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ORIGINAL ARTICLE

Research on the efficacy of the rectus sheath block method

Rektus kılıf bloğu yönteminin etkinliğinin araştırılması

Esma KARAARSLAN,[1] Ahmet TOPAL,[2] Onur AVCI,[1] Sema TUNCER UZUN[2]

Summary

Objectives: We aimed to retrospectively investigate the efficacy of ultrasound guided rectus sheath block (RSB) method in our study.

Methods: We scanned 235 patient files operated for abdominal pathology. Patients meeting the criteria were evaluated for intra-operative rectus sheath block and two different groups were formed. In these two groups of patients visual analogue scale (VAS) values recorded from the postoperative pain follow-up form and analgesic delivery (DEL) and analgesic demand (DEM) values recorded from patient controlled analgesia (PCA) device were compared. In addition, complaints of nausea, vomiting and constipation were evaluated.

Results: Postoperative VAS values (Postoperative 1, 12 and 24 hours p<0.001), DEM values (Postoperative 1, 12 and 24 hours p<0.001) and total amount of morphine consumed (Postoperative 1, 12 and 24 hours p<0.001) were lower in patients with RSB. Also, in patients with RSB nausea (p=0.014) and vomiting was less seen postoperatively (p=0.007). In the first 24 hours after surgery, constipation was seen in 8 patients with RSB and constipation was seen in 30 patients without RSB (p=0.00).

Conclusion: Ultrasound guided rectus sheath block is an effective method for postoperative pain control.

Keywords: Postoperative analgesia; rectus sheath block; ultrasonography.

Özet

Amaç: Çalışmamızda ultrasonografi eşliğinde yapılan rektus kılıf bloğu (RKB) yönteminin etkinliğini retrospektif olarak araştırmayı amaçladık.

Gereç ve Yöntem: Abdominal patoloji nedeniyle ameliyat olmuş 235 hasta dosyasını taradık. Kriterleri karşılayan hastalar intraoperatif RKB yapılması yönünden değerlendirildi ve RKB yapılan ve yapılmayan olarak iki farklı grup oluşturuldu. Belirlenen bu iki grup hastada postoperatif ağrı takip formuna kaydedilmiş olan vizuel analog skala (VAS) değeri ve hasta kontrollü analjezi (HKA) cihazından kaydedilmiş olan analjezik sunumu (DEL) ve analjezik isteği (DEM) değerleri karşılaştırıldı. Ayrıca hastanın ifade etmiş olduğu bulantı, kusma ve kabızlık şikayetleri değerlendirildi.

Bulgular: Postoperatif VAS değerleri (postoperatif 1, 12, 24. saat p<0.001), DEM değerleri (postoperatif 1, 12 ve 24. saat p<0.001) ve tüketilen toplam morfin miktarları (postoperatif 1, 12 ve 24. saat p<0.001) RKB yapılmış hastalarda daha düşüktü. Ayrıca, RKB yapılmış hastalarda postoperatif bulantı (p=0.014) ve postoperatif kusma daha az idi (p=0.007). Cerrahi sonrası ilk 24 saatte RKB uygulanmış 8 hastada, RKB uygulanmamış 30 hastada kabızlık görüldü (p=0.00).

Sonuç: Ultrasonografi eşliğinde yapılan RKB orta hat kesisi ile gerçekleştirilen batın ameliyatlarında postoperatif ağrı kontrolünde etkili bir yöntemdir.

Anahtar sözcükler: Postoperatif analjezi; rektus kılıf bloğu; ultrasonografi.

Introduction

The importance of postoperative pain management has gradually increased due to unwanted and delaying effects of pain on wound healing.[1] The aim of postoperative pain management is to eliminate or to minimize the feeling of discomfort, to reduce or to prevent side effects, and to make the treatment more economic in patients. However there is no ideal method available for this.[2,3]

Rectus sheath block allows us to prevent postoperative somatic pain in a zone from the dermis to the parietal peritoneum. Before ultrasonography was being actively used, this block has not been applied often

[1]Department of Anestesiology, Numune Hospital, Sivas, Turkey
[2]Department of Anestesiology, Necmettin Erbakan University Meram Faculty of Medicine, Konya, Turkey

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Correspondence**:** Dr. Onur Avcı. Numune Hastanesi, Anesteziyoloji Kliniği, Sivas, Turkey.
Phone: +90 - 530 - 112 64 08 e-mail**:** dronuravci@gmail.com

Table 1. Postoperative pain assessment form records used for patient follow-up

Patient name surname			File no	Age		ASA
	VAS	PCA-DEM	PCA-DEL	Nausea	Vomiting	Constipation
1 hour				Yes/No	Yes/No	Yes/No
12 hours				Yes/No	Yes/No	Yes/No
24 hours				Yes/No	Yes/No	Yes/No

VAS: Visual Analogue Scale; PCA: Patient controlled analgesia; DEM: Demand; DEL: Delivery.

or sufficient blocks could not have been achieved mostly with single injection method, due to the proximity of medicated zones and vital organs, and muscle layers being coherent and thin. Recently, this method is actively applied with ultrasonography guidance, single injection and catheter placement in the rectus sheath.

In this study, we retrospectively evaluated the efficacy of ultrasound guided rectus sheath block by comparing the amounts of needed analgesics and comparing symptoms like pain, nausea, vomiting and constipation in patients who were operated with above-below umbilicus incision in the general surgery operating room due to abdominal pathologies.

Material and Methods

This study was conducted to retrospectively investigate the efficacy of rectus sheath block, after the approval of the ethics committee (2016/598). Controlled analgesia follow-up forms and patient files from the algology department were utilized in this study. We gathered data from 235 patients' files, who were operated between July 2014 and March 2016. From these files; ASA 1–3 patients of 18–75 years of age who were operated with above-below umbilicus median incision by the general surgery department were identified. In addition, all of these patients were required to receive the routine 2 mg/kg tramadole for postoperative analgesia and morphine PCA for the postoperative period. 93 patients were determined to meet all of these criteria and 13 of them were not included in the study due to insufficient data. 80 patients were assessed in terms of intraoperative rectus sheath block method usage, and two groups were formed with 40 patients with rectus sheath block (group RSB) and 40 patients without rectus sheath block (Group C).

For these two groups; 1 hour, 12 hours and 24 hours postoperative VAS values recorded to algology clinic follow-up form (Table 1), DEL/DEM values recorded from PCA, as well as nausea, vomiting and constipation complaints from patients were compared.

Statistical analysis

Gathered data were recorded to SPSS 16.0 computer program. Descriptive statistics were shown with mean±standard deviation and frequency tables. Normal distribution conformity analysis of the data were done. Student T-test was used for between-groups comparison. Comparison between measurements was done with Bonferroni corrected paired sample T-test. Chi-square test was used for comparing categorical data. For all analyses, $p<0.05$ was considered as significance level.

Results

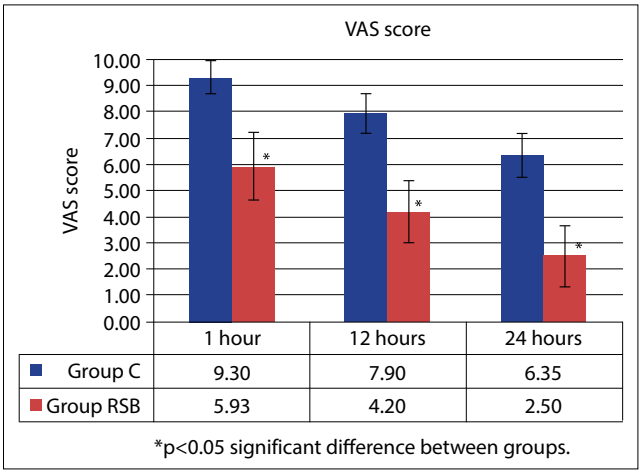
No statistically significant difference was observed when groups were compared in terms of demographic characteristics and ASA classification ($p>0.05$) (Table 2).

- VAS values in Group RSB at 1, 12 and 24 hours were found to be significantly low then Group C ($p<0.001$) (Fig. 1).

Table 2. Demographic characteristics of the groups

	Group C (n=40)	Group RSB (n=40)	p
Age (years)	56.53±11.110	57.20±12.623	0.800
Weight (kg)	77.23±12.877	79.32±13.234	0.474
Height (cm)	171.40±0.101	171.85±0.097	0.840
Gender F/M	10/30	10/30	1.000
ASA I/ II/ III	1/33/6	1/34/5	0.948

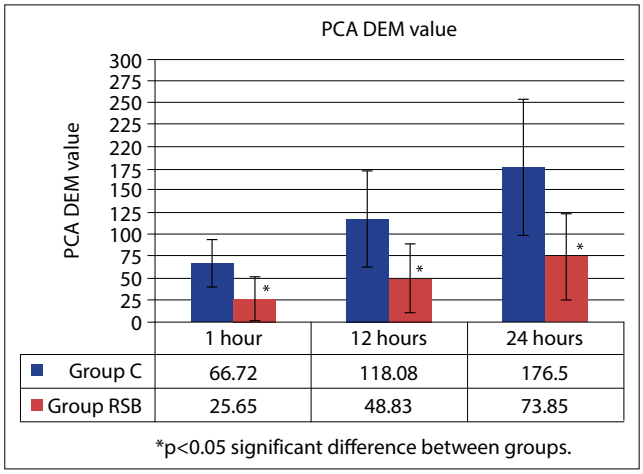
RSB: Rectus sheath block F: Female; M: Male.



	1 hour	12 hours	24 hours
Group C	9.30	7.90	6.35
Group RSB	5.93	4.20	2.50

*p<0.05 significant difference between groups.

Figure 1. VAS scores of the groups.



	1 hour	12 hours	24 hours
Group C	66.72	118.08	176.5
Group RSB	25.65	48.83	73.85

*p<0.05 significant difference between groups.

Figure 2. PCA DEM values of the groups.

- PCA DEM values in Group RSB at 1, 12 and 24 hours were found to be significantly low then Group C (p<0.001) (Fig. 2).
- PCA DEL values in Group RSB at 1, 12 and 24 hours were found to be significantly low then Group C (p<0.001) (Fig. 3).

While 24 (%60) patients had shown the symptom nausea in Group C, 13 (%32.5) patients had shown nausea in Group RSB and there was a statistically significant difference between two groups (p=0.014).

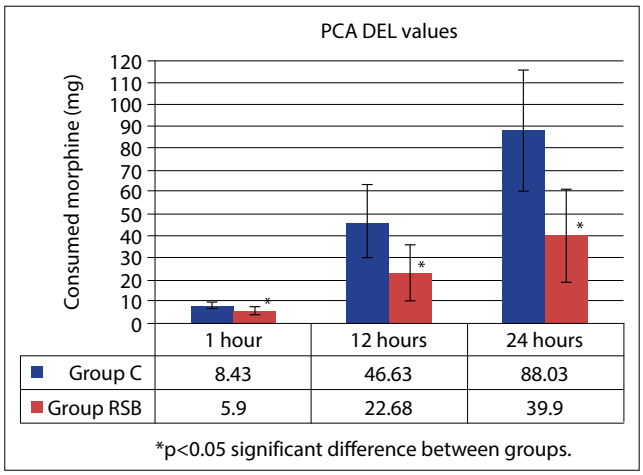
While 17 (%42.5) patients had shown the symptom vomiting in Group C, 6 (%15) patients had shown vomiting in Group RSB and there was a statistically significant difference between two groups (p=0.007).

While 30 (%75) patients had shown the symptom constipation in Group C, 8 (%20) patients had shown constipation in Group RSB and there was a statistically significant difference between two groups (p=0.00).

While total morphine consumption average of patients with postoperative constipation in 24 hours was 80.08±32.607 mg, this value was 49.38±29.367 mg for patients with no constipation. There was a statistically significant difference between total morphine consumption averages of patients with and without constipation (p<0.001).

Discussion

Postoperative pain is one of the most important factors effecting morbidity after surgery. Various oral, nasal, intravenous bolus, patient controlled intravenous and patient or nurse controlled intravenous



	1 hour	12 hours	24 hours
Group C	8.43	46.63	88.03
Group RSB	5.9	22.68	39.9

*p<0.05 significant difference between groups.

Figure 3. PCA DEL values of the groups.

drugs like nonsteroid anti-inflammatory drugs, paracetamol and opioids are being used for postoperative pain in different applications.[4–6]

Opioids are the most used agents in postoperative pain treatment. While usage of opioid agents date back to the beginning of modern surgery, management of opioid related side effects and pain can be insufficient.[7]

In recent years, the usage of local anaesthetics alongside opioids has come up in order to increase success of postoperative pain treatment and to reduce side effects of opioid agents.[8,9]

Peripheral nerve blocks are often used to prevent postoperative pain. With the use of ultrasonography, success rates of peripheral nerve blocks increase and less complications occur.[10] Recently, ultrasound guided rectus sheath block is performed after abdominal operations for pain control as a new method.[11–13]

Dolan J. et al observed that with loss of resistance method; in 45% of patients the needle was placed correctly but superficial, in 21% of patients the needle was placed deeper and in 34% of patients rectus sheath ponction was done. They reported that in 89% of patients whose blocks were done with ultrasonography, the needle was placed correctly.[14]

In their study, Marhoper P. et al reported that ultrasound guided nerve block with local anaesthesia has become a routine practice, and that it is more favorable for showing the needle placement and simultaneous local anaesthetic distribution than traditional methods like nerve stimulation and loss of resistance.[15]

In our retrospective study, we included patients with ultrasound guided rectus sheath block and did not observe rectus sheath block related complications in any patient. Effective analgesia is achieved and less complications occur, as the usage and experience of ultrasonography usage increases.

It should not be forgotten, that afferent neural blockage with local anesthesia is one of the most effective analgesic methods.[16] Rectus sheath block for postoperative analgesia can be an important component of multimodal analgesia.

The purpose of postoperative pain management is to prevent pain, as well as to minimize its side effects. After years of development opioids are still in the center of pain treatment. Although their analgesic effects are strong, side effects like respiratory depression, sedation, nausea, vomiting, constipation, bradycardia, hypotension and itching can be seen related to their usage.[17,18]

In their study, Elbahrawy et al.[19] investigated the effect of rectus sheath block on postoperative VAS, and reported that average VAS scores in rectus sheath block group was significantly lower than the control group. In a study by Halefoglu et al.[20] including pediatric patients with transverse incision laparotomy; they reported that rectus sheath block significantly lowers postoperative pain score (FLACC score). We observed that patients in the rectus sheath block group had significantly lower VAS scores than patients in the control group, too.

Rectus sheath block is a nerve blocking method used as a postoperative analgesia method, which should reduce the need for analgesics after surgery, and there are many studies in the literature which support this. For example Elbahrawy et al.[19] reported that intraoperative and postoperative opioid consumption was significantly lower in patients who received rectus sheath block compared to the control group.

In a study by Halefoglu et al.,[20] morphine consumption was found to be significantly lower in patients with rectus sheath block. Similarly Ozcengiz et al.[21] reported, that total tramadole consumption was significantly lower in patients with rectus sheath block application.

Similar to many other studies, we observed in our study that postoperative total morphine consumption was significantly lower for patients with rectus sheath block. In addition to other studies, we looked at patients' analgesic demands (DEM) from H.K.A devices in postoperative period from their pain follow-up form records, and found that as a more objective criteria of patient satisfaction, analgesic demands were lower in patients with rectus sheath block.

Multimodal analgesia, which includes non-opioid analgesics and ambulatory continuous peripheral nerve blocks, provides effective and adequate analgesia after surgery and reduces postoperative nausea and vomiting related to consumed opioids.[22]

In studies involving rectus sheath block used as a postoperative analgesic method, the postoperative side effect difference of reduced opioid consumption has been assessed. In a study, Elbahrawy et al.[19] investigated sedation scores and nausea and vomiting incidences and reported that nausea and vomiting incidence was significantly lower in patients with rectus sheath block compared to patients with only general anaesthesia. They also observed, that most of the patients, who expressed satisfaction, had a rectus sheath block application. Similarly, in a study by Halefoglu et al.;[20] while none of the patients with rectus sheath block had nausea or vomiting, 3 patients in the control group had nausea. In addition, sedation scores of patients with rectus sheath block

application was found to be significantly lower. Ozcengiz et al.[21] reported, that nausea and vomiting incidence was significantly lower in patients whose surgical rectus sheath block was made with local anaesthetics, compared to patients whose surgical rectus sheath block was made with saline, and that patient satisfaction was significantly higher.

Cuneyitoglu et al.[23] reported, that in the first 24 hours after surgery, 5 patients with ultrasound guided rectus sheath block and 1 patient with surgical rectus sheath block could defecate, while none of the patients who received no other analgesic method other than IV opioids could. So, they concluded that gastrointestinal system functions in patients with ultrasound guided rectus sheath block were significantly better.

Considering studies by Breschan et al.[24] and Manassero et al.;[25] we can see, that with proper patient selection, rectus sheath block can be used alone for perioperative analgesia, or even alone as an anaesthesia method for operations without visceral pain.

In our study, the application of nerve block methods such as rectus sheath block provides effective analgesia and reduces opioid related side effects by reducing opioid consumption. It also provides all of the advantages of effective pain control such as patient satisfaction, early mobilization and reduced costs.

In our retrospective study, we concluded that ultrasound guided rectus sheath block is an effective analgesic method within the first 24 hours. We observed, that rectus sheath block reduces patients' analgesic demands and opioid consumptions within the first 24 hours, and also lowers VAS scores.

In conclusion, with the effective usage of ultrasonography, success rates and safety of rectus sheath block also increases. With proper patient selection, it provides effective and adequate analgesia, while also reducing opioid related side effects by reducing opioid consumption. We think that rectus sheath block should often be considered in abdominal midline incisions for postoperative analgesia, and that it is a good alternative to other analgesic methods. It can be an important component of multimodal analgesia.

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