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Comparison of patient and surgeon satisfaction in patients undergoing knee arthroscopy with peripheral nerve block versus spinal anesthesia

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ABSTRACT

Objective. This study aims to compare two different methods of regional anesthesia applied for knee arthroscopy in terms of patient and surgeon satisfaction. *Materials and Methods*. Eighty patients who underwent knee arthroscopy either with spinal anesthesia (SA) or unilateral sciatic and femoral nerve block (SFNB) were included in the study. A nurse conducted a blind study questionnaire to assess the surgeon and patient satisfaction from anesthesia performed at the end of the surgery. Pain score, demographical data, duration of surgery, motor and sensory block duration, time of first rescue analgesia were recorded and analyzed statistically. *Results*. A statistically significant difference was found between the patient ($p = 0.001$; $p < 0.01$) and surgeon ($p = 0.022$; $p < 0.05$) satisfaction rates, these being lower in the group with SFNB comparable to patients with spinal anesthesia. There was a statistically significant difference between the first analgesic requirements of the patients according to the groups ($p = 0.001$; $p < 0.01$). The first analgesic requirement of the patients who received SFNB was later than in the case of patients who received spinal anesthesia. *Conclusions*. Patient and surgeon satisfaction with SA was significantly higher than SFNB. The peripheral nerve blocks are inadequate for patient and surgeon satisfaction for knee arthroscopy compared to SA.

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Introduction

Knee arthroscopy is a minimally invasive, outpatient surgical procedure [1]. It can be performed either with regional or under general anesthesia [2]. Perioperative complications with unanticipated hospital stays are a severe financial burden on the health system. Preventing or reducing them is the primary concern after surgery [3-5].

While perioperative mortality and morbidity have been the basis of all medical practices to date, patient satisfaction has also been added to these today. Evaluating patient satisfaction has become a new and necessary issue in both hospitals and anesthesia practice.

Measuring patient satisfaction is a complex and challenging issue. The authors have published detailed information about this subject. There are many recommendations for the best training in anesthesia, but there is no established standard method yet for assessing patient satisfaction [6]. Patients' satisfaction can also be a measurement tool for the quality of anesthesia for both patients and surgeons [6,7].

Regional anesthesia is superior to general anesthesia in preventing or reducing perioperative complications. For these reasons, physicians prefer neuraxial anesthesia or peripheral nerve blocks to general anesthesia, especially in the elderly patient population with cognitive dysfunctions [8,9]. However, with new short-acting agents used in general anesthesia, the time to discharge after general anesthesia has been reported to be shorter than neuraxial anesthesia [10].

The main concern related to regional anesthesia is remaining awake, headache, and backache, and surgeons' choice plays an essential role in patients' peripheral nerve block refusal despite the anesthesiologist [9,11]. Therefore, patient and surgeon satisfaction have great importance in determining the type of anesthesia.

This study compared two different regional anesthesia methods applied for knee arthroscopy for patient and surgeon satisfaction.

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Materials and Methods

After the ethics committee's approval (Decision no: 598, Date: February 14, 2017), and informed consent of the patient, this prospective observational study was conducted over a year from May 1, 2018, to May 1, 19, at the Anesthesiology and Reanimation Department of the Okmeydanı Training and Research Hospital. We enrolled eighty patients, aged between 18-70, with ASA I, II, and III, who underwent unilateral knee arthroscopy under either spinal anesthesia (SA) or unilateral sciatic and femoral nerve block (SFNB) and conducted the study under two groups.

Patients with pre-existing neurological deficit or disorder, bleeding diathesis, a history of hypersensitivity to local anesthetics (LA), psychiatric illness, mental retardation, and switched from regional anesthesia to general anesthesia were excluded from the study.

Eighty patients who underwent knee arthroscopy either with SA or SFNB consecutively were registered into one of the study groups in the post-anesthesia care unit (PACU) by an anesthesiologist blind to the study. There were 40 patients in each group. At the end of the surgery, the nurse conducted a blind questionnaire of study to assess the surgeon and patient satisfaction from anesthesia performed, which was the first endpoint of this study. An anesthesiologist performed a blind evaluation of the study regarding the patient satisfaction, with 4-point scale (1: excellent; no pain or discomfort, 2: good; mild pain and discomfort that does not require analgesia or sedation, 3: moderate; pain or discomfort tolerable with additional analgesic or sedation, 4: bad; not tolerable even with narcotic pain killers or sedation). The surgeon's satisfaction was assessed with the 3-point scale (1: good, 2: sufficient, 3: unfavorable). Pain score was set using the visual analog scale (VAS) over 10 (10 means the most severe pain and 0 indicates the absence of pain), at 10th minutes, 30th minutes, and 2nd, 6th, 12th, and 24th-hours postoperatively which was the second endpoint of the study. Demographical data, duration of surgery, duration of motor and sensory block, time of first rescue analgesia, and complications were also recorded and analyzed statistically.

Fifty percent of the patients in the study were allocated (n:40) in the SA group and received SA. SA, performed with 25 G spinal needles (EGEMEN, 25GX90mm, Quinke Grinded Spinal Anesthesia Needle, Izmir, Turkey) and 4 ml 0.5% hyperbaric bupivacaine in a sitting position with the median approach at the level of L3-L4.

The other half of the patients in the study (n:40) were in the SFNB group. The unilateral SFNB was performed under ultrasound guidance using a peripheric nerve stimulator with 150-mm needles (Stimuplex® Ultra 360® 20 Ga. X 6 inch (150 mm) 30° Beveled and Insulated Echogenic Needle with Extension Set) and ultrasound (Mindray Mobile Trolley M5 UMT-200) and linear probes (PL1E-30-43-611 MODEL:7L4s probe) with in-plane technique. For ultrasound-guided sciatic and femoral nerve block, patients received 20 mL of 0.25% bupivacaine (50 mg) and 20 mL of 2% prilocaine (200 mg).

Statistical Analysis

NCSS (Number Cruncher Statistical System) program was used for statistical analysis. Descriptive statistical methods (mean, standard deviation, median, frequency, ratio, minimum, maximum) were used while evaluating the study data. The suitability of quantitative data to normal distribution was tested by Kolmogorov-Smirnov, Shapiro-Wilk test, and graphical evaluations. Student t-Test was used for two-group comparisons of quantitative data with normal distribution. The Mann-Whitney U test was used for two-group comparisons of data that did not show normal distribution. Pearson's Chi-Square test was used to compare qualitative data. Significance was assessed at least at the $p < 0.05$ level.

Results

We matched the groups for age, sex, BMI, surgery duration, motor, and sensory block duration, time of first rescue analgesia, patient and surgeon satisfaction (Table 1), and pain score levels (Table 2).

Table 1. Evaluation of Descriptive Characteristics According to The Groups

		SFNB (n=40)	**SA (n=40)**	***p-value***
Age (years)	*Mean±SD*	41,33±14,79	46,25±11,84	***[a]0,104***
Gender; *n (%)*	**Female**	9 (22,5)	17 (42,5)	***[b]0,056***
	Male	31 (77,5)	23 (57,5)	
BMI (kg/m^2)	*Mean±SD*	25,92±2,93	25,37±2,72	***[a]0,345***
Surgery Duration (minutes)	*Mean±SD*	62,15±19,26	62,40±22,71	***[c]0,954***
Time For Rescue Analgesia (hours)	*Mean±SD*	9,33±4,57	6,43±1,89	***[c]0,001*** **
Motor Block Duration (Hours)	*Mean±SD*	13,68±2,36	1,15±0,36	***[c]0,001*** **
Sensorial Block Duration (hours)	*Mean±SD*	28,98±2,95	3,65±0,92	***[c]0,001*** **
Patient's Satisfaction; *n (%)*	**Yes**	13 (32,5)	37 (92,5)	***[b]0,001*** **
	No	27 (67,5)	3 (7,5)	
Surgeron's Satisfaction; *n (%)*	**Yes**	25 (62,5)	34 (85,0)	***[b]0,022****
	No	15 (37,5)	6 (15,0)	

*[a]Studen t Test [b]Pearson Ki-kare Test [c]Mann Whitney U Test **p<0.01 *p<0.05*

Table 2. Evaluation of Pain Score Levels According to Groups

VAS Score	SFNB (n=40) *Mean±SD*	SA (n=40) *Mean±SD*	*P*
10th min.	0	0	**-**
30th min.	0	0	**-**
2nd-hour	0,05±0,32	0,30±0,69	***[c]0,015****
6th-hour	2,33±1,46	5,33±0,97	***[c]0,001****
12th-hour	5,00±2,03	4,75±1,28	***[c]0,042****
24th-hour	1,83±1,45	2,45±1,20	***[c]0,032****

[c]Mann Whitney U Test ***p<0.01* **p<0.05*

According to the groups, the age and gender distribution of the cases do not show a statistically significant difference (Table 1, p> 0.05). There is no statistically significant difference in the duration of surgery between the groups (Table 1, p> 0.05). There was a statistically significant difference between the first analgesic requirements of the patients according to the groups (p = 0.001; p <0.01); The first analgesic requirement of the patients who received SFNB was later than the patients who received spinal anesthesia (Table 1).

We found a statistically significant difference between the duration of the motor and sensory block of the cases according to the groups (p = 0.001; p <0.01). The duration of motor and sensory block in patients with SFNB is longer than cases with spinal anesthesia (Table 1).

A statistically significant difference was found between the patient (p = 0.001; p <0.01) and surgeon (p = 0.022; p <0.05) satisfaction rates of the cases according to the groups. Patient and surgeon satisfaction rates in patients with SFNB are lower than patients with spinal anesthesia (Table 1).

A statistically significant difference was found between the 2nd (p = 0.015; p <0.05), 6th (p = 0.001; p <0.01), 12th (p = 0.042; p <0.05) and 24th-hour (p = 0.032; p <0.05) VAS scores of the cases according to the groups. The 2nd, 6th, and 24th-hour VAS scores of patients who underwent SFNB were lower than those who received spinal anesthesia. The 12th-hour VAS scores of patients who underwent SFNB were higher than those who received spinal anesthesia (Table 2). There was no complication noted during the study related to the regional anesthesia performed.

Discussion

This study evaluated patient and surgeon satisfaction, which was our first endpoint after surgery in patients who underwent unilateral knee arthroscopy with SA or SFNB. Statistical analysis of the data showed us that; unilateral knee arthroscopy with SA is associated with higher patient and surgeon satisfaction than SFNB. Patient satisfaction can also be used as an indicator of the quality of anesthesia care [7]. When SFNB is applied with a nerve stimulator under ultrasonography, the risk of complications is almost nonexistent. However, when compared to SA, the fact that SFNB is not a practical, easy-to-apply method such as SA that does not require equipment is not sufficient for patient and surgeon satisfaction.

Nerve block requires interventions from multiple and different anatomical regions, which is difficult to accept for patients. Requiring patient cooperation prevents it from being performed under sedation. The results of this study also support them. However, in this study, it was observed that SFNB provided more effective and longer postoperative analgesia compared to SA, and the additional analgesic requirement was later and less. Unlike patients who underwent SA, the absence of complications related to central blocks in patients with SFNB is another advantage. Therefore, SFNB is a more effective and reliable method in postoperative analgesia after knee arthroscopy.

Postoperative pain and mobilization have special importance for women who gave birth due to their responsibility for their newborn and to decrease thrombosis risk, which was increased with pregnancy. As a previously published study has shown, individual and adequate pain management is needed for women who have a cesarean delivery, as high pain levels interfere with early baby care and breastfeeding [9]. This is a well-known topic, and guidelines have some recommendations for postoperative care of women who give birth by cesarean section based on evidence, such as early and sufficient nutrition, early mobilization, prevention of thromboembolism, and glycemic control [10]. As postoperative pain control and comfort, be of particular importance for these issues, various anesthesia and analgesia modalities have been evaluated and compared. First of all, general and regional anesthesia were evaluated in a Cochrane review, and no evidence was shown that regional is superior to general anesthesia-related to the main maternal or neonatal outcomes [11].

Following the Cochrane review, further research was undertaken to investigate maternal-fetal outcome following general or regional anesthesia, one of these studies showed that the group undergoing general anesthesia was associated with greater maternal blood loss and a greater proportion of newborns with a 5-minute Apgar score <7 cesarean sections according to the spinal group during. Postpartum pain control and quality of life were also compared between the two types of anesthesia, and it was shown that compared to general anesthesia, neuraxial anesthesia is the preferred techniques such as spinal or epidural for cesarean they also provide effective pain control, mobility, and quick return to daily activities for new mothers and improves their quality of life [12].

Different regional anesthesia modalities such as epidural and spinal anesthesia were compared for postpartum pain control, it was observed that postoperative epidural ropivacaine use in pregnant women undergoing elective cesarean section was similar to patient-controlled epidural analgesia after spinal and epidural anesthesia. However, spinal anesthesia is accompanied by less postoperative pain, additional analgesic use, and side effects. Other interventions were introduced to control post-cesarean postpartum pain, one of which was suggested to be intravenous acetaminophen. The study revealed that the preoperative use of acetaminophen at an intravenous dose of 1 g did not reduce postoperative opioid drug doses or milligram equivalents of morphine, and did not decrease post caring period of stay. Postoperative pain after cesarean section affects early and late functional recovery. It is not easy to predict patients who are at risk for severe post-cesarean pain and the only way to improve postoperative pain management after cesarean section is to educate all involved individuals in this period. For this reason, further interventions have been introduced to obtain optimal results, two postpartum pain control modalities were proposed to be quadratus lumborum and transversus abdominis blocks. In a study, 76 women received either a quadratus lumborum block or a transversus abdominis plane block for postoperative pain relief. According to the results of the study, TAP block was less effective than QLB in reducing morphine demand and consumption. In another study, the importance of effective postoperative analgesia after the cesarean section was emphasized and it was recommended to provide early ambulation and facilitate breastfeeding. In another study, QLB was added to multimodal analgesia for postoperative pain after cesarean section in 50 patients. Patients in the QLB group revealed decreased morphine demand than control but there was a statistically significant difference in pain scores [13].

There are three meta-analyses published update including studies on postoperative quadratus lumborum block for post cesarean analgesia with a different conclusion, the one including 12 trials with the cumulative intravenous morphine equivalent consumption at 24 has a primary outcome, the meta-analysis showed us that intrathecal morphine, eliminates the benefits either of the TAP block or QLB for postoperative analgesia after cesarean section. TAP block also decreased nausea and vomiting incidence and the need for sedation with intrathecal morphine than controls, similar results have been shown in a recently published meta-analysis, and as we mentioned above, a previous meta-analysis involving seven studies showed a reduced opioid requirement of the quadratus lumborum block at cesarean section and may have 24-hour analgesic effects [9-11].

All these meta-analyses reported the results of trials on conventional quadratus lumborum block in cesarean delivery, our study is the first study on intraoperative QLB performed intraoperatively by the obstetrician to evaluate postoperative pain control after cesarean section, while the major drawback of this study is the lack of patient randomization for interventions to overcome this, participants were allocated consecutively into the groups.

In our study, a statistically significant difference was found between the patient ($p = 0.001$; $p < 0.01$) and surgeon ($p = 0.022$; $p < 0.05$) satisfaction rates, these being lower in the group with SFNB comparable to patients with spinal anesthesia. There was a statistically significant difference between the first analgesic requirements of the patients according to the groups ($p = 0.001$; $p < 0.01$). The first analgesic requirement of the patients who received SFNB was later than in the case of patients who received spinal anesthesia. The peripheral nerve blocks are inadequate for patient and surgeon satisfaction for knee arthroscopy compared to SA [14,15].

Conclusions

The SFNB is inadequate for patient and surgeon satisfaction compared to SA. Peripheral nerve blocks require intervention from multiple and different anatomical regions, which remains a significant concern for patients and limits its effectiveness.

Conflict of interest disclosure

There are no known conflicts of interest in the publication of this article. The manuscript was read and approved by all authors.

Compliance with ethical standards

Any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript. Ethics Committee approval for the study was obtained from the Ethics Committee Of Okmeydanı Training And Research Hospital (Decision no: 598, Date: February 14, 2017). Informed consent was obtained from parents of all patients included in the study.

Authors Contribution

ST: contributed to the acquisition of data, drafting the manuscript, and critical revision.

MM: contributed to the study design, interpretation of data, drafting of the manuscript.

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