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Comparison ultrasound-guided adductor canal block and surgeon-performed block for pain management after total knee arthroplasty: a prospective randomized controlled study

Mehmet Fevzi Cakmak[1*], Levent Horoz[1], Fatma Nur Arslan[2], Onur Utku Demir[1] and Kerem Basarir[3]

Abstract

Objective Adductor canal block (ACB) is widely performed for postoperative analgesia for total knee arthroplasty (TKA). The aim of this study is to compare surgeon-assisted and anesthesiologist-assisted (ultrasound-guided) adductor blocks in terms of postoperative analgesic efficacy.

Methods This study was designed as a double-blind, prospective and randomized trial. A total of 240 participants were randomly allocated to three groups: one where the surgeon performed the adductor canal block (ACBs), another where it was conducted by an anesthetist with ultrasound guidance (ACBa), and a third group without the adductor block. The follow-up management after the Total Knee Arthroplasty (TKA) procedure occurred on the first, third, and tenth days, as well as the twelfth week. Outcome measures comprised pain assessment using the Visual Analog Scale (VAS) and monitoring opioid analgesic consumption.

Results No significant differences in demographic profiles were observed between the groups. Groups ACBa and ACBs exhibited significantly lower VAS scores compared to the control group at both 3 and 12 h after surgery, with group ACBa showing the lowest VAS scores among all groups. However, at 1 day, 3 days, 10 days and 12 weeks after surgery, there was no significant difference in VAS scores between the ACBa and ACBs groups. On the first three days, the ACBa group had the lowest opioid consumption and the lowest total opioid consumption. The differences in VAS scores between the groups began to decrease on the first day after surgery.

Conclusion The adductor canal block (ACB) has been demonstrated to be an effective method of reducing pain in patients undergoing total knee replacement (TKR) in the postoperative period. Nevertheless, despite the pronounced impact that ACB performed by an anesthesiologist under ultrasound guidance has on VAS scores according to intraoperative ACB by surgeons, its effect on clinical outcomes has not been demonstrated.

*Correspondence:
Mehmet Fevzi Cakmak
mehmet.cakmak@ahievran.edu.tr

Full list of author information is available at the end of the article

Trial registrations This study was retrospectively registered with the Clinical Trials Registry Platform on July 31, 2024 (NCT06533085).

Keywords Total knee arthroplasty, Post-op Pain, Adductor Canal Block, Visual Analog Scale, Opioids

Introduction

In advanced stages of osteoarthritis (OA) of knee, one of major option of treatment is total knee arthroplasty (TKA) [1, 2]. Approximately 20% of individuals who undergo TKA experience a loss of physical function, primarily due to the variable intensity of post-operative pain [3, 4]. The risk of thromboembolism due to ambulation limitations and immobility increases along with pain [5]. Various approaches have been proposed to manage post-operative pain [6]. Three distinct regimens have been developed to control pain that develops after TKA. These can be pre-operative, intraoperative, and post-operative analgesic regimens [7]. The main component of the pre-operative regimen is opioids. Local infiltration analgesic regimens are considered in the intraoperative regime, while peripheral nerve blocks are examined in the post-operative analgesic regime [4, 7].

Opioids are effective in pain management, yet they come with limited side effects [8–10]. Local infiltration anesthesia administration is straightforward and carries a low risk of systemic toxicity [11]. While various methods exist, the posterior capsule is a commonly targeted administration site." [12, 13]. Adductor canal block (ACB) can be performed pre-operatively, intraoperatively, or post-operatively. The motor branches of the femoral nerve are preserved while blocking the saphenous nerve, and quadriceps muscle strength is minimally affected [4, 14–16]. Hospital stay is shortened. ACB is becoming increasingly popular due to these advantages [14, 17]. ACB is routinely performed with ultrasound (USG) pre-operatively or post-operatively. In addition, intraoperative ACB performed by the surgeon has recently been introduced [15, 16]. One of the techniques utilized to alleviate post-operative pain is known as posterior capsular infiltration analgesia (PCI). In PCI, local sensory nerve endings are targeted. PCI preserves muscle strength and does not negatively impact functional recovery [18].

The objective of this study is to compare postoperative pain among knee prosthesis patients who undergo adductor canal block (ACBa) performed by an anesthetist using ultrasound guidance, ACB (ACBs) performed intraoperatively by the surgeon, and those without ACB.

Materials and methods

This study has been designed in a double-blind, randomized, controlled trial format. The study included 255 participants diagnosed with knee osteoarthritis and underwent TKA surgery between May 2021 and May 2022 at our university hospital. The sample size for the study was determined through a power analysis. Based on power analysis for the F-test with a Type I error rate of 0.05, a 95% confidence interval, and a Type II error rate of 0.10, the requisite total sample size is determined to be 207 subjects (equating to 69 patients per group). Owing to the potential employment of non-parametric tests within the analyses, it is recommended to augment the sample size by 15%. Consequently, the calculated sample size necessary is established at 240 subjects (thereby requiring 80 patients per group) [19]. This study will be conducted in accordance with the principles of the Declaration of Helsinki. The study was approved by the ethics committee of the researchers' institution (Kirsehir Ahi Evran University, Faculty of Medicine Ethics Committee, IRB approval number: 2022-08/89) and registered with the Clinical Trials Registry Platform (NCT06533085). This study conforms to all CONSORT guidelines and reports the required information accordingly. Participation was voluntary. Informed consent was obtained from the participants, indicating that their information would be used in the study, but their identities would remain confidential. All participants signed consent forms before the procedure.

Physical examinations were repeated on participants before the surgery, and pre-operative anesthesia examinations were conducted. At this stage, the acceptance criteria for the participants were evaluated. Inclusion criteria were defined as end stage (Kellgren-Lawrence grade 4) knee osteoarthritis, treated with primary TKA and willing to participate the study. The following were excluded from the study: refusal to participate, underwent revision TKA, allergy to any of the painkillers used, contraindication to regional or spinal anesthesia, use of narcotic painkillers prior to surgery, sensory or motor neuropathy, cirrhosis of the liver, chronic renal failure. The study was continued with 240 participants after excluding those who did not meet the criteria. The participants were randomly divided into three groups, one being the control group. Figure 1 shows the Consolidated Standards of Reporting Trials (CONSORT) diagram.

A computer-generated randomized list was generated from which participants were randomly allocated to one of the three study groups in a 1:1:1 allocation ratio. Adductor canal block plus posterior capsular infiltration analgesia was performed intra-operatively by the surgeon using anatomical landmarks, and no additional imaging was performed (ACBs). Adductor canal block plus posterior capsular infiltration analgesia was performed post-operatively by a specialist in anesthesiology with the help

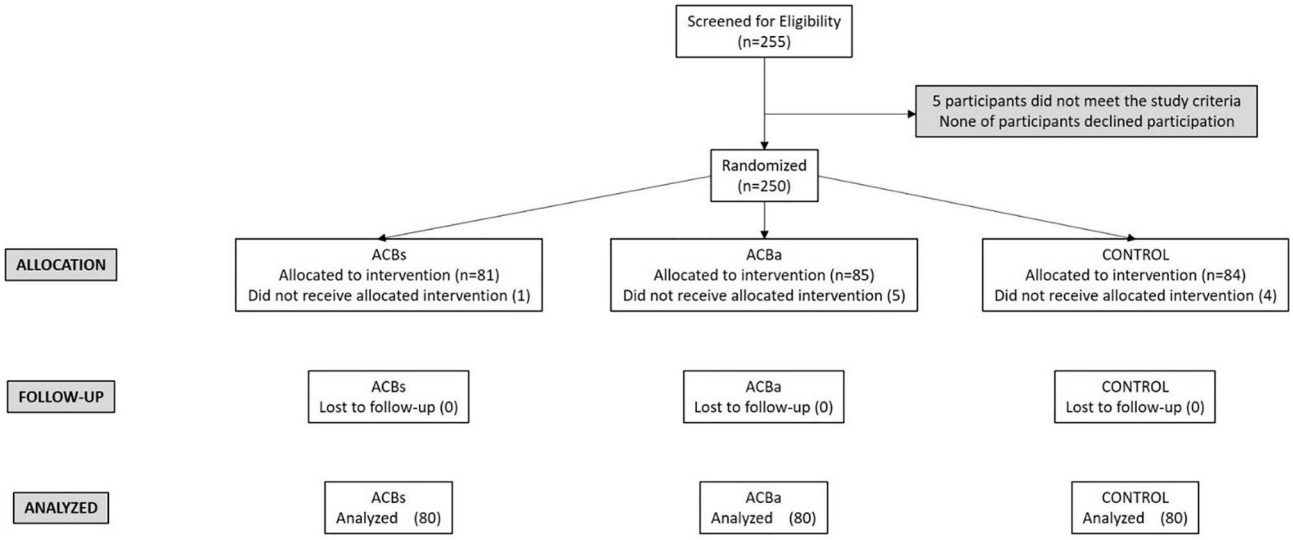

Fig. 1 Consort flow chart

of ultrasound (ACBa). Finally, a control group underwent PCI only. Patients were evaluated postoperatively by different authors for double-blind.

Participants and the surgeons conducting pre-operative and post-operative assessments need to be made aware of the group to which the patient belongs. The surgeon performing the operation is distinct from the one conducting the assessment.

All participants underwent surgery by a single senior surgeon, under spinal anesthesia performed by a single experienced anesthesiologist. The participants were prepared for the operation by applying lateral support in the supine position under spinal anesthesia. Following the administration of spinal anesthesia, a dose of 10 mg/kg of tranexamic acid was administered intravenously to each patient before the commencement of the surgical procedure. The surgical procedure involved a standard midline skin incision followed by a medial parapatellar arthrotomy. Subsequently, standard tibial and femoral osteotomies were performed with the use of a tourniquet during implant cementation. The Genesis II (Smith & Nephew, Memphis, TN) primary posterior-stabilized implant was utilised. The tourniquet was inflated at the stage when the cuts were completed and the washing procedure began. The implant was then performed, the cement reaction was completed, and the tourniquet cuff was lowered. Total knee arthroplasty with a tourniquet and cement was used in all participants.

Three groups were evaluated in the study. All three groups underwent intraoperative PCI.

Group 1 (adductor canal block by surgeon) The method described by Pepper et al. was employed [20]. Accordingly, the anatomical landmarks were first determined by the surgeon post-implantation. The medial femoral cavity was dissected with finger dissection. The vastus medialis obliquus muscle was dissected laterally. The needle was advanced posterior-superiorly by resting it on the anteromedial aspect of the femur at a 45° angle, approximately four finger breadths (7 cm) proximal to the joint line. It was ensured that the needle was not within an artery, and a 22G 10 cm needle was used to inject 7 ml of 0.5% bupivacaine+8 ml of 0.9% saline. No additional peri-articular injection was performed (Fig. 2).

Group 2 (Adductor canal block by anesthesiology specialist) This method was performed post-operatively right after the surgery was over. The anesthesiologist used an ultrasound-guided technique without a stimulator aid to apply the adductor canal block. While the patient was supine, the leg position was done with a slight external thigh rotation. After proper positioning, the skin was prepared with an iodine solution, and a sterile technique was used. For block performance, a 22-gauge 100 mm needle and linear ultrasound probe were chosen. Our target zone for the adductor canal block was the inner mid-thigh, where the vasoadductor membrane can be seen on the medial border of the vastus medialis muscle and the lateral side of the femoral artery. Sartorius muscle was seen anterior to all three of those structures. After ultrasonography visualization of the vasoadductor membrane, the needle was targeted to the membranous structure beside the femoral artery. A mixture of 7 ml 0.5% bupivacaine with 8 ml of %0.9 isotonic saline solution was injected slowly into the particular area as peri-articular filling lateral to the femoral artery was seen (Fig. 3).

Group 3 (Control group) The posterior capsular infiltration analgesia procedure was performed following irrigation procedures before implantation. The PCI procedure

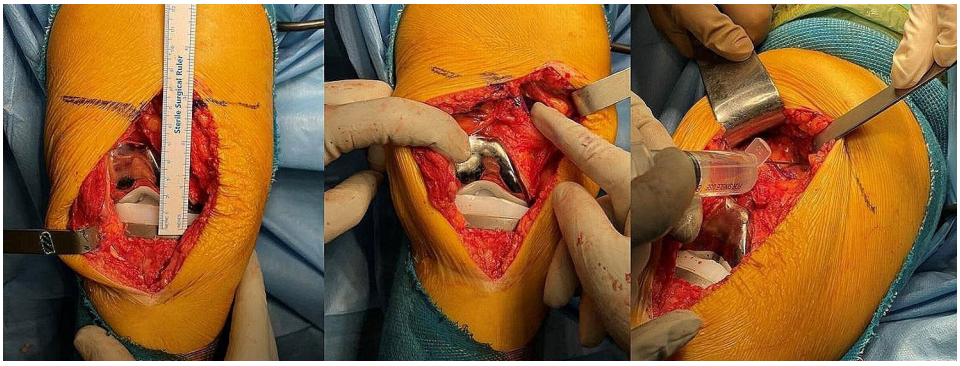

Fig. 2 **(a)** Following implantation, anatomical landmarks are identified. **(b)** Clivage is achieved through blunt finger dissection 7 cm proximal to the joint line. **(c)** A block is performed by entering at a 45-degree angle

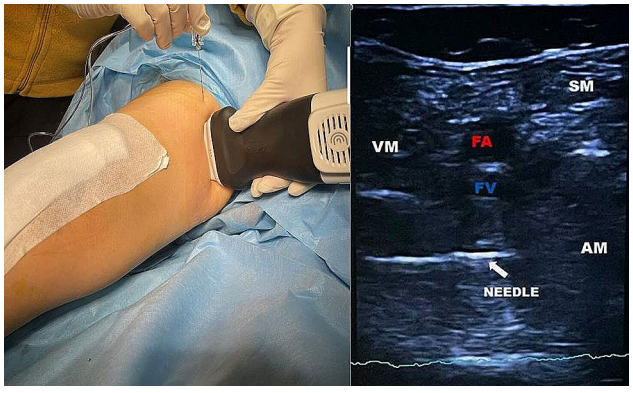

Fig. 3 **(a)** Postoperative emergence in supine position following ABC procedure in the post-anesthesia care unit. **(b)** Ultrasonographic visualization under compression. FA - Femoral Artery, FV - Femoral Vein, VM - Vastus Medialis Muscle, S - Sartorius Muscle, AM - Adductor Magnus Muscle

involves injecting 20 mL of the PCI cocktail (consisting of 0.2% ropivacaine and 2.0 mg/mL epinephrine) into the posterior aspect of the capsule through the intercondylar space of the femur. The PCI cocktail was prepared by an anesthesiologist who was not a part of the study (Fig. 4).

Postoperative rehabilitation and management Continuous physical therapy was conducted to measure the patient's endurance at certain movement degrees. The device was set at 45° on the first day after surgery, and rehabilitation began. Those who tolerated rehabilitation for 60 min were gradually increased to 75°, 90°, 105°, and 120°. On the first day, a maximum of 90° was allowed, and on the second day, the 105° and 120° were moved to those who tolerated it. The angle the participants could tolerate and how long was recorded on the 1st, second, and third days. Metamizole sodium 500 mg/dose every 6 h intravenously, celecoxib (orally, once daily, 400 mg per dose), paracetamol (oral, four times daily, 500 mg per dose), pregabalin (orally, once daily, 75 mg per dose) were given for postoperative pain management. In patients who continue to experience pain or who are unable to undergo rehabilitation.

Examined variables The participants' age, gender, body mass index, and the side of the operation were examined. The participants' need and consumption of opioids. (One ampoule (2 ml) contains 100 mg of tramadol hydrochloride. Range of motion (ROM) was measured pre-opera-

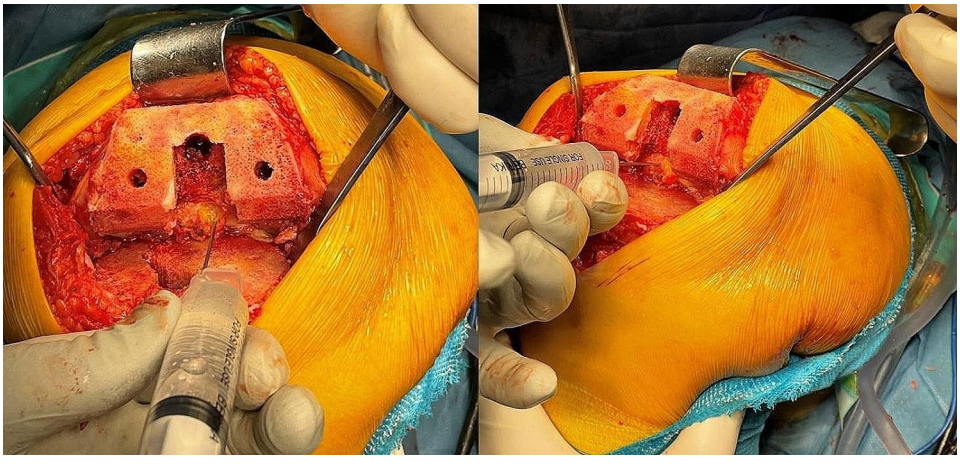

Fig. 4 **a** & **b**. Following the femoral and tibial cuttings, post-irrigation procedure, PCI is performed

tively and 12th week post-operatively. The Knee Society Score (KSS) [21] and the Oxford Knee Score (OKS) [22] were also measured preoperatively and at 12 weeks post-operatively to assess functional status. VAS scores were recorded for the participants before surgery and at 3 h, 12 h, first day, 3 days, 10 days and 12 weeks after surgery.

Statistical analysis

The statistical analysis was performed using the SPSS 26 program. The suitability of the data regarding variables was evaluated using the Kolmogorov-Smirnov test for normal distribution. Relationships between categorical variables were investigated using Chi-Square tests. Wilcoxon test was used for the analysis of two repeated measurements, and the Friedman test was used for more than two repeated measurements. The Kruskal-Wallis test was used to compare more than two independent groups. When a significant difference was found, the source of the difference was determined with the Bonferroni correction. In the analysis, a p-value of less than 0.05 was considered the statistical significance limit.

Results

The participants' ages, gender, body mass index, and the side on which the procedure was performed have been analyzed statistically. The youngest participant is 44, and the oldest participant is 82 years old. The average age of the participants is 64,7±8,3. The body mass index average is around 30. No significant differences in demographic profiles were observed between the groups presented in Table 1.

Groups ACBa and ACBs exhibited significantly lower VAS scores compared to the control group at both 3 and 12 h after surgery, with group ACBa showing the lowest VAS scores among all groups (Table 2). However, at 1 day, 3 days, 10 days and 12 weeks after surgery, there was no significant difference in VAS scores between the ACBa and ACBs groups.

On the first three days, the ACBa group had the lowest opioid consumption and the lowest total opioid consumption (Table 3).

The differences in VAS scores between the groups began to decrease on the first day after surgery (Table 4).

There were no statistically significant differences observed between the groups in terms of post-operative range of motion. There was a significant difference between the pre-op and post-op KSS values in each group ($p<0.001$). However, the groups have no significant difference at preoperatively and postoperatively. There is a similarity among the groups regarding OKS values in the pre-op period, while the post-op 12th week values are statistically different. However, the groups have no significant difference at 12th week postoperatively (Table 5).

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Upon analyzing the CPM values, a significant difference was determined among the groups in the CPM values obtained on the first and second day ($p=0.01$ and $p=0.03$, respectively). The difference was caused by the anesthetic block group's CPM measurements being higher than the other groups. The mean of the first-day measurements in the anesthetic block group (54.75±14.27) was higher than the mean of the control (50.81±14.39) and surgical block (53.44±13.90) groups. Similarly, in the measurements made on the second day, the values obtained from the anesthetic block group (57.94±8.06) were higher than the control (54.56±12.45) and surgical (55.13±13.24) groups. No difference was observed among the groups in the measurements conducted on the third day.

Table 1 Demographics data of all groups

	Groups	*n*	Mean ± SD		X^2	*p*
Age	ACBs	80	64,7 ± 8,3		1,8	0,406
	ACBa	80	64,0 ± 6,8			
	Control	80	65,6 ± 8,4			
Body Mass Index	ACBs	80	30,4 ± 13,4		3,1	0,139
	ACBa	80	31,5 ± 9,0			
	Control	80	29,1 ± 10,2			
			Left (n %)	**Right (n %)**	X^2	**p**
Side of the Operation	ACBs	80	44 (%55,0)	36 (%55,0)	1,3	0,522
	ACBa	80	39(%48,8)	41 (%51,3)		
	Control	80	37 (%46,3)	43 (%53,8)		
			Women (n %)	**Man (n %)**		
Gender	ACBs	80	40 (%50,0)	40 (%50,0)	2,6	0,612
	ACBa	80	41 (%51,3)	39 (%48,8)		
	Control	80	42 (%52,2)	38 (%47,8)		

ACBs: Adductor canal block by surgeon; ACBa: Adductor canal block by anesthesiology, SD: Standard deviation

Table 2 Pain analyses of all groups

	Group	*n*	Mean	Standard Deviation	X^2	*p*	Diff.
VAS - Pre Op	ACBs	80	9,00	1,031	3,6	0,158	-
	ACBa	80	9,18	0,97			
	Control	80	8,81	1,21			
VAS - Post Op 3. hour	ACBs	80	4,40	0,97	135,4	**< 0,001**	2 < 1
	ACBa	80	3,75	0,64			1 < 3
	Control	80	5,93	0,72			2 < 3
VAS - Post Op 12. hour	ACBs	80	5,85	0,84	153,5	**< 0,001**	2 < 1
	ACBa	80	4,69	0,85			1 < 3
	Control	80	7,40	0,89			2 < 3
VAS - Post Op 1.day	ACBs	80	7,25	1,20	45,1	**< 0,001**	1 < 3
	ACBa	80	6,95	1,21			2 < 3
	Control	80	8,19	1,04			
VAS - Post Op 3. day	ACBs	80	5,51	1,27	49,7	**< 0,001**	1 < 3
	ACBa	80	5,38	1,29			2 < 3
	Control	80	6,64	1,03			
VAS - Post Op 10. day	ACBs	80	3,33	1,22	46,5	**< 0,001**	1 < 3
	ACBa	80	3,75	1,48			2 < 3
	Control	80	4,69	1,10			
VAS - Post Op 12. week	ACBs	80	1,66	0,98	11,2	**0,004**	1 < 3
	ACBa	80	1,54	0,81			2 < 3
	Control	80	1,98	0,95			

ACBs: Adductor canal block by surgeon; ACBa: Adductor canal block by anesthesiology

Table 3 Comparison of analgesic recruitment between the groups

	Group	*n*	Mean	Standard Deviation	X^2	*p*	Diff.
Initial Requirement Hour	ACBs	80	8,71	3,73	62,7	**< 0,001**	3 < 1
	ACBa	80	9,56	5,46			3 < 2
	Control	80	5,11	2,43			
OPIOID 1. Day Usage*	ACBs	80	1,23	0,47	73,6	**< 0,001**	2 < 1
	ACBa	80	0,99	0,46			1 < 3
	Control	80	1,73	0,47			2 < 3
OPIOID 2. Day Usage*	ACBs	80	1,05	0,76	81,5	**< 0,001**	2 < 1
	ACBa	80	0,59	0,70			1 < 3
	Control	80	1,78	0,59			2 < 3
OPIOID 3. Day Usage*	ACBs	80	0,63	0,76	82,6	**< 0,001**	2 < 1
	ACBa	80	0,21	0,49			1 < 3
	Control	80	1,24	0,62			2 < 3
Overall Usage*	ACBs	80	2,90	1,66	100,2	**< 0,001**	2 < 1
	ACBa	80	1,79	1,39			1 < 3
	Control	80	4,74	1,40			2 < 3

*1 unit : One ampoule (2 ml) contains 100 mg of tramadol hydrochloride. ACBs: Adductor canal block by surgeon; ACBa: Adductor canal block by anesthesiology

Discussion

Adductor canal block is commonly used in management of pain after TKA surgery. The application of ACB is not only debated in terms of their effectiveness in pain management but also due to their significant and high costs [18]. Recently, there has been an ongoing debate about using ACB and TKA. This has led to efforts to develop an equally effective, low-cost alternative. Adductor canal block have been developed with this aim in mind and studied through prospective and retrospective studies following the development of cadaveric studies [20, 23] and similar research [18, 24, 25]. According to these studies, the most significant advantage of ACBs over TKA is their lower cost [24, 25]. In our randomized, double blind study, we found that VAS score and opioid consumption were significantly lower in the adductor canal block + PCI group of anesthesiologists on day one.

Various studies have demonstrated that ACBs and ACBa effectively reduce post-operative pain. However, the pain has been found to subside more rapidly with ACBa than with ACBs, and the pain-free period is more extended [18, 25, 26]. The findings in the studies generally

Table 4 Differences in VAS scores decrease from preoperative and after surgery

Group	Variable	*n*	Mean	Standard Deviation	X^2	*p*
ACBs	VAS - Pre Op	80	9,00	1,03	436,571	**< 0,001**
	VAS - Post Op 3. hour	80	4,40	0,97		
	VAS - Post Op 12. hour	80	5,85	0,84		
	VAS - Post Op 1. day	80	7,25	1,20		
	VAS - Post Op 3. day	80	5,51	1,27		
	VAS - Post Op 10. Day	80	3,33	1,22		
	VAS - Post Op 12. week	80	1,66	0,98		
ACBa	VAS - Pre Op	80	9,18	0,97	431,7	**< 0,001**
	VAS - Post Op 3. hour	80	3,75	0,64		
	VAS - Post Op 12. hour	80	4,69	0,85		
	VAS - Post Op 1. day	80	6,95	1,21		
	VAS - Post Op 3. day	80	5,38	1,29		
	VAS - Post Op 10. day	80	3,75	1,48		
	VAS - Post Op 12. week	80	1,54	0,81		
Control	VAS - Pre Op	80	8,81	1,21	433,0	**< 0,001**
	VAS - Post Op 3. hour	80	5,93	0,72		
	VAS - Post Op 12. hour	80	7,40	0,89		
	VAS - Post Op 1. day	80	8,19	1,04		
	VAS - Post Op 3. day	80	6,64	1,03		
	VAS - Post Op 10. day	80	4,69	1,10		
	VAS - Post Op 12. week	80	1,98	0,95		

ACBs: Adductor canal block by surgeon; ACBa: Adductor canal block by anesthesiology

Table 5 Comparison range of motion and functional outcomes between the groups

	Group	*n*	Mean	Standard Deviation	*p*	Diff
Preoperative Knee Society Score	ACBs	80	43,25	13,519	0,260	-
	ACBa	80	41,65	12,484		
	Control	80	43,48	14,324		
12th week Knee Society Score	ACBs	80	89,85	7,911	0,346	-
	ACBa	80	90,08	5,223		
	Control	80	90,38	7,232		
Preoperative Oxford Knee Score	ACBs	80	11,15	4,287	0,573	
	ACBa	80	11,83	4,820		
	Control	80	11,13	4,262		
12th week Oxford Knee Score	ACBs	80	38,56	3,642	0.08	-
	ACBa	80	40,28	8,869		
	Control	80	36,45	4,197		
Preoperative Range of motion	ACBs	80	94,94	6,136	0.871	
	ACBa	80	94,66	8,605		
	Control	80	94,69	6,332		
12th week Range of motion	ACBs	80	115,38	6,151	0.651	
	ACBa	80	113,31	7,752		
	Control	80	115,00	5,277		

emphasize that there is no significant difference between the two methods in terms of patient satisfaction and side effects [21, 25, 27]. Sveom et al. reported no significant difference in opioid pain medication usage between the groups during the first 24 h after surgery. Nonetheless, group ACBs had a shorter hospital stay than the other groups [25]. The results obtained from our study differ from those previously reported. In our study, the values of the VAS measured at different times in the post-operative period were statistically significantly lower in the ACBa group compared to the other groups. The highest values were obtained from the control group in all measurements. In our study, VAS scores obtained from the ACBa group at 12 weeks were statistically significantly better than those from other groups, indicating that participants in this group perceive less pain in the long term.

Regarding opioid use, a similar difference was observed. The use of opioids in the first three days was lower in the ACBa group than in the other groups, and this difference was statistically significant.

The anesthetic agent may have caused the difference between the studies. In our study, 0.5% bupivacaine+8 ml 0.9% saline was used, while 15 cc 0.5% ropivacaine was used in the other study. There are different practices regarding the agents and amounts used in related studies [28–30]. In the study conducted by Peterson and colleagues, ACBs were compared to ACBa. The findings revealed that the post-operative VAS values of the ACBs group were significantly lower within the first 24 h post-operation. Additionally, participants in this group demonstrated a lesser need for opioids. Both of these outcomes were statistically significant. No difference was observed in the total opioid consumption per the recorded VAS values within the first 24 h [25]. In our study, the results of the post-operative analyses in which the values of the VAS were examined revealed that the data of the ACBa group were statistically significantly lower than those of the other groups. The analyses regarding opioid usage also indicated that usage was lower in the ACBa group and that there was a later need for opioids. The number of participants in the study conducted by Peterson and colleagues is lower than ours. The groups consist of 50 participants each. In the ACBs group, 0.5% bupivacaine and 30 mg ketorolac were used. In the ACBa group, 0.25% bupivacaine was used [25]. The difference between the findings of the two studies may be due to these differences. In our study, 0.5% bupivacaine was used for both groups.

In a study conducted by Greenky and colleagues, some findings were obtained that were similar to ours. Accordingly, the pain determined in the first 24 h post-op is lower in the ACBa group. However, the fact that the values of both groups are similar in the following days and there is no difference between the groups in terms of opioid use are different findings from our study [18]. The similarity between the two studies is that their designs are prospective. Although this study was conducted with 63 participants, our study had 240 participants. The significant difference in the number of participants may have affected the results of the studies.

Our study possesses specific characteristics that differentiate it from other studies. Our study is prospective, whereas a significant portion of similar studies is retrospective [25, 26]. It is widely accepted that the data obtained from prospective studies are more reliable [31]. The number of participants in our study is greater than that of all comparable studies found in the literature [18, 25, 26]. In order to attain more accurate results, a control group was established in our study. Randomized controlled studies like ours measure the efficacy of treatment and control interventions. Treatment efficacy must be indicated by comparison with the control intervention [31]. The results of our study are of high reliability. In our study, VAS values were measured three times within the first 24 h post-op, on the third and tenth day, and in the 12th week. This way, the changes in VAS values were examined over a wide range. The time participants required opioids post-op and the total opioid consumption were also studied in our study. All of these are strong points of our study.

Our study has certain limitations. One of these limitations is that the VAS scores depend on the participant's compliance. The impact of mood disorders and inflammatory osteoarthritis, which may influence patient outcomes and pain scores, has not been evaluated. However, the participants did not report a history of drug use related to these diseases. Variability in the participants' compliance abilities may affect the data. Other limitations include the lack of examination of variables such as length of hospital stay or post-operative complications. The control group may be designed as a placebo.

Conclusion

In our randomized double-blind study, the effectiveness of adductor canal block applied by different practitioners was evaluated. The adductor canal block (ACB) has been demonstrated to be an effective method of reducing pain in patients undergoing total knee replacement (TKR) in the postoperative period. Nevertheless, despite the pronounced impact that ACB performed by an anesthesiologist under ultrasound guidance has on VAS scores according to intraoperative ACB by surgeons, its effect on clinical outcomes has not been demonstrated.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12891-024-07762-x.

Supplementary Material 1

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Author contributions
Study design: MFC, LH. Literature search: FNA, OUD, Data: MFC, OUD, Writing of the original draft: MFC. Literature review and editing: MFC, LH Supervisior: KB, Revision of the manuscript: MFC, LH, KB.

Funding
None.

Data availability
The data are available upon reasonable request from the corresponding author.

Declarations

Ethics approval and consent to participate

This study will be conducted in accordance with the principles of the Declaration of Helsinki. The study was approved by the ethics committee of the researchers' institution (Kirsehir Ahi Evran University, Faculty of Medicine Ethics Committee, IRB approval number: 2022-08/89) and registered with the Clinical Trials Registry Platform (NCT06533085). Kirsehir Ahi Evran University, Faculty of Medicine Ethics Committee is in full compliance with international guidelines for human research protection such as the Declaration of Helsinki. All participants will provide their written informed consent after receiving written and oral information about the study. All participants signed consent forms before the procedure.

Consent for publication

N/A.

Conflict of interest

None.

Author details

[1]Department of Orthopedics and Traumatology, Kirsehir Ahi Evran University, Kirsehir, Turkey
[2]Department of Anesthesiology, Kirsehir Ahi Evran University, Kirsehir, Turkey
[3]Department of Orthopedics and Traumatology, Halic University, Istanbul, Turkey

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