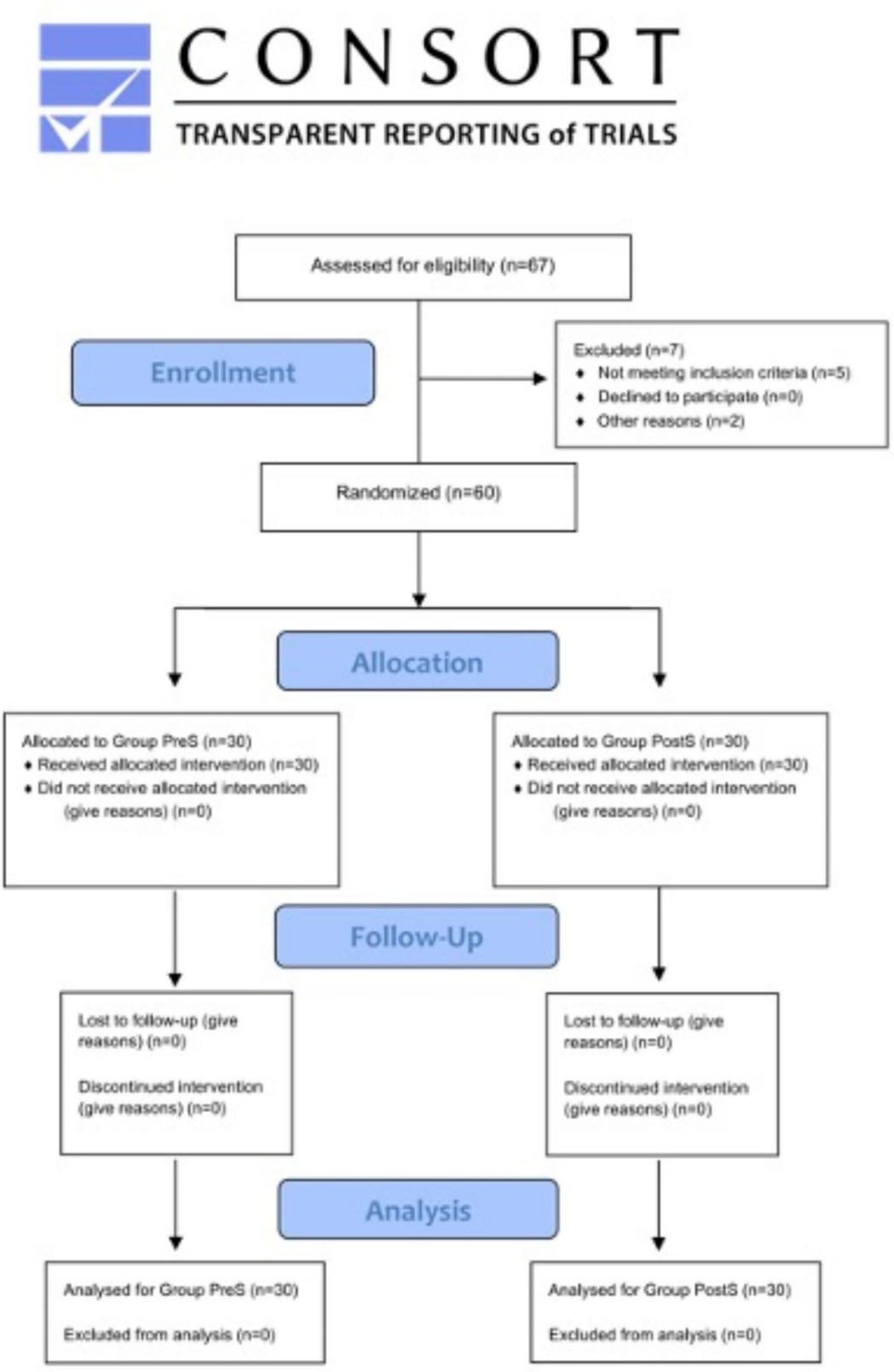

Fig. 1 Consort diagram

Table 1 Demographic data's

Variable	Group PreS	Group PostS	*p*-value
Age	74.20 ± 6.83	76.50 ± 9.41	0.544
Gender (F/M)	14/16	16/14	0.606
Height	162.26 ± 7.67	162.43 ± 8.95	0.939
Weight	62.83 ± 8.35	64.06 ± 9.06	0.586
Body mass index (BMI)	23.86 ± 2.68	24.28 ± 2.80	0.561
ASA (II/III)	13/17	13/17	1.000
Spinal Level (L3-L4/L4-L5)	15/15	17/13	0.605
Spinal anaesthesia time	7.63 ± 2.82	10.03 ± 3.51	***0.005***
Surgery Time	68.50 ± 16.61	69.00 ± 15.44	0.904
Total Time	92.00 ± 18.08	93.33 ± 17.23	0.771

F/M: female/male ASA: American Society of Anesthesiologists, (-/+) number of patients

* $p < 0.005$ statically significant and $p < 0.001$ ($p = 0.000$)

study, preoperative SFICB resulted in shorter spinal anesthesia duration and lower pain intensity with less fentanyl requirement, indicating less trauma exposure.

The benefits of preoperative FICB extend to facilitating positioning and preventing intraoperative pain responses. As highlighted in clinical guidelines, administering the block earlier in the surgical timeline contributes to better pain scores [20]. Compared to techniques like lumbar plexus block, which are associated with higher complication rates and greater technical complexity, SFICB offers notable advantages in terms of safety and feasibility [4]. Furthermore, some trauma-related challenges that arise during patient positioning for spinal anesthesia, as discussed in this study, may also be encountered with lumbar plexus block, further supporting SFICB as a preferable alternative. FICB may also exhibit synergistic effects when combined with neuraxial anesthesia [21]. From a clinical perspective, the precise timing of preoperative SFICB administration is essential to maximize its effectiveness in early pain control and optimize overall patient recovery. Therefore, a single-shot FICB should be performed as early as possible after a hip fracture [2]. The importance of sustained analgesia, as well as early pain control, is reflected in superior recovery quality, as measured by QoR-15 [8, 22, 23]. In our study, QoR-15 scores at 24 h postoperatively were higher in the preoperative SFICB group.

Chen et al. (2023) reported that preoperative SFICB administration improved the time to first analgesia to 403.5 ± 39.6 min compared to the control group receiving IV PCA. At 24 h postoperatively, the QoR-15 score was 114.1 ± 8.3 in the SFICB group and 104.6 ± 8.4 in the control group [24]. Upon examining the study populations, it was noted that there were more patients undergoing total hip arthroplasty (THA) surgery, and the majority of the patients belonged to ASA class II. In contrast, our study exclusively included patients undergoing HHA,

Table 2 Pain rating and total score for the Qor-15

Variable		Group PreS	Group PostS	Effect Size (Cohen's d)	*p*-value
Q11: Moderate pain score[#]	T0	6.00 (3.00)	6.00 (2.00)	SMD 0.05, 95% CI -0.45 to 0.56	0.863
	T1	8.00 (2.00)	7.00 (2.00)	SMD 0.57, 95% CI 0.05 to 1.09	0.061
	p	***0.004****	***0.047****		
Q12: Severe pain score[#]	T0	6.50 (3.00)	7.00 (3.00)	SMD 0.17, 95% CI -0.34 to 0.68	0.621
	T1	9.00 (1.00)	7.00 (3.00)	SMD 1.15, 95% CI 0.60 to 1.69	***0.000****
	p	***0.000****	***0.028****		
Total Qor-15 score	T0	93.50 (16.00)	93.50 (14.00)	SMD 0.33, 95% CI -0.18 to 0.84	0.336
	T1	101.50 (9.00)	98.00 (12.00)	SMD 0.58, 95% CI 0.06 to 1.09	***0.034****
	p	***0.002****	***0.001****		

* $p < 0.005$ statically significant and $p < 0.001$ ($p = 0.000$)

[#]Between 10 and 0, 10: never (excellent) and 0: always (bad)

Table 3 Patients' delirium, PONV incidence, and analgesic evaluations

Variable	Group PreS	Group PostS	Effect Size (Cohen's d)	*p*-value
N-DSS score	9.00 (1.00)	9.00 (1.00)	SMD 0.23, 95% CI -0.28 to 0.73	0.360
Delirium n (%)	6 (20.00)	7 (23.33)		0.754
PONV score (0/1/2/3) (-/+)	22/3/4/1	20/4/3/3		0.710
Preoperative fentanyl requirement n (%)	5 (16.67)	18 (60.00)		***0.000****
Dexmedetomidine (mcg)	44.50 (26.00)	47.50 (32.00)	SMD − 0.27, 95% CI -0.78 to 0.23	0.286
First rescue time (min.)	400.00 (82.50)	435.00 (85.00)	SMD − 0.63, 95% CI -1.15 to -0.11	***0.026****
PCA- Analgesic consumption (mg/24h)	175.00 (62.50)	170.00 (52.50)	SMD − 0.14, 95% CI -0.65 to 0.37	0.661
Total morphine ME (mg)	17.50 ± (6.03)	17.00 ± (5.38)	SMD − 0.18, 95% CI -0.69 to 0.33	0.564

N-DSS: Nursing Delirium Screening Scale, PONV: Postoperative nausea and vomiting,

PCA: Patient-controlled analgesia, ME: morphine equivalent, (-/+) number of patients

* $p < 0.005$ statically significant and $p < 0.001$ ($p = 0.000$)

showing a homogenous distribution in terms of ASA classification. From an orthopedic perspective, this outcome is expected, as the primary reason for opting for THA instead of HHA in fracture cases is the anticipation of better functional capacity or improved functional life expectancy. Although THA has slightly different pain profiles, its potential for enhanced mobility and long-term function makes it a preferred choice in suitable patients. This may be associated with greater recovery than seen in our study.

Preoperative FICB, a relatively safe and effective technique, minimizes systemic analgesia requirements and lowers delirium risk when performed before surgery in hip fracture patients [25]. It is also associated with improved pain management and reduced complications postoperatively [26]. Gao et al. (2019) reported reduced postoperative pain scores and opioid consumption in their meta-analysis [27]. Similarly, Thompson et al. (2019) highlighted reduced opioid use and improved patient satisfaction [28].

Dai et al. (2021) conducted a meta-analysis that included studies comparing the use of preoperative and postoperative Fascia Iliaca Block (FIB) with a control group. Their findings revealed that block usage was associated with reduced postoperative opioid consumption. However, there was no statistically significant difference in many parameters in the preoperative and postoperative FIB compared to the control group. These parameters including 24-hour pain relief (preoperative SMD −0.27, 95% CI −0.82 to 0.27; postoperative SMD 0.47, 95% CI −0.37 to 1.31), 24-hour opioid consumption (preoperative SMD −0.78, 95% CI −2.31 to 0.75; postoperative SMD −0.14, 95% CI −0.38 to 0.10), and complication rates (preoperative RR 0.62, 95% CI 0.25 to 1.57; postoperative RR 1.59, 95% CI 0.59 to 4.28). Despite the lack of statistical analysis, there appears to be a superior trend in favor of preoperative FIB. However, the studies in this meta-analysis differ in many technical aspects, making it difficult to properly interpret the data [29]. Although a concentration of 0.20% bupivacaine has been reported to have analgesic properties similar to 0.25% [30], higher quality randomized controlled trials are also needed to determine the optimal technique and injection volume for FICB [10]. In our study, the addition of SFICB at different time points did not result in a significant statistical difference in opioid consumption and complications. While moderate pain relief was similar between the groups, preoperative SFICB demonstrated superior efficacy in reducing severe pain levels.

Postoperative delirium (POD) is a frequent complication in surgical patients, with an incidence rate reported as high as 40% following hip fracture surgery. Continuous FICB has been shown to reduce the incidence of POD [31]. Additionally, perioperative peripheral nerve blocks (PNB) have been reported to lower the incidence of POD in elderly adults undergoing hip fracture surgery [32]. In elderly patients presenting to the emergency department with hip fractures, ultrasound-guided SFICB provided effective early analgesia, improved exercise tolerance, and enhanced sleep quality [33]. In our study, there was no difference in delirium scores between the preoperative and postoperative SFICB groups.

Meta-analyses have shown that preoperative FICB can reduce the incidence of POD in elderly patients without pre-existing cognitive impairment undergoing hip surgery. Furthermore, the use of spinal anesthesia instead of general anesthesia in these patients has been associated with a reduction in POD incidence when combined with preoperative FICB [34]. While PNBs have been shown to reduce postoperative neurocognitive dysfunction (PND) in cognitively intact elderly patients with hip fractures, no significant differences have been found between PNBs and analgesics in terms of PND incidence. Additionally, there are no meaningful differences in PONV rates or pain relief between PNB and analgesic groups [35]. Similarly, our study found no differences in delirium incidence or PONV rates between the preoperative and postoperative SFICB groups.

In this study, there were no missing data for any of the analyzed variables. All collected data were complete, ensuring the reliability and robustness of the statistical analyses. The absence of missing data eliminates potential biases related to data handling methods, thereby strengthening the validity of our findings.

Limitations

This study has several limitations that should be addressed in future research to provide a more comprehensive understanding of the effects of FICB. One notable limitation is that patients were not mobilized on the first postoperative day, preventing the classification of mobilization-related functional pain. While the study primarily focuses on immediate postoperative recovery, future research should incorporate objective mobility assessments to determine whether improved QoR-15 scores correlate with earlier mobilization. Larger cohort studies should also evaluate QoR-15 and pain scores at 48–72 h and assess mobility outcomes at 1–2 weeks postoperatively. Additionally, chronic pain, long-term morbidity, and mortality outcomes were not examined.

The exclusion of patients aged 65 years or older, those with a BMI ≥ 30, and individuals with severe organ dysfunction limits the generalizability of the findings to obese or high-risk surgical patients. Furthermore, the potential impact of obesity on the pharmacokinetics of siFICB and postoperative recovery remains unexplored, representing an important area for future research.

While the study demonstrates the benefits of preoperative siFICB, factors such as dexmedetomidine sedation and variations in preoperative fentanyl requirements may have influenced postoperative recovery. A sensitivity analysis for these variables may be necessary. The lack of patient blinding and sham block are additional methodological limitations of this study. These factors may have influenced the interpretation of results and should be considered in future research. Another limitation is the use of 0.20% bupivacaine, which warrants further investigation to determine its optimal concentration and efficacy.

Conclusions

While preoperative SFICB was associated with better postoperative QoR-15 scores compared to postoperative SFICB in elderly patients undergoing HHA, additional research is needed to determine the optimal preoperative timing of the block and perioperative settings. This study contributes to the existing body of evidence.

Abbreviations

ASA	American Society of Anesthesiologists
BMI	Body mass index
FIB	Fascia Iliaca Block
FICB	Fascia Iliaca Compartment Block
HHA	Hip hemiarthroplasty
N-DSS	Nursing Delirium Screening Scale
NRS	Numerical rank score
PACU	Post-anesthesia care unit
PCA	Patient-controlled analgesia
PNB	Peripheral nerve blocks
PND	Postoperative neurocognitive dysfunction
POD	Postoperative delirium
PONV	Postoperative nausea and vomiting
QoR-15	Quality of Recovery-15
RSS	Ramsay Sedation Scale
SFICB	Suprainguinal Fascia Iliaca Compartment Block
THA	Total hip arthroplasty
VAS	Visual analog scale

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12871-025-03060-8.

Supplementary Material 1

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Not applicable.

Author contributions

The research questions were formulated, and the study was designed by EM, OA, OS, MC, and FGO. Data analysis was carried out by EM, OS, OA, and MC. The manuscript was initially drafted by EM and MC. Critical review, editing, and approval of the manuscript were performed by EM, OA, OS, MC, and FGO. EM and OA finalized the manuscript, incorporating feedback from all authors. All authors contributed with comments and approved the final version of the manuscript.

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Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This prospective randomized trial was conducted following ethical approval from the Başakşehir Çam and Sakura City Hospital Ethics Committee (KAEK/2023.06.259) and was registered on ClinicalTrials.gov (ID: NCT05965544). All participants provided written and verbal informed consent before joining the study. The clinical trial was prospectively registered on July 20, 2023. This manuscript adheres to the applicable CONSORT guidelines and the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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