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Orgınal Article

Comparison of The Effects of Erector Spina Plane Block and Transversus Abdominis Plane Block Methods on Postoperative Analgesia in Elective Caesarian Section with Ultrasonography Account

Elektif Sezaryen Operasyonlarinda Ultrasonografi Eşliğinde Erektör Spina Düzlem Bloğu Ve Transversus Abdominis Düzlem Bloğu Yöntemlerinin Postoperatif Analjezi Üzerine Etkilerinin Karşilaştirilmasi

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Highlights

- ESP block found more effective regarding VAS scores, tramadol consumption, and patient satisfaction for elective cesarean section.

Abstract

Background: The study aimed to compare the efficacy of erector spina plane (ESP) block and transversus abdominis plane (TAP) block in postoperative analgesia in cesarean section operations.

Materials and Methods: The study included a total of 90 pregnant women scheduled for elective cesarean section under spinal anesthesia between February 2021 and February 2022. Following the completion of the operation, the patients were randomly assigned to three groups: TAP, ESP, and a control group using a closed envelope technique. Demographic data, postoperative Visual Analog Scale (VAS) scores at 0, 2, 4, 8, 12, and 24 hours, time of first analgesic administration in the patient control analgesia (PCA), the total amount of tramadol consumed, complications, surgeon, and patient satisfaction were recorded.

Results: The time of first analgesic administration was statistically significantly lower in the TAP group than in the ESP group ($p<0.01$). Postoperative tramadol consumption at 0,2,4 and 8 hours was statistically significantly lower in the ESP group than in other groups ($p<0.01$). At 24 hours, the total amount of tramadol consumed was statistically significantly lower in the ESP group than in other groups ($p<0.01$). Patient satisfaction was higher in the ESP group compared to the TAP and control groups ($p<0.01$).

Conclusion: The study found that ESP and TAP block groups consumed less tramadol postoperatively and had lower VAS scores than the control group in cesarean section operations. We found that the ESP block was more effective regarding VAS scores, tramadol consumption, and patient satisfaction.

Keywords: Cesarean section operation, postoperative analgesia, patient-controlled analgesia, transversus abdominis plane block, erector spina plane block

ÖZ

Amaç Çalışmanın amacı, erektör spina düzlem (ESP) bloğu ile transversus abdominis düzlem (TAP) blogunun elektif sezaryen operasyonlarında postoperatif analjezi üzerine etkinliğini ve hasta memnuniyetine etkilerini karşılaştırmaktır.

Gereç ve Yöntem: Çalışmaya, 15/02/2021-15/02/2022 tarihleri arasında elektif şartlarda spinal anestezi altında sezaryen operasyonu olacak toplam 90 gebe dahil edildi. Çalışma prospektif, randomize, çift kör karşılaştırmalı olarak yapıldı. Operasyon bitiminde hastalar kapalı zarf tekniği ile TAP, ESP ve kontrol grubu olarak rastgele 3 gruba ayrıldı. Demografik veriler, postoperatif 0., 2., 4., 8., 12., 24. saatlerde Vizüel Analog Skala (VAS) skorları, HKA'de ilk analjezik uygulama zamanı, toplam tüketilen tramadol miktarı, komplikasyonlar, cerrah ve hasta memnuniyeti kaydedildi.

Bulgular: Hastaların demografik verilerinde, vital bulgularının takiplerinde istatistiksel anlamlı fark izlenmedi. HKA'de ilk analjezik uygulama zamanı TAP grubunda ESP grubuna göre istatistiksel olarak anlamlı düşük saptandı ($p<0,01$). Postoperatif tramadol tüketimi 0,2,4 ve 8. saatlerde ESP grubunda diğer gruplara kıyasla istatistiksel olarak anlamlı düşük saptandı ($p<0,01$). 24 saatte toplam tüketilen tramadol miktarı karşılaştırıldığında ESP grubunda diğer gruplara kıyasla istatistiksel olarak anlamlı düşük değerler izlendi ($p<0,01$). Hasta memnuniyeti ESP grubunda TAP ve kontrol grubuna göre daha yüksek bulundu ($p<0,01$).

Sonuç: Bu çalışmanın sonucunda sezaryen operasyonlarında hem ESP hem de TAP blok gruplarının kontrol grubuna kıyasla postoperatif daha az tramadol tükettiğini ve VAS skorlarının daha düşük olduğunu saptadık. Özellikle ESP bloğunun VAS skorları, tramadol tüketimi ve hasta memnuniyeti açısından daha etkili olduğunu tespit ettik. ESP bloğunun, sezaryen sonrası ağrı yönetiminde diğer analjezi yöntemlerine iyi bir alternatif olacağı kanaatindeyiz.

Anahtar Kelimeler: Sezaryen operasyonu, postoperatif analjezi, hasta kontrollü analjezi, transversus abdominis düzlem bloğu, erektör spina düzlem bloğu

Introduction

Effective pain management after cesarean section provides early recovery and mobilization of the mother, prevents the undesirable effects of pain, and ensures the earlier establishment of mother-baby bonding (1). Inadequate postoperative pain control may lead to delayed recovery, decreased function, and life quality, persistent postoperative pain, and increased risk of complications and postpartum depression (2).

Multidisciplinary approach of anesthesiology and obstetrics clinics is very important for pain control after cesarean section. Many new peripheral and regional block techniques have been described to avoid the side effects of opioids administered systemically or neuraxially. With the widespread use of ultrasonography, the complication risk of these techniques has decreased, and the success rate has increased (3).

Pain after cesarean section is of somatic and visceral origin. Most of the pain is of somatic origin. Somatic pain control can be achieved with regional block techniques. A Transversus abdominis plane (TAP) block is a commonly used technique in cesarean section operations due to its proven efficacy (4). The TAP block targets the transversus abdominis plane, which is an anatomical space situated between the internal oblique and transversus abdominis muscles, located superficially to the transversus abdominis muscle. This space contains the thoracolumbar nerves between the T10 and L1 vertebrae. By administering a local anesthetic agent between the internal oblique and transversus abdominis muscles, sensory blockade of the entire abdominal wall can be achieved (5). The erector spina plane (ESP) block is a paraspinal facial plane block in which the needle is inserted between the erector spina muscle and the thoracic transverse processes, and a local anesthetic is administered that blocks the dorsal and ventral branches of the thoracic and abdominal spinal nerves (7). ESP block, first described by Mauricio Forrero et al. in 2016, is a new block with increasing popularity in postoperative pain management (6). Although it was first applied in treating thoracic neuropathic pain, many studies showing its efficacy in different surgeries have been published. ESP block provides both somatic and visceral analgesia (7-8). In this study, it was planned to compare the effectiveness of USG-guided TAP and ESP blocks on postoperative pain and to evaluate patient and surgeon satisfaction after the end of the surgical procedure in patients undergoing cesarean section under spinal anesthesia.

MATERIAL AND METHODS

The study was planned as single-center, prospective, double-blind, and randomized. Ethics committee approval of Harran University Faculty of Medicine Ethics Committee dated 15/02/2021 and numbered 2021.04/17 was obtained. Between 15/02/2021 and 15/02/2022, a total of 90 pregnant women aged 18-45 years, ASA II, who would undergo cesarean section under spinal anesthesia under elective conditions, were included. All patients were informed about the study and their written and verbal consents were obtained.

In the operation room, a vascular line was inserted with a 20G cannula, 0.9% NaCl infusion was started, and monitoring was performed. Patients were placed in the right or left lateral decubitus position to perform the intervention. After asepsis with an alcohol-based povidone-iodine solution, the skin was covered with a sterile drape. A 25 G pencil-tipped spinal needle was inserted into the spinal space at the T10-L1 interval, determined as the Tuffier line. After CSF flow was observed, 2 ml (10 mg) 0.5% hyperbaric bupivacaine was administered into the subarachnoid space, and the patient was placed in a supine position. The operating table was tilted 15 degrees to the left until the baby came out. The level of sensory block was determined by a 'pin-prick' test, and the operation was allowed when it reached the T4-6 level. Demographic data, vital signs (heart rate, non-invasive blood pressure measurement, oxygen saturation) of the patients were recorded at the beginning of surgery at 0. min.At the end of the surgery, the patients were randomly divided into 3 groups using the closed envelope technique:

Group T: Patients who will undergo TAP block.

Group E: Patients who will undergo ESP block.

Group K: Control group patients who will not be blocked and will only be subjected to patient control analgesia (PCA)

The responsible investigator performed all blocks applied to the patients. Ultrasound devices and linear probes were used for the blocks. Both blocks were performed bilaterally, and 40 ml of the local anesthetic mixture, 20 ml of 0.25% bupivacaine, and 0.5% lidocaine were injected on each side. Patients to undergo ESP block were placed in the right or left lateral decubitus position. Under USG guidance, the vertebrae were counted, and the T9 vertebra level was marked. After the necessary asepsis conditions were met, the linear USG probe was placed longitudinally lateral to the spinous process of the T9 vertebra. With a 22 G, 50 mm, insulated facet-type needle, 1 mL of the prepared local anesthetic solution was administered, and the location of the needle tip was checked. Then, the entire solution was injected into the area by aspiration at frequent intervals. Local anesthetic distribution was monitored by USG. The same procedure was performed on the other side.Patients who were to undergo a TAP block were placed in a supine position, and after the necessary asepsis conditions

were met, the linear USG probe was placed on the iliac crest perpendicular to the mid-axillary line. A 22 G, 100 mm, insulated facet-type needle was inserted with 1 mL of local anesthetic to confirm the needle location. The entire solution was then injected into the field by aspiration at frequent intervals. Local anesthetic distribution was monitored by USG. The same procedure was performed on the other side. At the end of the operation, all patients were administered tramadol 5mg/ml concentration in a volume of 100 mL, 20 mg bolus, without background dosage, 30 minutes locked time, and a 4-hour limit of 150 mg with a patient-controlled analgesia device. The VAS score was recorded by asking the severity of the pain by the nurse. In addition, at postoperative hours 0, 2, 4, 8, 12, and 24, the VAS scores of the patients, the amount of tramadol consumption and demand, blood pressure, heart rate and saturation values, nausea and vomiting, and other complaints were recorded by a nurse who did not know which group the patients were in. Patient and surgeon satisfaction were asked at the end of the 24th postoperative hour, and scores were recorded.

Statistical Method

In this study, the NCSS (Number Cruncher Statistical System) 2007 program was used for statistical analysis. Data were evaluated by various descriptive statistical methods. The conformity of the quantitative data to the normal distribution was examined using the Shapiro-Wilk test and graphical analysis. ANOVA and Bonferroni-adjusted pairwise comparisons were used to compare normally distributed quantitative variables among multiple groups. Kruskal-Wallis test and Dunn-Bonferroni test were used for quantitative variables that did not fit normally. Repeated measures ANOVA and Bonferroni-adjusted pairwise comparisons were used for intra-group comparisons of normally distributed quantitative variables. In intra-group comparisons of quantitative variables that did not fit the normal distribution, Friedman test and Wilcoxon signed-ranks test and Bonferroni corrected pairwise comparisons were performed. Fisher-Freeman-Halton exact test was used to compare qualitative data. Pearson correlation was used in the evaluation of the patient-surgery satisfaction relationship according to the groups. $p<0.05$ was accepted as statistical significance level and results with p-value less than 0.05 were considered statistically significant.

RESULTS

Ninety out of 97 patients who had elective cesarean section were included in this study, which was carried out in the operating room of Harran University Medical Faculty Hospital between 15/02/2021 and 15/02/2022, and 7 patients were excluded. All pregnant women participating in the study were at term.

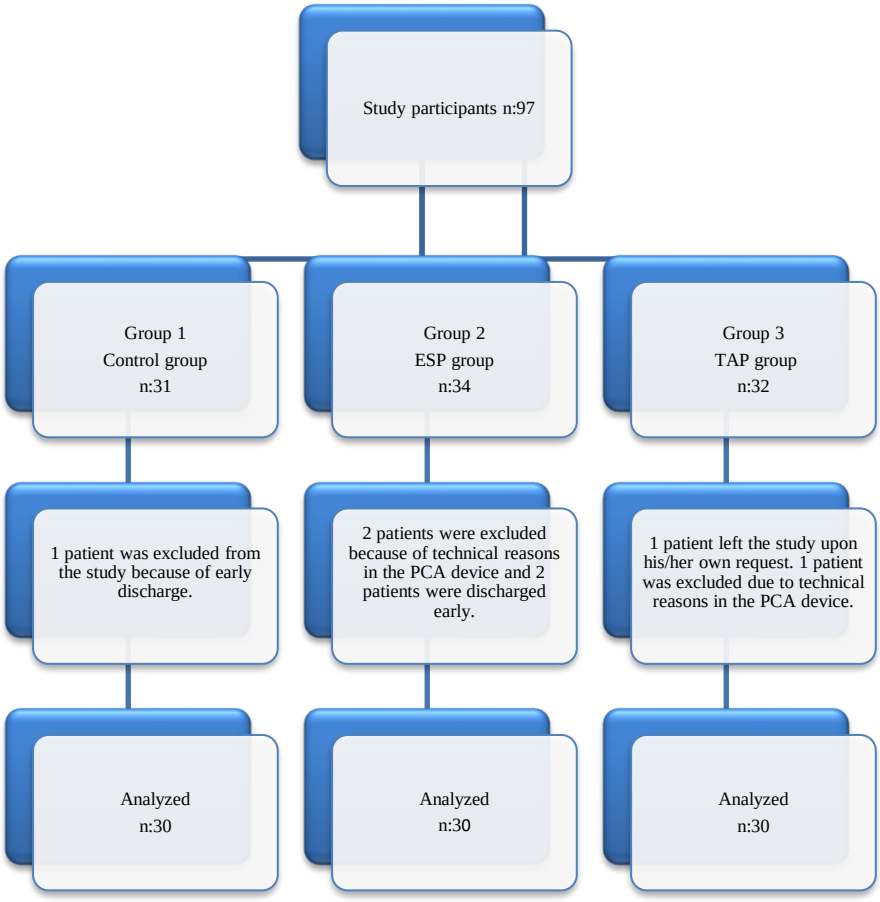

Figure-1: Flowchart

A statistically significant difference was found in the time taken for the first bolus dose between the groups (p=0.001; p<0.01). Pairwise comparisons revealed that the time elapsed in the K group was significantly lower than both the E and T groups (p=0.001; p=0.001; p<0.01).

Age, weight, height, comorbidities, number of previous cesarean sections, and duration of surgery were not statistically significantly different between the groups (p>0.05). The groups had no statistically significant difference in postoperative heart rate measurements.

In addition, when the study findings were analyzed, it was determined that there was no statistically significant difference in systolic blood pressure measurements between the groups. The groups had no statistically significant difference in diastolic blood pressure measurements.

Table-1: Evaluation of Demographic Data by Groups

		Group E	Group K	Group T	
Age	*Mean±Sd*	31.5±5.01	32.73±4.64	31.13±5.94	***[a]0.465***
	Median(Min-Max)	31 (22-41)	33 (25-44)	31 (20-41)	
Weight (kg)	*Mean±Sd*	77.07±12.81	81±10.20	77.57±12.40	***[a]0.380***
	Median(Min-Max)	75.5 (55-108)	79.5 (64-105)	74.5 (60-109)	
Height (cm)	*Mean±Sd*	160.23±4.38	162.07±3.58	162.43±4.87	***[a]0.112***
	Median (Min-Max)	160 (150-168)	162 (155-168)	163 (151-170)	
BMI	*Mean±Sd*	74.09±12.81	79.80±10.20	79.82±12.39	***[a]0.380***
	Median (Min-Max)	75.5 (58-95)	79.5 (64-100)	75.5 (60-109)	
Comorbidity	*Median (Min-Max)*	24 (%80.0)	21 (%70.0)	22 (%73.3)	***[b]0.753***
	Yes	6 (%20.0)	9 (%30.0)	8 (%26.7)	
	Asthma	0 (0)	1 (%11.1)	3 (%37.5)	***[b]0.257***
	Diabetes	3 (%50.0)	2 (%22.2)	1 (%12.5)	***[b]0.360***
	Hypertension	1 (%16.7)	2 (%22.2)	0 (0)	***[b]0.446***
	Cigarette	4 (%66.7)	2 (%22.2)	3 (%37.5)	***[b]0.275***
	Hyperthyroidism	0 (0)	1 (%11.1)	2 (%25.0)	***[b]0.589***
	Hypothyroidism	0 (0)	1 (%11.1)	0 (0)	***[b]1.000***
	Psoriasis	0 (0)	1 (%11.1)	0 (0)	***[b]1.000***
	Glaucogoma	0 (0)	1 (%11.1)	0 (0)	***[b]1.000***
	Gastritis	0 (0)	0 (0)	1 (%12.5)	***[b]0.609***
Number of previous cesarean sections	*Mean±Ss*	3.67±1.52	3.42±1.53	3.19±1.36	***[a]0.508***
	Median (Min-Max)	4 (1-6)	4 (1-6)	4 (1-6)	
Surgical time (min)	*Mean±Sd*	50.3±12.56	47.7±11.19	50.47±11.07	***[a]0.588***
	Median (Min-Max)	47.5 (33-100)	45 (30-70)	50 (30-82)	

Abbreviations:[a]*Oneway ANOVA Test,*[b]*Fisher Freeman Halton Tes, **p<0.01, BMI: Body mass index (BMI),Group E: Group Erector Spina Plane,Group K: Group Control,Group T: Group Transversus Abdominis Plane*

Table-2: Evaluation of Postoperative VAS Scores by Groups

Postoperative VAS		**Group E**	**Group K**	**Group T**	
Hour 0	*Mean±Sd*	0.20±0.55	2.13±2.66	0.77±1.14	***[d]0. 002*****
	Median (Min-Max)	0 (0-2)	0.5 (0-8)	0 (0-4)	
Hour 2	*Mean±Sd*	0.67±1.09	4.90±1.73	1.93±1.86	***[d]0.001*****
	Median (Min-Max)	0 (0-4)	4 (3-10)	2 (0-8)	
Hour 4	*Mean±Sd*	1.93±1.89	4.80±1.00	4.10±1.95	***[a]0.001*****
	Median (Min-Max)	2 (0-6)	5 (3-7)	4 (0-8)	
Hour 8	*Mean±Sd*	3.37±1.75	4.73±1.39	4.83±1.12	***[a]0.001*****
	Median (Min-Max)	4 (0-6)	5 (2-7)	5 (3-7)	
Hour 12	*Mean±Sd*	3.67±1.63	3.70±1.51	3.43±1.19	***[a]0.742***
	Median (Min-Max)	4 (0-8)	4 (0-6)	4 (0-6)	
Hour 24	*Mean±Sd*	2.93±1.78	3.47±1.63	2.77±1.25	***[a]0.203***
	Median (Min-Max)	4 (0-6)	3.5 (0-6)	3 (0-5)	

Abbreviations:[a]*Oneway ANOVA Test,*[d]*Kruskal Wallis Test,*p<0.05,**p<0.01,VAS: Visual Analog Scale,Group E: Group Erector Spina Plane,Group K: Group Control, Group T: Group Transversus Abdominis Plane*

According to the groups, there was a statistically significant difference between the patients' postoperative 0. and 2. hour VAS scores. As a result of the pairwise comparisons made to determine the difference, the postoperative 0. hour VAS scores of the patients in the K group (Group Control) were statistically significantly higher than those in the Group E (Group Erector Spina Plane) and T groups (Group Transversus Abdominis Plane) (p=0.001; p<0.01). Postoperative 2nd-hour VAS scores were significantly higher than those in the E and T groups (p=0.001; p=0.001; p<0.01).

There was a statistically significant difference between the patients' 4th and 8th-hour postoperative VAS scores according to the groups (p=0.001; p<0.01). As a result of pairwise comparisons made to determine the difference, the postoperative 4th-hour VAS scores of the patients in the E group were statistically significantly lower than those in the K and T groups (p=0.001; p=0.001; p<0.01). The postoperative 8th-hour VAS scores of the E group were statistically significantly lower than those of the K and T groups (p=0.004; p=0.001; p<0.01)

There was no statistically significant difference in the patients' postoperative 12th and 24th-hour VAS scores according to the groups (p>0.05).

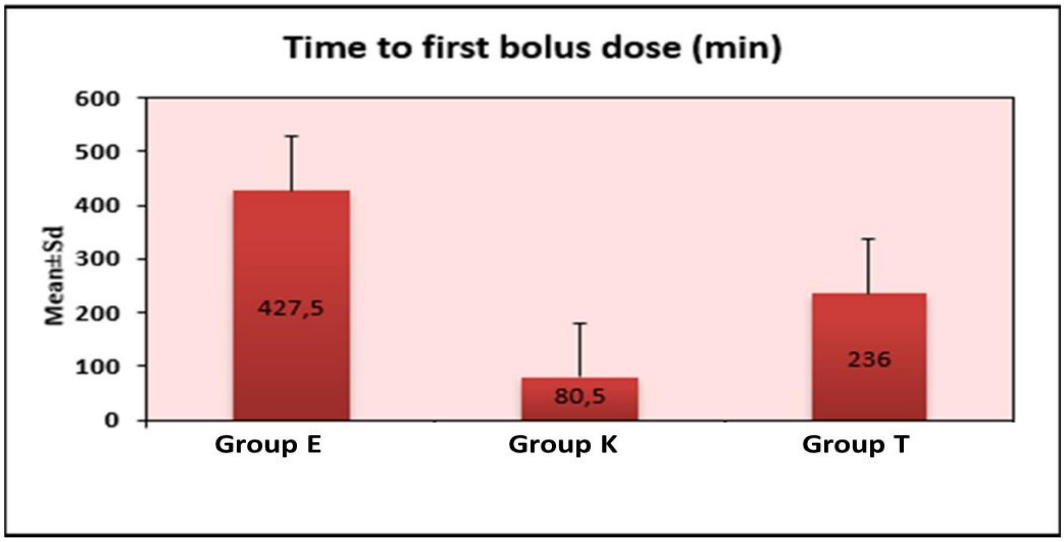

Figure-2: Distribution of the time taken for the first bolus dose by groups.

A statistically significant difference was found between the time taken for the first bolus dose according to the groups (p=0.001; p<0.01). As a result of the pairwise comparisons made to determine the source of the difference, the time elapsed in the K group was found to be statistically significantly lower than those in the E and T groups (p=0.001; p=0.001; p<0.01).

Table-3: Evaluation of Postoperative Tramadol Consumption by Groups

Postoperative Opioid		**Group E**	**Group K**	**Group T**	**P**
Hour 0 dose (mg)	*Median (Min-Max)*	0 (0-0)	0 (0-20)	20 (20-20)	***[d]0.001***
Hour 2 dose (mg)	*Median (Min-Max)*	0 (0-20)	20 (0-40)	0 (0-40)	***[d]0.001***
Hour 4 dose (mg)	*Median (Min-Max)*	0 (0-40)	20 (0-40)	20 (0-40)	***[d]0.001***
Hour 8 dose (mg)	*Median (Min-Max)*	20 (0-40)	20 (0-40)	20 (20-40)	***[d]0.001***
Hour 12 dose (mg)	*Median (Min-Max)*	20 (0-40)	20 (0-20)	20 (0-40)	***[d]0.024****
Hour 24 dose (mg)	*Median (Min-Max)*	20 (0-40)	20 (0-20)	0 (0-40)	***[d]0.080***

Abbreviations: *Post hoc test (Tamhane),[d]Kruskal Wallis Test,**p<0.01, Group E: Group Erector Spina Plane,Group K: Group Control, Group T: Group Transversus Abdominis Plane*

When the data in Table 3 were analyzed, it was determined that there was a statistically significant difference between the 0th and 2nd hour tramadol consumptions of the subjects according to the groups (p=0.001; p<0.01). As a result of the pairwise comparisons made to determine the source of the difference, it was determined that the 0th and 2nd hour tramadol consumption of the subjects in the K group was significantly higher than the subjects in the E and T groups (p= 0.001; p=0.001; p<0.01).

It was determined that there was a statistically significant difference between the 4th hour tramadol consumption of the cases according to the groups (p=0.001; p<0.01). As a result of the pairwise comparisons made to determine the source of the difference, it was determined that the 4th hour tramadol consumption of

the subjects in the E group was significantly lower than the subjects in the K and T groups (p=0.001); p=0.002; p<0.01).

It was determined that there was a statistically significant difference between the 8th hour tramadol consumption of the subjects according to the groups (p=0.001; p<0.01). As a result of the pairwise comparisons made to determine the source of the difference, the 8th hour tramadol consumption of the subjects in the T group was found to be significantly higher than the subjects in the E and K groups (p=0.001; p=0.013; p<0.05).

It was determined that there was a statistically significant difference between the 12th hour tramadol consumption of the cases according to the groups (p=0.024; p<0.05). As a result of the pairwise comparisons made to determine the source of the difference, it was determined that the 12th hour tramadol consumption of the subjects in the E group was significantly higher than the subjects in the K group (p=0.019; p<0.05). In addition, it was determined that the 24th hour tramadol consumption of the patients did not show a statistically significant difference according to the groups (p>0.05).

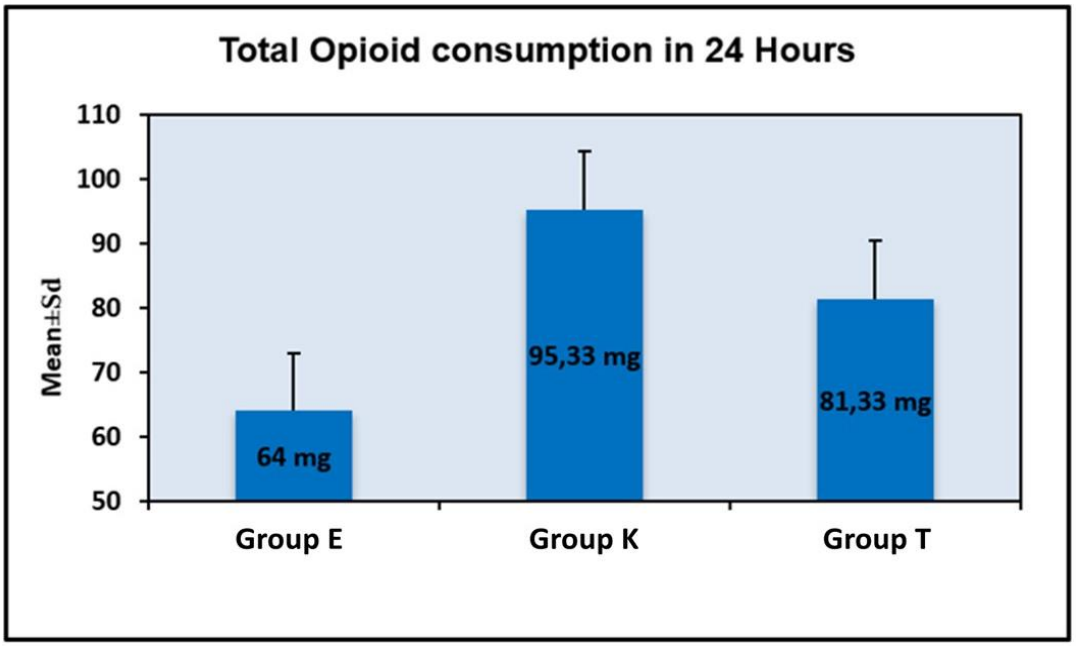

Figure-3: Distribution of total tramadol consumed in 24 hours by groups

When Figure 3 was examined, it was determined that there was a statistically significant difference between the total amount of tramadol taken by the patients in the postoperative 24 hours according to the groups (p=0.001; p<0.01). As a result of the pairwise comparisons made to determine the source of the difference, it was determined that the total amount of tramadol taken by the E group patients in 24 hours was significantly lower than the K and T groups (p=0.001; p= 0.012; p<0.05).

Intraoperative and postoperative side effects were not statistically significantly different between the groups (p>0.05). A statistically significant difference was found in the time taken for the first bolus dose between the groups (p=0.001; p<0.01). Pairwise comparisons revealed that the time elapsed in the K group was significantly lower than both the E and T groups (p=0.001; p=0.001; p<0.01).

Table-4: Evaluation of Intraoperative and Postoperative Side Effects by Groups

		Group E	Group K	Group T	P
Intraoperative side effects	**No**	16 (53.3)	20 (66.7)	19 (63.3)	***[b]0.631***
	Yes	14 (46.7)	10 (33.3)	11 (36.7)	
	Nausea	2 (14.3)	1 (10.0)	0 (0)	***[b]0.622***
	Hypotension	12 (85.7)	10 (100)	11 (100)	***[b]0.335***
	Bradycardia	1 (7.1)	0 (0)	0 (0)	***[b]1.000***
Postoperative side effects	**Drowsiness**	2 (66.7)	2 (100)	3 (75.0)	***[b]1.000***
	Nausea and vomiting	0 (0)	0 (0)	1 (25.0)	
	Dizziness	1 (33.3)	0 (0)	0 (0)	

Abbreviations: *[b]Fisher Freeman Halton Test,**p<0.01,VAS: Visual Analog Scale,Group E: Group Erector Spina Plane,Group K: Group Control, Group T: Group Transversus Abdominis Plane*

Table-5: Evaluation of Patient and Surgeon Satisfaction by Groups

		Group E	Group K	Group T	P
Patient satisfaction	*Mean±Sd*	4.23±0.73	1.87±0.94	3.57±0.77	***[a]0.001***
	Median (Min-Max)	4 (3-5)	2 (1-4)	4 (2-5)	
Surgeon satisfaction	*Mean±Sd*	4.27±0.74	1.80±0.81	3.57±0.82	***[a]0.001***
	Median (Min-Max)	4 (3-5)	2 (1-3)	4 (2-5)	
Patient-Surgery Satisfaction relationship					
	r	0.905	0.923	0.729	
	p	***0.001***	***0.001***	***0.001***	

Abbreviations:*[a]Oneway ANOVA Test,r: Pearson Correlation Coefficient,**p<0.01,Group E: Group Erector Spina Plane,Group K: Group Control,Group T: Group Transversus Abdominis Plane*

DISCUSSION

Multimodal analgesia is one of the most effective and up-to-date approaches to treating postoperative pain. This approach, which involves the combined administration of opioid or non-opioid analgesics with regional methods, reduces opioid consumption and reduces the systemic side effects related to opioids, reduces costs by shortening the length of hospital stay with early recovery (9-12). The results of this study showed that the time to first analgesic administration was statistically significantly lower in the TAP group than in the ESP group. In addition, it was determined that the consumption of tramadol at the postoperative 0,2,4, 8 and 24 hours was statistically significantly lower in the ESP group compared to the other groups. In addition, it was determined that patient satisfaction was higher in the ESP group than in the TAP and control groups. While the TAP block provides sensory blockade of the entire abdominal wall, the ESP block provides both somatic and visceral analgesia by blocking both the dorsal and ventral branches of the thoracic and abdominal spinal nerves. This mechanism explains the effectiveness of the ESP block over TAP.

IV tramadol can be used effectively in combination with non-opioid drugs (13). In many studies comparing tramadol and morphine administered with PCA devices, it was found that both drugs provided adequate analgesia, but the rate of nausea, vomiting, sedation, and respiratory depression was higher in patients treated with morphine (14-16). Illett et al. reported that short-term tramadol use after a cesarean section is very effective and safe in terms of analgesia and is compatible with breastfeeding (17). In another study conducted on 120 pregnant women, continuous opioid infusion and PCA and opioid administration were compared, and lower incidence of nausea and vomiting, greater patient satisfaction, and more effective pain control were observed in the group using PCA devices (18). In our study, we applied tramadol to our patients with PCA devices for the first 24 hours. While none of our patients had respiratory depression and sedation, nausea-vomiting rates were similar to the tramadol groups of these studies.

Using LA combinations in regional anesthesia reduces the toxicity risks that may occur due to using these drugs alone in higher dosages (19-20). TAP block was first described by Rafi in 2001 as a local anesthetic injection into the anatomical area determined as the Petit triangle and then developed by Hebbard et al. in 2007 by applying USG-guided (21-22). It has been reported that the USG-guided block is more reliable and effective than the anatomical marking technique, reducing the risk of complications.

Many studies are investigating the efficacy of TAP block for postoperative pain control after cesarean section in the literature. Some of these studies were performed with general anesthesia (23-24) and most of them compared the effectiveness of TAP block in cesarean section operations performed with spinal anesthesia (25-26). In these studies, with both anesthesia techniques, TAP block has been shown to be highly effective in postoperative analgesia

In another study (25) with 60 patients who underwent cesarean section under spinal anesthesia, the analgesic efficacy of TAP block after cesarean section was evaluated, 15 ml of 0.5% ropivacaine was administered to the TAP block group, and 15 ml 0.9% saline was applied to the control group and the salvage analgesia time was found to be 593 minutes. In our study, unlike this, the first tramadol requirement was 236 minutes on average in the TAP block group. We think that this difference is because the local anesthetic agent used is different.

The ESP block, described in 2016 by Mauricio Forrero et al. (6), is a new block in postoperative pain management that is growing in popularity. Although it was first applied in treating thoracic neuropathic pain, many studies have been published showing its effectiveness in different surgeries. The number of studies showing the effectiveness of ESP block after cesarean section operation is very limited.

In a study conducted by Malavat et al. (27) comparing TAP block and ESP block in 60 patients undergoing elective cesarean section under spinal anesthesia, it was found that ESP block provided longer analgesia

compared to TAP block. The mean time to first rescue analgesia was 43.53 hours for ESP block and 12.07 hours for TAP block. Furthermore, the total analgesic requirement was significantly lower in the ESP group compared to the TAP group. In the study, both groups received a bilateral administration of 0.2% ropivacaine at a dose of 0.2 ml/kg as a local anesthetic. Additionally, 15 mg of intravenous diclofenac was administered as an analgesic. In a study conducted by Boules et al. (28) on 60 patients who delivered elective cesarean section under spinal anesthesia, the effect of TAP and ESP blocks on postoperative pain was investigated. In this study, 20 mL of 0.25% bupivacaine was used as a local anesthetic solution. Median tramadol consumption in the first 24 hours was significantly higher in the TAP group than in the ESP group (125 mg [100 - 150] and 100 mg [75 - 100]).

In a meta-analysis, Wang et al. (29) examined studies on local anesthetic techniques for postoperative pain control after cesarean section. A total of 5039 patients were included in 68 studies, and pain control and analgesia consumption were investigated in these patients who underwent six local anesthesia techniques, including TAP block, ilioinguinal and iliohypogastric nerve block, quadratus lumboruma blocks, transversalis fascia plan block, ESP block, and wound infiltration. It has been shown that fascial blocks and wound infiltration techniques reduce opioid consumption within the first 24-48 hours. In particular, the most effective method of TAP block has been found. However, since there are numerical differences between the methods in the study and there are differences in local anesthetic doses, we think that this study provides insufficient data, especially in terms of ESP block. A study of 60 patients who underwent abdominal hysterectomy showed that total opioid consumption in the first 24 hours was significantly higher in the control group than in the group with ESP block (30). A similar ten-disease case report published by Altınpulluk et al. (31) revealed that ESP block is effective in postoperative analgesia in patients undergoing abdominal hysterectomy.

One of the biggest advantages of ESP block is that the risk of complications is low because the injection site is quite far from the pleura, neural structures, and major vascular structures (32) (33). The first complication reported after ESP block is pneumothorax (34). In a case report published by Selvi et al. (35), a 29-year-old patient reported unexpected motor weakness as a side effect of an epirector spina plane block after a cesarean section. The incidence of TAP block complications is also considered to be low. Complications such as visceral organ injuries, intraperitoneal injection, and transient femoral nerve palsy have been reported in several publications (36-37).

Nausea and vomiting are common side effects of opioid agents and significantly reduce patient comfort. A published meta-analysis found that the rate of nausea and vomiting in 1018 patients who underwent ESP block for postoperative analgesia in breast and thoracic surgery was significantly reduced in the ESP block group (38). On the other hand, in a study conducted by Aksu et al. (39) comparing ESP block and control groups, no significant difference was found in terms of postoperative nausea and vomiting. In a study comparing TAP and ESP blocks in terms of postoperative analgesia after total abdominal hysterectomy, the incidence of postoperative nausea and vomiting was higher in the TAP block group than in the ESP block group. However, it was not statistically significant (40). In our study, in parallel with these studies, there was no statistically significant difference between the groups regarding postoperative nausea, vomiting, and other side effects. We did not come across a similar study that evaluated all complication rates in the literature. In this respect, we think that our work is specifical.

This is the first study in which the postoperative analgesic efficacy of patients classified as ESP block, TAP block, and control group in cesarean section operations was compared, unlike the studies in the literature.

After all, we observed that ESP and TAP blocks provided effective analgesia compared to the control group; ESP block provided more effective analgesia than TAP block and increased patient satisfaction.

Study limitations

The limitations of our study are that patients were followed up only for the first 24 hours in the postoperative period, and therefore we could not evaluate the long-term pain scores and complications of the methods used, limited data on the efficacy of ESP block for postoperative analgesia after cesarean delivery, and we did not perform dermatomal examination to determine the level of sensory block due to the persistence of spinal anesthesia effects.

Conclusion

Our study compared the analgesic efficacy of TAP and ESP blocks applied for postoperative pain treatment after cesarean section operations. We found that ESP block prolonged the time required for the first analgesic compared to TAP block, significantly reduced postoperative tramadol consumption in the first 24 hours, lower VAS scores, and increased patient and surgeon satisfaction. We believe that in the future, USG-guided ESP block will be one of the analgesia methods that can be used, especially in cesarean section and other lower

abdominal surgeries, as knowledge and experience increase. For this reason, we think that more studies are needed in this regard.

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