ORIGINAL ARTICLE

Comparison of pericapsular nerve group block and femoral nerve block in spinal anesthesia position analgesia for proximal femoral fractures in geriatric patients: a randomized clinical trial

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ABSTRACT

BACKGROUND: This study aimed to compare the analgesic efficacy of the femoral nerve block (FNB) with that of the pericapsular nerve group (PENG) block in the lateral decubitus position for spinal anesthesia in geriatric hip fracture surgery.

METHODS: Patients aged ≥65 years scheduled to undergo hip fracture surgery for proximal femur fractures with an American Society of Anesthesiologists physical status of class I–IV and body mass index of 18–40 kg/m^2 were included in the study. The PENG block or FNB was performed 20 min before positioning for spinal anesthesia. Lateral position, hip flexion, and lumbar spine flexion pain were evaluated during spinal anesthesia.

RESULTS: Sixty patients completed the study. The median pain scores for lateral positioning were 2 (0–4) and 2.5 in the PENG and FNB groups, respectively (P=0.001). The median pain scores during hip flexion were 1 (0–4) and 2.5 in the PENG and FNB groups, respectively (P<0.001). The median pain score during lumbar flexion was 1 (0–4) and 2.0 in the PENG and FNB groups, respectively (P=0.001). The two groups did not show a significant difference in the quality of the spinal anesthesia position (P>0.05).

CONCLUSION: Pre-operative PENG block is more effective in reducing the pain associated with spinal anesthesia position than FNB in geriatric hip fractures. Both blocks had a similar effect on posture quality and the number of spinal interventions.

Keywords: Femoral fractures; geriatrics; pain; spinal anesthesia.

INTRODUCTION

Hip fractures are the most common orthopedic trauma affecting geriatric patients.[1] The World Health Organization reports that the population over the age of 60 is expected to reach over 2.1 billion by 2050.[2] Over the years, the incidence of hip fractures has seen a notable rise, which can be attributed to the increasing elderly population.

Neuroaxial blocks are preferred over general anesthesia in hip fracture surgery due to their positive effects on morbidity and mortality.[3,4] Single-dose spinal anesthesia is the most common method of neuroaxial blocks.[5] Spinal anesthesia is commonly administered while the patient is seated or lying on their side in a lateral decubitus position.[5] However, performing spinal anesthesia in the sitting or lateral decubitus position in patients with hip fractures is a painful and difficult process.

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[6-8] The management of the pain that occurs during the positioning for spinal anesthesia contributes significantly to the success of anesthesia by increasing patient comfort and the quality of the patient's position during spinal anesthesia.[9-11]

Multimodal analgesia techniques are recommended for the management of pain during spinal anesthesia positioning.[8,12,13] Different regional analgesia techniques have been used with ultrasonography (USG) as alternatives to drugs, such as nonsteroidal anti-inflammatory drugs and opioids. The popularity of the pericapsular nerve group (PENG) block, which has recently been introduced as an alternative to the fascia iliaca compartment block (FICB) and femoral nerve block (FNB), has increased substantially.[8,12]

Girón-Arango et al. described PENG block in 2018 as a technique to manage acute pain in patients with hip fractures.[12] The PENG block is considered an effective analgesic technique for the hip joint due to its ability to target the articular branches of the accessory obturator nerve, femoral nerve, and a segment of the obturator nerve, all of which contribute to the highly complex innervation of the hip.[12] The PENG block mostly targets the sensory nerves in the anterior capsule of the hip joint, and it has been shown to contribute to effective physical therapy, early ambulation, and discharge among patients with hip fractures.[12,14-16] Although limited studies have been conducted comparing the efficacy of the PENG block with that of FNB for perioperative pain management in hip fractures, a specific study on the effects of the PENG block on spinal anesthesia position pain management is not available in the literature.[17,18]

Therefore, this study aimed to compare the analgesic efficacy of the PENG block with that of FNB in managing the pain due to lateral decubitus positioning for spinal anesthesia during hip fracture surgery in geriatric patients. The secondary objective of our study was to compare the effects of the PENG blocks with those of FNB on the quality of the patient's position for spinal anesthesia and the number of spinal anesthesia interventions. The hypothesis of this study was that PENG block during spinal anesthesia provides more effective analgesia and better postural quality than FNB for lateral decubitus position pain in geriatric patients undergoing surgery for hip fracture.

MATERIALS AND METHODS

This single-center, prospective, and randomized study was conducted at a tertiary hospital. University The Ethics Committee of the University (PN:2023/28) granted approval for this study. This study was carried out in adherence to the principles outlined in the Declaration of Helsinki. All participants were informed verbally and in writing and their informed consent was obtained. Patients aged ≥65 years who were scheduled to undergo hip fracture surgery for proximal femur fracture with an American Society of Anesthesiologists (ASA) physical status of class I–IV and a body mass index (BMI) between 18 and 40 kg/m^2 were included in the study. Patients who declined participation and patients with lumbar degenerative disease, coagulopathy, allergy to local anesthetics, mental disorders (with incomplete orientation and cooperation), and infection at the injection site were excluded from the study.

Randomization was performed using a computer-generated randomization sequence, and the patient allocation was concealed in sealed opaque envelopes. The patients who underwent the PENG block technique were allocated to the PENG block group, whereas those who underwent the FNB technique were allocated to the FNB group. Peripheral vascular access was gained after taking the patient to the operating theater, and routine monitoring was performed.

PENG Block

The patient was positioned in the supine position, and a linear ultrasound (USG) probe (2–5 MHz Vivid iq; GE Healthcare) was placed over the anterior inferior iliac spine in the transverse plane. The probe was then rotated counterclockwise by approximately 45° to align with the pubic ramus (Fig. 1). The iliopubic eminence, femoral artery, iliopsoas muscle and tendon, and pectineus muscles were visualized. A 10-mm 22 G block needle (Ultraplex®360, B BraunMelsungen, Germany) was advanced medially such that it was placed in the musculofacial plane between the anterior psoas tendon and posterior pubic ramus. After hydrolocation of the psoas tendon, 20 mL of 0.25% bupivacaine was injected in 5 mL increments after confirming negative aspiration.

FNB

The patient was positioned supine and a linear USG probe (2–5 MHz Vivid iq; GE Healthcare) was placed transversely in the inguinal region. The femoral vein in the medial, the femoral artery in the middle, and the fascia lata in the lateral and below the fascia iliaca, just above the iliopsoas muscle were visualized. After imaging the femoral artery, the femoral nerve usually appears as a hyperecoic mottled oval or triangular structure just lateral to the artery. Subsequently, a 10-mm 22 G block needle (Ultraplex®360, B Braun Melsungen, Germany) was advanced medially using the in-plane technique, and the femoral nerve was reached laterally to the femoral artery. After confirming negative aspiration, 20 mL of 0.25%

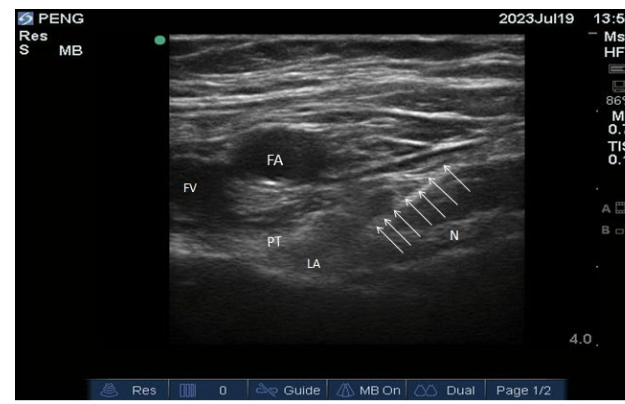

Figure 1. Ultrasound image of the PENG block.

bupivacaine local anesthetic was injected in 5 mL increments. The patient was placed in the lateral decubitus position 20 min after the end of the block, and spinal anesthesia was initiated. Spinal anesthesia was induced using 3 mL of 0.5% hyperbaric bupivacaine in both groups. All interventional procedures were performed by three anesthesiologists with at least 5 years of experience.

The demographic data of the patients, including the sex, age (years), height (cm), weight (kg), BMI (kg/m^2), and ASA physical status (I–IV), were recorded. The presence of comorbidities was extracted from the patient records and medical histories. The fracture type was recorded as femoral neck or intertrochanteric fracture. The surgical techniques included partial hip prosthesis, proximal femoral nail, open reduction and internal fixation, intramedullary nail, cannulated screws, and total hip arthroplasty. The total anesthesia duration (minutes) referred to the time interval starting from the initiation of spinal anesthesia until the completion of the surgery, and the duration of the surgical procedure (minutes) as recorded as the time from the surgical incision to the completion of the surgery.

Resting pain before the block was recorded using the visual analog scale score (0–10). The patients were positioned in the lateral decubitus position 20 min after the end of the block, and the pain scores were evaluated for the lateral position, hip flexion, and flexion of the lumbar spine. Pain during positioning was evaluated as follows: 0, calm; 1, grimacing; 2, moaning; 3, shouting; and 4, inability to continue the procedure due to restlessness or agitation. The quality of the positioning was rated as follows: 0, weak hip flexion ≤30°; 1, adequate hip flexion 30°–<60°; 2, good hip flexion between 60° and <90°; and 3, optimal hip flexion ≥90°. The number of lumbar punctures performed under spinal anesthesia was recorded. General anesthesia was administered if spinal anesthesia could not be administered on the fourth attempt. The incidence of complications (hypotension, bradycardia, desaturation, agitation, and inadequate anesthesia) during the perioperative period was noted.

Sample Size and Statistical Analysis

We performed the power analysis of the study using G*Power 3.1.9.4 statistical package program. The primary goal of the present study was to compare the pain scores in lateral positioning for spinal anesthesia. In our pilot study of 10 patients, one patient had a pain score of ≥3 in the PENG group, and five patients had a pain score of ≥3 in the FNB group. To achieve a power of 90% power and an α error of 0.05, at least 29 patients should have been included in each group in the study. We included 30 patients in each group.

Continuous variables are expressed as means ± SD or median (Q1–Q3). The Shapiro–Wilk test was used for evaluating the normality of the data distribution. The analysis of normally distributed data was performed using an independent t-test, whereas the non-normally distributed data were analyzed using the Mann–Whitney U-test. P<0.05 was considered statistically significant. Categorical variables are presented as numbers (percentages) and were assessed using Pearson's Chi-square test (χ2) or Fischer's exact test. Statistical analyses were performed using the IBM SPSS Statistics version 25 (IBM).

RESULTS

Between February 2023 and August 2023, 83 patients were evaluated for eligibility. Sixteen patients did not meet the appropriate criteria for the study, and five did not want to participate in the study. After obtaining written informed consent, 62 patients were enrolled in the study and randomized (Fig. 2). One patient in the PENG group withdrew consent

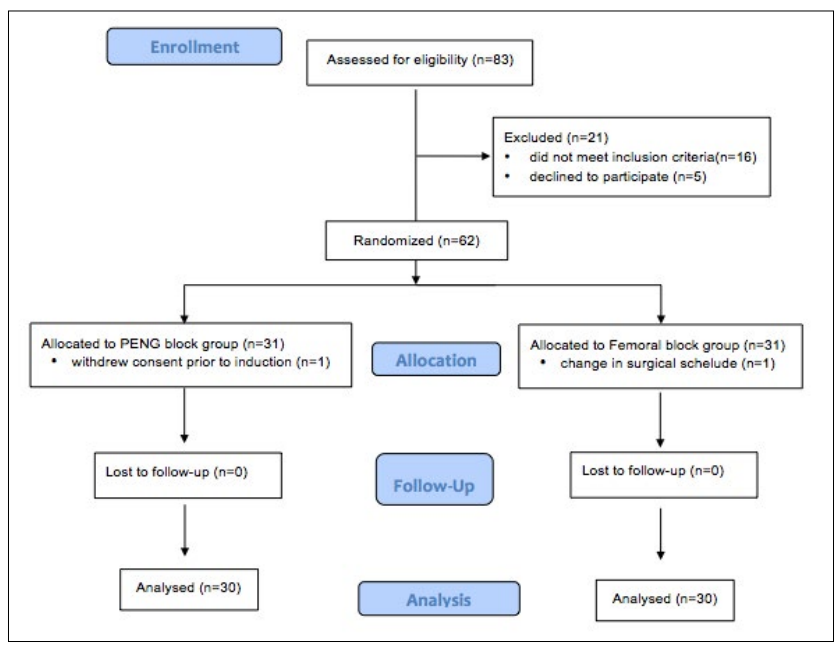

Figure 2. Flow diagram.

Table 1. Demographic data of patiens

	PENG block group (n=30)	Femoral block group (n=30)	P-value
Age (years)	76.70±9.92	78.77±8.91	0.400†
Weight (kg)	71.60±14.13	67.41±12.13	0.228†
Height (cm)	162.10±9.97	160.04±7.71	0.403†
BMI (kg/m^2)	27.25±5.03	26.46±4.21	0.532†
Gender (F:M)	18:12 (60%:40%)	22:8 (73.3%:26.7%)	0.273*
ASA physical status	2:8:17:3	1:12:16:1	0.539*
(I:II:III:IV)	(6.7%:26.7%:56.7%:10.0%)	(3.3%:40.0%:53.3%:3.3%)	

The data are mean ± SD or number (%). PENG: Pericapsular nerve group; BMI: Body mass index; ASA: American society of anesthesiologists. †Independent samples t-test; *Chi-square test.

Table 2. Comorbidities of patients (yes/no)

	PENG block group (n=30)	Femoral block group (n=30)	P-value
Epilepsy	1:29 (3.3%:96.7%)	1:29 (3.3%:96.7%)	1.000**
Parkinson's disease	2:28 (6.7%:93.3%)	3:27 (10.0%:90.0%)	1.000**
Rheumatic disease	0:30 (0%:100%)	1:29 (3.3%:96.7%)	1.000**
Hyperlipidemia	1:29 (3.3%:96.7%)	0:30 (0%:100%)	1.000**
Hypothyroidism	2:28 (6.7%:93.3%)	0:30 (0%:100%)	0.492**
Congestive heart failure	2:28 (6.7%:93.3%)	6:24 (20.0%:80.0%)	0.254**
Cancer	3:27 (10.0%:90.0%)	0:30 (0%:100 %)	0.237**
Coronary artery disease	6:24 (20.0%:80.0%)	2:28 (6.7%:93.3%)	0.254**
Cerebrovascular disease	3:27 (10.0%:90.0%)	2:28 (6.7%:93.3%)	1.000**
Benign prostatic hyperplasia	3:27 (10.0%:90.0%)	0:30 (0%:100%)	0.237**
Chronic kidney disease	1:29 (3.3%:96.7%)	4:26 (13.3%:86.7%)	0.353**
Asthma	1:29 (3.3%:96.7%)	3:27 (10.0%:90.0%)	0.612**
Diabetes mellitus	9:21 (30.0%:70.0%)	7:23 (23.3%:76.7%)	0.559*
Hypertension	25:5 (83.3%:16.7%)	21:9 (70.0%:30.0%)	0.222*
Chronic pulmonary disease	6:24 (20.0%:80.0%)	3:27 (10.0%:90.0%)	0.472**
Arrhythmia	3:27 (10.0%:90.0%)	3:27 (10.0%:90.0%)	1.000**

The data is number (%). PENG: Pericapsular nerve group ** Fischer's exact test, *Chi-square test.

just before undergoing the block, and the surgical procedure was changed for one patient in the FNB group. Thus, 60 patients completed the study without any side effects or complications.

The mean age of the patients is 77.33±9.40 years; the mean height, weight, and BMI are 161.16±8.99 cm, 69.54±13.24 kg, and 26.89±4.65 kg/cm^2, respectively. Forty (66.7%) patients were female and 20 (33.3%) patients were male. No difference was found when the two groups were compared in terms of demographic characteristics (Table 1).

Comparison between the comorbidities of the two groups revealed no significant differences (Table 2). The three most common comorbidities in the PENG group were hypertension (n=25, 83.3%), diabetes mellitus (n=9, 30%), and coronary artery disease (n=6, 20%), whereas those in the FNB group were hypertension (n=21, 70%), diabetes mellitus (n=7, 23.3%), and congestive heart failure (n=6, 20%). Two patients aged 67 and 65 years in the PENG group (6.7%) and one patient (3.3%) aged 64 years in the FNB group had no comorbidities.

Table 3 presents the parameters related to anesthesia and surgical features evaluated in the present study. Intertrochanteric fractures (n=20, 66.7%) were more common in the PENG group, whereas femoral neck fractures and intertro-

Table 3. Intraoperative data of patients

Variable	PENG block group (n=30)	Femoral block group (n=30)	P-value
Type of fracture (1:2)	10:20 (33.3%:66.7%)	15:15 (50.0%:50.0%)	0.190*
Surgical techniques	6:19:0:3:1:1	12:14:1:1:2:0	0.297*
(1:2:3:4:5:6)	(20.0%:63.3%:0.0%:10.0%:3.3%:3.3%)	(40.0%:46.7%:3.3%:3.3%:6.7%:0.0%)	
Total anesthesia time (min)	155.10±45.49	155.30±31.85	0.987†
Surgical procedure time (min)	128.55±45.42	127.00±35.33	0.905†
The number of lumbar puncture attempts	1.00 (1.00–2.00)	1.50 (1.00–2.00)	0.140††

are number (%), mean±SD or median (Q1, Q3). PENG: Pericapsular nerve group. Type of fracture 1: Femur neck fracture, 2: Intertrochanteric fracture. Surgical techniques 1. Partial hip protesis, 2: Proximal femur nail; 3: Open reduction and internal fixation; 4: İntramedullar nail; 5: Cannulated screws; 6: Total hip arthroplasty. *Chi-Square test, †Independent samples t-test; ††Mann–Whitney U-test.

Table 4. Pain scores related to positional changes during spinal anesthesia procedures

Variable	PENG block group (n=30)	Femoral block group (n=30)	P-value
Pre-operative VAS (0–10)	5.00 (4.00–6.00)	5.00 (4.75–6.00)	0.742††
Lateral position	3:9:15:3:0	1:4:10:15:0	0.008*
(0:1:2:3:4) n: (%)	(10.0%:30.0%:50.0%:10.0%:0%)	(3.3%:13.3%:33.3%:50.0%:0%)	
median (Q1-Q3)	2.00 (1.00–2.00)	2.5 (2.00–3.00)	0.001††
Hip flexion	1:15:13:1:0	1:3:11:14:1	
(0:1:2:3:4) n: (%)	(3.3%:50.0%:43.3%:3.3%:0.0%)	(3.3%:10.0%:36.7%:46.7%:3.3%)	<0.001*
median (Q1-Q3)	1.00 (1.00–2.00)	2.5 (2.00–3.00)	<0.001
Lomber flexion	4:16:8:2:0	1:7:13:8:1	
(0:1:2:3:4) n: (%)	(13.3%:53.3%:26.7%:6.7%:0.0%)	(3.3%:23.3%:43.3%:26.7%:3.3%)	0.025*
median (Q1-Q3)	1.00 (1.00–2.00)	2.00 (1.00–3.00)	0.001††
Quality of patient position	5:7:14:4	5:14:10:1	0.187*
(0:1:2:3) n: (%)	(16.7%:23.3%:46.7%:13.3%)	(16.7%:46.7%:33.3%:3.3%)	
median (Q1-Q3)	2.00 (1.00–2.00)	1.00 (1.00–2.00)	0.115††

The data are number (%) or median (Q1, Q3). PENG: Pericapsular nerve group, VAS: Visual analog scale. *Chi-Square test, ††Mann–Whitney U-test.

chanteric fractures occurred equally in the FNB group. Proximal femoral nail (n=33, 55%) and partial hip replacements (n=18, 30%) were the most commonly performed surgeries. No significant distinctions were noted among the groups concerning the duration of anesthesia, duration of surgery, or the number of lumbar puncture interventions (p>0.05).

Table 4 presents the comparison of the pain scores related to positional changes during spinal anesthesia. The most common pain sign during lateral positioning in the PENG group was "moaning" (n=15, 50%), whereas the most common pain sign was "shouting" in the FNB group (n=15, 50%). The median pain scores during lateral positioning were 2 (0–4) and 2.5 (0–4) in the PENG and FNB groups, respectively (p=0.001). "Grimacing" was the most common pain sign in the PENG group during hip flexion and lumbar flexion, whereas "moaning" was the most common pain sign in the FNB group. The median pain scores during hip flexion were 1 (0–4) and 2.5 (0–4) in the PENG and FNB groups, respectively (p<0.001). The median pain scores during lumbar flexion were 1 (0–4) and 2.0 (0–4) in the PENG and FNB groups, respectively (p=0.001). The most common patient position quality was "good hip flexion" (n=14, 46.7%) in the PENG group and "adequate hip flexion" (n=14, 46.7%) in the FNB group. The two groups showed similar results regarding the quality of the patient's position during spinal anesthesia, and the differences were not statistically significant (p>0.05).

Table 5 presents the perioperative hemodynamic side effects and complications. No significant differences were observed between the groups in terms of complications. Hypotension was the most common complication in the PENG (n=11, 36.7%) and FNB (n=10, 33.3 %) groups. No patient was considered to have "inadequate anesthesia" in the PENG group,

Table 5. Perioperative hemodynamic adverse effects and complications. (yes/no)

Variable	PENG block group (n=30)	Femoral block group (n=30)	P-value
Hypotension	11:19 (36.7%:63.3%)	10:20 (33.3%:66.7%)	0.787*
Bradycardia	2:28 (6.7%:93.3%)	3:27 (10.0%:90.0%)	1.000**
Desaturation	3:27 (10.0%:90.0%)	4:26 (13.3%:86.7%)	1.000**
Agitation	1:29 (3.3%:96.7%)	2:28 (6.7%:93.3%)	1.000**
Inadequate anesthesia	0:30 (0.0%:100.0%)	4:26 (13.3%:86.7%)	0.112**
Transition to general anesthesia	1:29 (3.3%:96.7%)	2:28 (6.7%:93.3%)	1.000**

The data is number (%). PENG: Pericapsular nerve group. **Fischer's exact test, *Chi-square test.

and one patient was returned to general anesthesia (3.3%). Four patients (13.3%) were considered to have "inadequate anesthesia" in the FNB group, and 2 patients (6.7%) were returned to general anesthesia. The patients received spinal anesthesia after the block, so inadequate anesthesia is related to the spinal anesthesia, not the pre-spinal blocks.

DISCUSSION

Our study showed that the analgesic efficacy of the PENG block was superior to that of the FNB in managing the pain caused by lateral positioning, hip flexion, and lumbar flexion before spinal anesthesia in geriatric hip fractures. There was no difference between the blocks in terms of the quality of the patient's position during spinal anesthesia or the number of spinal anesthesia interventions.

Severe pain after a hip fracture greatly impairs patient comfort during the pre-operative period. The intensity of movement-related pain increases during the pre-operative period, which affects the success of the procedure and patient comfort in cases where positioning is required, such as during spinal anesthesia.[19] Regional analgesia techniques are effective for pain management in geriatric hip fracture surgeries, and FNB, FICB, and lumbar plexus block are the most commonly used techniques for this region.[7,11,20]

FNB is one of the most commonly used methods for managing perioperative pain in hip fractures.[11,19,20] However, the effect of FNB on motor nerves can cause loss of strength in the quadriceps muscle and adversely affect the ambulation, rehabilitation, and discharge processes, especially in geriatric patients.[18] In addition, FNB does not act on all of the nerves that provide sensory innervation to the hip joint.[21] This has led to the introduction of alternative regional techniques. The PENG block is one such technique described by Girón-Arango et al. in 2018 that aids in the management of acute pain caused by hip fractures.[12]

The anterior capsule of the hip joint has more nociceptive fibers, whereas the posterior capsule is predominantly composed of mechanoreceptors.[14] The obturator, accessory obturator, and femoral nerves provide innervation of the anterior capsule.[14] The PENG block, which covers the articular branches of the femoral nerve, accessory obturator nerve, and part of the obturator nerve, appears to be a highly suitable and effective block for the hip joint.[12] The previous studies have shown that the PENG block anesthetizes the nerves that innervate the hip joint to provide effective analgesia by acting only on the joint branches and does not delay early ambulation by not causing a motor block.[16,18] In addition, it can be administered with a single injection in the supine position without having to place the patient in a position that causes pain.[10,12] Furthermore, the PENG block mostly targets the sensory nerves in the anterior capsule, thereby contributing to effective physical therapy and early discharge.[21]

Randomized controlled trials examining the effects of various regional analgesia methods on the pain caused by spinal anesthesia position and spinal success in patients with hip fractures have shown that these methods reduce pain and increase the success rate of spinal anesthesia.[3,5,13-15] Acharya and Lamsal, in their study of 10 cases of hip fractures, reported that performing the PENG block in the pre-operative period reduced positional pain and increased patient comfort during positioning for spinal anesthesia.[10] Similarly, Mistry et al., in their study of five patients with acetabular fractures, reported that the PENG block reduced positional pain and the need for salvage analgesics when the patient was brought into a sitting position for spinal anesthesia.[6] In their retrospective study of 48 patients with hip fractures, Hua et al. reported that the PENG block reduced spinal anesthesia position pain more effectively than the FICB block.[16] In the present study, we showed that the PENG block may be more beneficial than FNB for the management of spinal anesthesia position pain.

No previous study has compared the effects of the PENG block with those of FNB on spinal anesthesia position pain and spinal anesthesia success in the pre-operative period. Two previous studies have compared the effects of the PENG block with those of FNB on post-operative analgesic efficacy and opioid use in patients with femoral fractures.[17,18] In the study by Lin et al., in addition to lesser pain in the post-operative ward in the PENG group, the two blocks had similar analgesic effects in the post-operative period, and the effects

of post-operative opioid use were similar in both studies.[17,18]

In the present study, no statistically significant differences were observed in terms of the quality of the patient's position during spinal anesthesia or the number of spinal interventions. This may be attributed to the lack of a difference in the quality of the patient's position during spinal anesthesia between the groups as our population consisted of geriatric patients. The quality of the patient's position during spinal anesthesia does not change significantly among geriatric patients due to joint changes during the chronic period.[22] Thus, the number of spinal interventions was similar.

Although there was no difference between the groups in terms of perioperative complications due to inadequate anesthesia in the present study, no patient in the PENG group had any complications due to "inadequate anesthesia." This result can probably be considered a positive contribution of the PENG block to surgical anesthesia. In the geriatric population, "agitation" due to regional anesthesia is an important cause of concern. This situation is supported by the fact that three patients who "transitioned to general anesthesia" among our patients also experienced agitation.

Treating hip fracture positional pain in the emergency department is other important issue for patient comfort. Güllüpınar et al. used PENG block for this purpose and found a significant decrease in both pain scores and analgesic amount.[23] In this respect, PENG block seems to be a reasonable regional block even in non-anesthesia practice settings.

The present study has some limitations. The first limitation is that it was a single-center study with relatively few patients and a limited number of anesthesiologists. Another Second limitation is that we used a subjective assessment method to measure the quality of the patient's position during spinal anesthesia, similar to other studies.[7] Moreover, we did not evaluate post-operative pain using secondary measurements, which can be considered a limitation in terms of evaluating the effectiveness of the PENG block. Another limitation of our study is that time from injury to surgery was not evaluated.

CONCLUSION

Pre-operative PENG block was more effective in reducing spinal anesthesia position pain than FNB in geriatric patients. Both blocks had a similar effect on the quality of the patient's position during spinal anesthesia and the number of spinal interventions. Thus, the PENG block can be used as a new method with the added advantage of its positive effect on the entire perioperative process in geriatric hip fractures and safety.

Ethics Committee Approval: This study was approved by the Gulhane Training And Research Hospital Ethics Committee (Date: 15.02.2023, Decision No: 2023/28).

Peer-review: Externally peer-reviewed.

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ORİJİNAL ÇALIŞMA - *ÖZ*

Geriatrik hastalarda proksimal femur kırıklarında spinal anestezi pozisyonu analjezisinde perikapsüler sinir grubu bloğu ile femoral sinir bloğunun karşılaştırılması: Randomize klinik çalışma

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AMAÇ: Bu çalışmada, geriatrik hastalarda kalça kırığı cerrahisinde spinal anestezi için lateral dekübit pozisyonu verildiğinde oluşan ağrı üzerine femoral sinir bloğu ile perikapsüler sinir grubu bloğunun analjezik etkinliğinin karşılaştırılması amaçlanmıştır.

GEREÇ VE YÖNTEM: Proksimal femur kırığı nedeniyle kalça kırığı cerrahisi geçirmesi planlanan ≥65 yaş, Amerikan Anestezistler Derneği fiziksel değerlendirmesinde sınıf I-IV arasında olan ve vücut kitle indeksi 18-40 kg/m^2 olan hastalar çalışmaya dahil edildi. Perikapsüler sinir grubu bloğu veya femoral sinir bloğu spinal anestezi için pozisyondan 20 dakika önce yapıldı. Spinal anestezi sırasında lateral pozisyon, kalça fleksiyonu ve lomber omurga fleksiyonu verilmesi sırasında oluşan ağrılar değerlendirildi.

BULGULAR: Altmış hasta çalışmayı tamamladı. Lateral pozisyon verirken oluşan medyan ağrı skorları sırasıyla perikapsüler sinir grubunda 2 (0-4) ve femoral sinir bloğu gruplarında 2.5 idi (p=0.001). Kalça fleksiyonu verirken oluşan medyan ağrı skorları sırasıyla perikapsüler sinir grubunda 1 (0-4) ve FNB gruplarında 2.5 idi (p<0.001). Lomber fleksiyon sırasında oluşan medyan ağrı skoru sırasıyla perikapsüler sinir grubunda 1 (0-4) ve femoral sinir bloğu gruplarında 2.0 idi (p=0.001). İki grupta spinal anestezi pozisyonunun kalitesinde anlamlı bir fark görülmedi (p>0.05).

SONUÇ: Geriatrik kalça kırıklarında preoperatif perikapsüler sinir grubu bloğu spinal anestezi pozisyonuna bağlı ağrının azaltılmasında femoral sinir bloğuna göre daha etkilidir. Her iki blok da duruş kalitesi ve spinal girişim sayısı üzerinde benzer bir etkiye sahiptir.

Anahtar sözcükler: Ağrı; femur kırıkları; geriatri; spinal anestezi.

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