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Comparison of infraclavicular block and axillary block activities performed in ultrasonography coexisting in upper extremity surgery

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ABSTRACT

Aims: Infraclavicular and axillary block performed with ultrasound guidance are effective peripheral anesthesia methods applied in upper extremity surgery. We aimed to compare these methods in terms of duration of the block and action, first analgesic requirement and side effects.

Methods: This prospective, randomized study was conducted for upper extremity surgery. 100 patients were included to perform infraclavicular block (Group 1, n=51) and axillary block (Group 2, n=49) USG guided. Patients are between 19 and 85 years old. Both groups were premedicated with 0.3 mg/kg midazolam or 0.5-1 µg/kg fentanyl. Both groups were treated with a mixture of local anesthetics in a total volume of 30 mL [7.5 mL 0.5% bupivacaine (Bustesin®, 56.25 mg), 7.5 mL 2% prilocaine (Priloc®, 225 mg) and 5 mL saline] was injected. Block placement time, motor and sensory tests, postoperative 2nd, 4th, 8th, 12th. and analgesic requirement at the 24th hour, Bromage scale, Verbal Rating scale, nausea vomiting, patient satisfaction, and block adequacy data were recorded.

Results: In this study, 60% of the participants included were male and 40% were female. The systolic, diastolic and mean arterial pressures were higher in group of axillary blockade than those with blockade of infraclavicular blocks. Radial, median, ulnar and musculocutaneous nerve pin-prick test loss and loss of touch test was more frequent in infraclavicular block patients. According to the Bromage scale, the partial block was seen more frequently in patients who had a close block and a full block infraclavicular block. In patients with the axillary blockade, sedoanalgesia and general anesthesia needs after postoperative intraoperative 20 min and postoperative sedoanalgesia was needed. According to the postoperative Bromage scale; complete and close to the thumb and more frequent in infraclavicular block patients. In Postop VRS, it was observed that the patients with the axillary block group had mild, moderate, and severe pain complaints. Patient satisfaction in the postoperative period was similar in both groups.

Conclusion: There is no significant difference between these techniques regarding surgical adequacy and subjective postoperative analgesia and dysesthesia. Complete and near-complete block rates in the infraclavicular block approach are minimally higher than in the axillary block approach.

Keywords: Upper extremity surgery, infraclavicular block, axillary block, USG

INTRODUCTION

The use of regional anesthesia techniques in orthopedic surgical operations continues to develop and become more popular. Regional anesthesia techniques can be used to provide effective and reliable analgesia in the postoperative period. Especially in the postoperative period, to be less costly, to shorten the length of stay in the hospital, to cause less physiological damage to all organs, to provide faster postoperative nausea, vomiting, aspiration, because of the many advantages of extubating strength. In addition, possible anesthesia complications such as malignant hyperthermia and long-term exposure to harmful effects of general anesthetic agents are reduced.[1-4]

The technique of needle nerve stimulation has been the standard method for about 30 years. However, in recent years, peripheral nerve block applications have become more popular with the use of ultrasound (USG) technology. Ultrasonics is a very high-frequency sound wave. These are divided into infrasound, audible sound, and ultrasonic according to the frequency. The use of envy began in the 1950s. Its first use in anesthesia was in

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1978 with the application of supraclavicular block. Since anesthetic agents can be safely applied in peripheral blocks performed under ultrasound guidance, these techniques are now widely used in extremity surgeries. The preference for peripheral nerve blocks has increased due to the relatively more invasive and traumatic nature of central blocks, the use of anticoagulants, and related contraindications and complications. Especially in extremity surgery, perioperative analgesia and anesthesia is another important factor.[5,6]

According to the patient, the plexus nerves can be blocked from any of the 5 anatomical regions such as interscalene, supraclavicular, infraclavicular, axillary and terminal nerves.[7-9] The brachial plexus, located in the infraclavicular region, provides the anatomical innervation of the region from the upper part of the axilla to the region covering the musculocutaneous nerve from the shoulder to the hand.[10] Therefore, the brachial plexus can be formed from the fingers to the shoulder on the upper extremity thanks to injections performed in the infraclavicular region.[11]

The perivascular approach is the easiest and most used technique in brachial plexus block (BPB) application. So, with an axillary approach, the radial, ulnar and median nerves are blocked at the same time in forearm, wrist, and hand surgery. For this reason, the axillary block provides the opportunity to perform surgery on the hand, forearm, and 1/3 distal part of the arm in the upper extremity.[12] The lack of complications such as central neural block and pneumothorax is one of the biggest advantages of being able to easily apply the other blocks to large patients who are difficult to carry out. In the axillary approach, the arm is abducted. This position complicates the application of the method. However, it provides a suitable anesthesia area for operations to be performed under the elbow. The presence of infection or tumoral structure at the injection site, factors that prevent abduction of the arm, and a history of mastectomy reduce the chance of success of the procedure.[13]

In this study, we aimed to compare the duration of block, onset time, duration of action, first analgesic requirement after surgery, onset time of motor block and side effects. USG guided infraclavicular and axillary block control in patients undergoing upper extremity surgery.

METHODS

The study was approved by the Keçiören Training and Research Hospital Clinical Researches Ethics Committee (Date: 26.02.2014, Decision No: 498). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Between the ages of 19-85 and undergoing hand surgery, wrist and forearm surgery, totally 100 patients were included in the study. They were treated with USG guided infraclavicular block (Group I n=51) and axillary block (Group II n=49). The patients were randomly divided into two groups by the closed envelope technique. The two groups were compared in terms of application time, the block onset time, duration of action, time to first postoperative analgesic requirement, time to motor block removal and side effects. Patients who did not cooperate, were outside the specified age range, pregnant, infection at the injection area, had coagulation disorders, had any neurological deficit or have an allergy to local anesthesia were excluded from the study.

The patients were monitorised with electrocardiogram, SpO_2 and noninvasive blood pressure in the block application room and peripheral vascular catheter was inserted. Before the procedure, both groups received 0,3 mg/kg midazolam or 0,5-1 μg/kg fentanyl as premedication. All blocks were performed by two experienced anesthesiologists in USG-guided block exercises. Patients' blood pressures (systolic, diastolic, and mean arterial pressures), heart rate (HR) and peripheral oxygen saturation (SpO_2) values, block placement time, motor and sensory tests, postoperative 2^{nd}, 4^{th}, 8^{th}, 12^{th} and analgesic requirement at the 24^{th} hour, Bromage Scale (BS), Verbal Rating Scale (VRS), nausea and vomiting, patient satisfaction and block adequacy data were recorded.

Group I (Infraclavicular Block): This method was made according to the lateral sagittal infraclavicular block (LSIB) technique proposed by Klaastad et al.[10] Electrocardiography, SpO_2 and noninvasive blood pressure monitoring of the patient admitted to the supine position were performed. After the disinfection with povidone-iodine, the injection point was loosened at a 90° angle from the limb to the limb to be surgically loosened, as suggested by the LSIB technique. The patient's head was slightly inverted on the opposite side of the block.[10] The local anesthetic (LA) mixture was prepared with 7,5 mL of 0,5% bupivacaine (Bustesin®, 56,25 mg), 7,5 mL of 2% prilocaine (Priloc®, 225 mg), and 5 mL of saline and applied to the block area. During the process, Siemens® Sonoline (Germany) G20 USG machine and 10-18 MHz linear probe were used. Immediately after the axillary artery was visualized, the stimulation needle was directed to the posterior part of the artery in the same plane with the probe (in-plane technique).[10] The position of needle was confirmed by observing the rhythmic contraction movements of the hand and wrist with the neurostimulator. In order to avoid intravenous injection, 2 mL of LA mixture was injected to check whether there was an increase in heart rate. The rest of the drug mixture was injected with the intermittent aspiration to give a total of 20 mL. During LA application, "U" distribution was observed between 3 and 11 hours around the axillary artery with USG.

Group II (Axillary Block): Electrocardiography, SpO_2 and noninvasive blood pressure monitoring of the patient admitted to the supine position were performed. The patient's head is slightly turned to the opposite side. The stimulation needle to be used for the block was concurrently connected to the nerve stimulator (Stimuplex HNS 11, Braun Medical, Melsungen, Germany). The arm was abducted on the side to be operated at an angle of at least 90° with the body. The arm and forearm were flexed to 90° and the area to be blocked was sterilized. The injection site was determined with the nerve stimulator. After the blood was aspirated and no blood was seen, 20 mL volume of LA mixture [7,5 mL of 0,5% bupivacaine (Bustesin®, 56,25 mg), 7,5 mL of 2% prilocaine (Priloc®, 225 mg) and 5 mL of saline] was injected. During the process, 20 Gauge (G), 50 mm USG compliant needle, Siemens® Sonoline (Germany) G20 USG machine and a 10-18 MHz linear probe was used again. The high frequency linear probe was inserted transversely into the humerus. Radial, median, ulnar and musculocutaneous nerves around the axillary artery and vein were determined. Then, the stimulation needle was directed to the upper and posterior side of the axillary artery with the in-plane technique. Later, LA mixture was injected around median, ulnar or radial nerve. The distribution around the cord and axillary arteries were observed with USG during LA application.

Pin-prick Test: A scale that assesses the development of sensory loss in patients after block application.

0: No sensory loss,
1: Pin-prick test (loss of sensation)
2: Loss of touch test

Motor Block Start Time (Modified Bromage Scale): A scale that evaluates the development of the motor block after the patient has a value between 0-3.

0: No motor block (arm, forearm flexion complete)
1: Partial block (partial flexion at the heart, full flexion at the front)
2: Tama-close block (no arm flexion, reduced flexion in the forearm, moving fingers)
3: Full block (no fingers in arm and forearm, fingers in motion).

Verbal Rating Scale (VRS): A scale on that patients express their pain with a value between 0-4.

0: No pain,
1: Slight pain,
2: Moderate pain,
3: Severe pain,
4: Irritable pain.

The datas obtained from the research were analyzed using the Statistical Package for the Social Sciences (SPSS) version 15.0 statistics program. Descriptive statistics were summarized as mean±SD deviation, median, the minimum, maximum value for numerical variables, and numbers and percentages for categorical data. The Kolmogorov-Smirnow test checked normal dissociation suitability. Variance analysis was used in repeated measures to examine the difference between repeated measures in continuous variables. Chi-square and Fisher's exact test was used to assess the differences between the categorical variables. Statistical significance in the study was accepted as $p < 0.05$.

RESULTS

There were no statistically significant differences in terms of mean age, height, weight, ASA classifications, mean duration of application, and gender distribution in the groups during the study period. In addition, there was no statistically significant difference when we compared groups in terms of the duration of block application in our study.

Demographic characteristics and duration of administration were similar in both groups (**Table 1**). The duration of operation was significantly higher in Group I ($p=0.02$). When the mean arterial pressures were compared, it was found that Group II was generally higher than Group I. This difference was statistically significant ($F=3.63$, $p=0.006$). While the mean heart rate was analyzed, at Group II, it was observed that the measurements were generally higher than Group I ($F=7.885$, $p<0.001$). As the oxygen saturation was evaluated, it was found that at Group II, the measurements were similar ($F=2,961$, $p=0.14$) (**Table 1**).

Table 1. Demographic data of the groups and duration of application and operation (Mean±SD, %)

	Group1 (n:51)	Group 2 (n:49)	p
Age	42.70±14.80	41.30±17.34	0.66
Length (cm)	168.74±10.45	170.0±11.03	0.53
Weight (kg)	74.94±12.53	77.73±11.57	0.25
ASA	1.86±0.56	1.77±0.62	0.46
Application time (min)	4.21±1.87	4.85±2.23	0.12
Operation time (min)	71.73±36.79	56.93 ±23.38	0.02
Sex (K / E) (%)	45.1/54.9	34.7/65.3	0.28

According to the radial "pin-prick test" results of the groups; statistically significant difference was found between the percentage of sensory loss and the percentage of loss of touch between the groups at the 5^{th}, 20^{th}, 25^{th}, 30^{th}, 35^{th}, 40^{th} and 45^{th} minutes of the application. Corresponding to the results of the median "pin-prick test", a statistically significant difference was found between the percentage of sensory loss and the

percentage of loss of touch between the groups at the 5th and 10th minutes of the application. According to the results of the "pin-prick test" of ulnar, there was no statistically significant difference between the two groups in terms of the percentage of sensory loss and the percentage of loss of touch at the 0th, 15th, 20th, 25th, 30th, and 35th min. Based on the musculocutaneous "pin-prick test" was lost in 56.9% of patients in Group I and 24.5% of patients in Group II in the 5th minute of the procedure. So, this difference was significant (**Table 2**).

Table 2. Evaluation of radial, median and ulnar nerve pin-prick test results according to groups (%)

	Group 1 (n:51)		Group 2 (n:49)		p
	n	%	n	%	
Radial 20. min					<0.001
No sensory loss	5	9.8	26	53.1	
Pin-prick test loss	37	72.5	22	44.9	
Loss of touch test	9	17.6	1	2.0	
Median 5. min					<0.001
No sensory loss	19	37.3	37	75.5	
Pin-prick test loss	31	60.8	12	24.5	
Loss of touch test	1	2.0	0	0.0	
Ulnar 20. min					0.450
No sensory loss	8	15.7	12	24.4	
Pin-prick test loss	35	68.6	36	73.5	
Loss of touch test	8	15.7	1	2.0	
Musculoc utaneous 5. min					<0.001
No sensory loss	22	43.1	37	75.5	
Pin-prick test loss	29	56.9	12	24.5	
Loss of touch test	-	-	-	-	

Intraoperative analgesic requirements of the patients were evaluated at the beginning of the treatment, at 5th and 10th minutes. None of the patients in the groups needed analgesia. At the 15th, 20th, and 25th minutes of the procedure, sedoanalgesia didn't required both of groups. However, despite sedoanalgesia, general anesthesia was administered at 30th, 35th, 40th and 45th minutes in both groups. While BS results of the groups were examined; at the beginning of the procedure, the partial block was observed in 7,8% of patients in Group I. In Group II, partial block was observed in 4.1% of the patients and this difference was not statistically significant. Additionally, at 5th, 10th, 15th, 20th, 25th, 30th, 35th, 40th minutes, BS differed in percentages of partial block, the close-to-the-thumb block between and complete block percentages. However, this was not statistically significant in both groups. At the postoperative 2nd hour, 49.0% partial block, 19.6% the close-to-the-thumb block, and 9.8% complete block were seen in Group I. In Group, II 40.8% partial block, 16.3% close-to- the-thumb block were observed and this difference was significant (**Table 3**).

Table 3. Evaluation of preoperative and postoperative Bromage Scale results according to patients (%)

	Group 1 (n:51)		Group 2 (n:49)		p
	n	%	n	%	
0. min					0.67
No block	47	92.2	47	95.9	
Partial Block	4	7.8	2	4.1	
20. min					0.69
No block	1	2.0	1	2.0	
Partial Block	18	35.3	23	46.9	
Preoperative Period					
Tama-close block	23	45.1	18	36.7	
Full block	9	17.6	7	14.3	
45. min					0.29
No block	1	2.0	2	4.1	
Partial Block	12	23.5	19	38.8	
Tama-close block	26	51.0	21	42.9	
Full block	12	23.5	7	14.3	
2. hour					0.03
No block	11	21.6	21	42.9	
Partial Block	25	49.0	20	40.8	
Tama-close block	10	19.6	8	16.3	
Full block	5	9.8	0	0.0	
4. hour					0.09
No block	25	49.0	35	71.4	
Postoperative Period					
Partial Block	20	39.2	11	22.4	
Tama-close block	4	7.8	3	6.1	
Full block	2	3.9	0	0.0	
8. hour					0.35
No block	43	84.3	44	89.8	
Partial Block	6	11.8	5	10.2	
Tama-close block	2	3.9	0	0.0	
Full block	-	-	-		

There was no significant difference in postoperative analgesia requirements between the groups at the postoperative 2nd and 12th hours. But, at the 4th and 8th hours, analgesic requirements were significantly higher in Group II than Group I (p=0.01 and p <0.001) (**Table 4**).

Table 4. Evaluation of postoperative analgesia needs of the groups (%)

	Group 1(n:51)		Group 2 (n:49)		p
	n	%	n	%	
2. hour					0.53
No	50	98.0	47	95.9	
Yes	1	2.0	2	4.1	
4. hour					0.01
No	46	90.2	35	71.4	
Yes	5	9.8	14	28.6	
8. hour					<0.001
No	41	80.4	23	46.9	
Yes	10	19.6	26	53.1	
12. hour					0.95
No	47	92.2	45	91.8	
Yes	4	7.8	4	8.2	

When the groups were evaluated in terms of postoperative VRS results; there was a statistically significant difference between mild pain, moderate pain, and severe pain frequency between the groups at the 8th hour (p= 0.01). These complaints were seen more frequently in Group II (**Table 5**).

Table 5. Evaluation of postoperative Verbal Rating Scale results of patients according to groups (%)

VRS	Group1 (n:51)		Group 2 (n:49)		p
	n	%	n	%	
2. hour					0.35
No pain	49	96.1	46	93.9	
Mild Pain	1	2.0	3	6.1	
Severe Pain	1	2.0	0	0.0	0.06
No pain	45	88.2	34	69.4	
4. hour					
Mild Pain	5	9.8	10	20.4	
Severe Pain	1	2.0	5	10.2	
8. hour					0.01
No pain	37	72.5	20	40.8	
Mild Pain	11	21.6	20	40.8	
Middle-Grade Pain	3	5.9	8	16.3	
Severe Pain	0	0.0	1	2.0	
12. hour					0.07
No pain	45	88.2	44	89.8	
Mild Pain	2	3.9	5	10.2	
Middle-Grade Pain	4	7.8	0	0.0	

In addition, there were complaints of nausea and vomiting in the patients at postoperative 2nd, 4th and 8th hours. Postoperative nausea and vomiting complaints were seen in one patient (2,0%) in Group II at 12th hour and this difference was not statistically significant (chi-square=1,051 p=,89). No statistically significant difference was found between the groups when postoperative patient satisfaction was assessed at 2nd, 4th, 8th, and 12th hours.

When the satisfaction of the surgeons was examined, 78.4% of the infraclavicular block was very satisfied according to 65.3% of the axillary block application. But this difference was not statistically significant (Chi-square=2,350 p=0,30).

DISCUSSION

Peripheral nerve blocks are a procedure performed to allow surgical interventions and provide analgesia by administering LA to the peripheral nerve or ganglion. Peripheral nerve blocks are used in a wide area for anesthesia, medical treatment, postoperative analgesia and pain therapy purposes.1 In addition, the trend towards less invasive techniques in anesthesia practice has led to an increased interest in peripheral nerve blocks.[12]

Nowadays, it is accepted that BPB is an effective method that can be used safely for anesthesia or analgesia in upper extremity surgeries. This method is widely used with the axillary approach because the neurovascular envelope in which the local anesthetic drug is distributed is far from the vital organs, the risk of complications is low, and it can be applied easily. In this study, infraclavicular block and axillary block methods, which are regional anesthesia techniques used in upper extremity surgery, were used.[13,14]

With the use of USG in peripheral nerve block approaches, imaging of the needle tip, nerve localization and local anesthetic injected area distribution can be observed. In addition to this, patient comfort is increased by decreasing the number of needle passes. When the complication rate is reduced in USG-guided blocks, the success rate is increased.[15-17] However, the USG guideline shortens the block performance period, the number of trial and the block starts time. Also, the block can be performed using lower LA doses.[18,19]

In our study, peripheral nerve block applications were performed in the presence of USG and neurostimulator. In this regard, the literature does not show any superiority between the groups using USG and neurostimulators for infraclavicular block.[20] However, the duration of administration was shorter in the USG group.[21-23] In a study, Sauter et al.[21] randomly divided 80 patients into USG and neurostimulation groups for lateral sagittal infraclavicular block (LSIB) application. They found no statistically significant difference in the comparison of success rates, application times, sensory block formation times and patient satisfaction related to the block procedure in their studies (p>0.05). In addition to this, it is the most important advantage of the USG-guided blocks to display not only target tissues but also neighboring anatomical organ at risk.[24]

Sandhu et al.[25] in their study in 2006, retrospectively evaluated 1146 adult patients who underwent USG-guided infraclavicular block. They found a success rate of approximately 100% when USG was used alone and applied around all three cores.[20] Ootaki et al.[26] in their study with 60 patients, they provided 100% complete block in the musculocutaneous nerve with USG-guided infraclavicular block. On another study, Sauter et al.[21] found that the success rate of LSIB application was 85% in neurostimulation technique and 95% in USG use. In the studies evaluating supraclavicular block, USG has also been found to be more successful, safety and shorter application time compared to the neurostimulator. It has been concluded that not only the technique, but also the experience of the practitioner, the type and amount of LA, anatomical differences and obesity in the patient are effective for successful block.[26,27]

However, in a study, there was a statistically significant difference between the administration times of infraclavicular block (n=11, duration=622±139 sec) and axillary block (n=11, duration=789±131 sec).28 In addition, in the study of Tran et al.[29] 70 patients were randomized to receive USG guided infraclavicular block using double bubble sign or axillary block with triple-stimulation. The axillary block method was significantly longer than in the infraclavicular block method (p <0.001).

Heid et al.[15] compared vertical blocks of infraclavicular plexus (n=30) and blocks of high axillary plexus (n=30) in their study. The patient underwent sensory testing at intervals of 15 minutes, and analgesia and development of anesthesia were investigated for the radial nerve, 80% of the vertical infraclavicular plexus group achieved anesthesia after 30 minutes, whereas 36.7% of the high axillary plexus group achieved anesthesia and a statistically significant difference was found (p <0.005). There was no significant difference between the groups when compared for ulnar sensory loss. Similarly, in the study of Heid et al.[15] no difference was found in the sensory test for the ulnar nerve. However, in the study of Heid et al.[15] a significant difference was found between the vertical infraclavicular plexus (70%) and the high axillary plexus (34%) blocks only at the 15th minute of the sensory test for the musculocutaneous nerve (p <0.05).

There was no statistically significant difference for BS in all measurements between the groups in terms of the partial block, proximal block, and complete block percentage. In addition, both block formation and block administration durations were found to be similar between the infraclavicular block and supraclavicular block approach in Gurkan[24] and colleagues studying 110 patients in two groups. In the study of Song et al.[28] patients with axillary and infraclavicular block were examined for motor loss rates of 1 to 5 days (5=normal, 1=full paralysis) during the interval of 0 to 30 minutes. Only the motor loss ratios of the musculocutaneous nerve at the 0 and 5 min were significantly higher than the axillary blunt infraclavicular block.

The sensation of pain, nausea, and vomiting in patients with regional anesthesia is undesirable to anesthesiologists.[30] In our study, no statistically significant difference was found in the complaints of nausea and vomiting in the groups. However, patients who underwent infraclavicular block had faster recovery times, lower pain scores, quadruple nausea, and fewer hospital discharge than patients receiving general anesthesia.[31]

When postoperative analgesic requirements of the groups were compared, it was significantly higher in group II than group I at the 4th and 8th hours. Tran et al.[29] randomized 70 patients to receive USG guided infraclavicular block using double bubble sign or axillary block with triple stimulation. They found that the need for analgesia was 5 (14%) and 8 (23%) patients, respectively.

There was no statistically significant difference in VRS between the groups at postoperative 2nd, 4th, and 12th hours in our study. However, in the infraclavicular block group at the 8th hour postoperatively, 21.6% of the patients had mild pain, 5.9% had moderate pain. The group applied axillary block, 40.8% of the patients had mild pain, 16.3%, and severe pain at 2.0% was observed and this difference was statistically significant. In a study comparing the lateral vertical infraclavicular plexus block with the axillary plexus block in 40 children between 1 and 10 years of age, Fleischmann et al.[14] used the Visual Analogue Scale (VAS) (1-5 points corresponding to the face expression) for pain recipe and between two treatment groups no significant difference was observed between VAS values before pneumonectomy, during pneumonectomy, and after 30 minutes after pneumonia.

The first general anesthesia was applied in Group II at the 30th minutes (4 patients, 8,16%) and in Group I at the 40th minutes (2 patients, 3.92%). Sandu et al.[32] also reported that 114 patients underwent general anesthesia in 3 patients (2.4%) in their study of infraclavicular block administration in the presence of USG.

CONCLUSIONS

In our study, there was no significant difference in terms of duration and block characteristics of the USG-guided infraclavicular block method and the axillary block method. However, the infraclavicular block method is more advantageous in terms of analgesia requirements during and after the operation. When the satisfaction of the surgeon was examined, there was no statistically significant difference between the groups. In addition, complete and near-complete block ratios in the infraclavicular block method are minimally higher than in the axillary block method. As a result, interest in the use of USG in regional anesthesia applications is increasing rapidly. The reason for this is that the success rate is higher and the complication rate is lower in USG-guided blocks.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by the Keçiören Training and Research Hospital Clinical Researches Ethics Committee (Date: 26.02.2014, Decision No: 498).

Informed Consent: Written consent was obtained from the patient participating in this study.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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