

Effectiveness of bilateral block transversus abdominis plane approach linea semilunar compared to lateral approach as post-laparotomy colorectal analgesia

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Abstract

Background: Patients who undergo midline incision colorectal surgery often experience moderate to severe postoperative pain, which lead to high level of opioid need. Transversus Abdominis Plane (TAP) block is a component of multimodal analgesia which May reduce postoperative pain and amount of opioid consumption. This study aims to compare the effectiveness of Linea Semilunaris approaches to Lateral approach of TAP block on the postoperative pain, duration of the postoperative analgesia effect and quality of postoperative recovery in patients undergoing colorectal surgery with general anesthesia

Methods: This study was a single blind random controlled trial. Forty patients who met the criteria and were planned for colorectal surgery under general anesthesia at Prof. Dr. IGNG Ngoerah General Hospital, Denpasar. Subjects were then randomly allocated into 2 groups, group P1 were planned to receive bilateral TAP block with semilunar approach, while group P2 were planned to receive bilateral TAP block with lateral approach. Both treatment groups received Bupivacaine 0.25% 20 ml on each side of the abdomen postoperatively. Furthermore, an evaluation of pain intensity (VAS) was carried out at 1, 6, 12, 24 and 48 hours postoperatively, recording the duration of the analgesic and the quality of postoperative recovery which was assessed using the QoR-40 questionnaire.

Results: There were no significant differences in demographic characteristics between the two groups. Statistical tests showed that group P1 had lower pain intensity (VASE) at 6 hours (median: 0 vs. 3), 12 (mean: 2.42 vs. 3.36), and 24 (mean: 2.45 vs. 3.18) ($p < 0.001$), longer duration of analgesic effect (minutes) (median: 460 vs. 260, $p < 0.001$), lower total opioid morphine requirement (mg) in 24 hours (median 3 vs. 5, $p < 0.001$) and higher quality of recovery (QoR-40 score) of patients at 24 hours (median 180 vs. 147.5, $p < 0.001$) and 48 hours (median: 181.5 vs. 151.5, $p < 0.001$).

Conclusion: Bilateral TAP block in with semilunar approach show better analgesia effectiveness and quality of recovery after midline incision colorectal surgery than lateral approach

Keywords: Transversus Abdominis Plane Block; Lateral; Semilunar; Colorectal laparotomy; Quality of postoperative recovery; Postoperative analgesia

1. Introduction

Colorectal laparotomy is one of the major surgical procedures for the treatment of colorectal cancer that can cause complications such as pain. Postoperative pain can affect the time of mobilization and rehabilitation, length of hospitalization, patient satisfaction and chronic pain. Conventional pain management using opioids has side effects

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(nausea, vomiting, decreased bowel motility) so that regional techniques such as epidural analgesia have been developed to reduce opioid use and accelerate recovery. The application of epidural analgesia for pain management often causes complications such as infection and hematoma, as well as the risk of more severe installation such as entry into the subarachnoid space to spinal nerve injury.¹ To reduce side effects and deal with this perioperative pain problem, multimodal pain management can be used, one of which is using epidural analgesia.²

Another technique developed is the Transversus Abdominis Plane (TAP) block. This technique has a low risk of complications because it is easily recognized based on sonoanatomy. In the development of analgesia techniques in midline laparotomy, several approaches to local anesthetic injection in the TAP technique were developed such as the lateral, subcostal and posterior approaches. Each TAP block approach has its own characteristics of analgesic coverage. These approaches each have different broad scopes of analgesia and although initially the lateral TAP approach was said to be used for midline laparotomy, the results of different studies have caused researchers to not be able to provide clear recommendations. The TAP technique of the semilunar line approach developed with initial studies showed a better analgesic profile and provided a wider scope of analgesia.^{3,4}

TAP block with semilunar line approach is said to be an effective and safe procedure for colorectal laparotomy, this block has a very low risk of complications, because the sonoanatomy is easily recognized and there are no nearby structures at risk of injury. Bilateral TAP block with semilunar line approach produces sensory block with dermatome coverage T10-L1 and wider spread laterally and medially in colorectal laparotomy surgery, combining the effects of TAP block and rectus sheath.^{5,6}

2. Materials and methods

This study is a pure experimental research with a double-blind randomized control trial design. The subjects in this study were divided into two groups: the control group received lateral approach TAP Block, while the experimental group received semilunar linear approach TAP Block. To assign the subjects into either the first experimental group or the control group, randomization was conducted, and blinding was applied to both the subjects and the researcher. Then the pain intensity was assessed using a visual analogue scale (VAS) at 1, 6, 12, 24, and 48 hours, the duration of the analgesic effect, the total opioid requirement in 24 and 48 hours, the quality of postoperative recovery 24 and 48 hours (QoR-40) postoperatively. The study was conducted in the operating room of the Central Surgical Installation of a teaching hospital from May to October 2024.

Inclusion Criteria includes adult patients aged 18-65 years undergoing colorectal laparotomy surgery with physical status ASA I-II. Exclusion Criteria include drug allergy, infection in the area to be blocked, severe cardiovascular disorders, history of chronic analgesia use, use of blood thinners that have not been stopped according to guidelines and coagulopathy, the patient or patient's guardian refuses to sign a consent form to participate in this study, patients with impaired consciousness. Drop Out Criteria includes complications (eg, allergic reactions, severe bleeding, death) and patient was on ventilator postoperatively.

2.1. Procedure

Patients in group P1 will be given bilateral TAP block with a semilunar line approach after general anesthesia. The ultrasound machine uses a linear probe placed lateral to the umbilicus to visualize the rectus sheath, then directed laterally to visualize the external obliquus, internal obliquus and transversus abdominis muscles with the semilunar line as a connector. The injection target is the area below the semilunar line. The needle is inserted using the in-plane technique. Local anesthetic bupivacaine 0.25% is then injected into the target area as much as 20 ml. Identify the hypoechoic sign that appears after injection in the area, with the local anesthetic appearing to spread medially and laterally, lifting the internal oblique and rectus abdominis muscles upwards. After the needle injection is removed, the block is performed with the same procedure on the opposite side.

Patients in group P2 will be given bilateral TAP block with a lateral approach after general anesthesia. The ultrasound machine uses a linear probe placed between the iliac crest and the lower border of the ribs in the anterior midaxillary line at the level of the umbilicus. Identify the abdominal layers (external oblique, internal oblique, and transversus abdominis muscles). The injection target is the area between the internal oblique and transversus abdominis muscles. The needle is inserted using the in-plane technique. Local anesthetic bupivacaine 0.25% is then injected into the target area as much as 20 ml. Identify the hypoechoic sign that appears after injection in the area that lifts the internal oblique muscle upwards. After the needle injection is removed, a block is performed with the same procedure on the opposite side.

Patients were given PCA morphine demand only analgesia with the following provisions: bolus dose of 1 mg per squeeze, maximum dose of 10 mg/4 hours and lockout interval of 6 minutes and ketorolac 30 mg (iv) given every 8 hours and paracetamol 500 mg (po) given every 6 hours.

After the patient moves to the room, the acute pain service (APS) team will evaluate the pain scale at 1, 6, 12, 24, 48 hours postoperatively, the first time the PCA button was pressed and the total opioid consumption data in 24 and 48 hours on the PCA machine will be recorded.

Complications and side effects during surgery and postoperatively such as hypotension, arrhythmia, bradycardia, nausea, vomiting, intravascular injection, lower extremity muscle weakness, and local anesthesia systemic toxicity are recorded in the evaluation recording sheet

Patients are given the Indonesian version of the QoR-40 questionnaire to assess the quality of postoperative recovery at 24 hours and 48 hours postoperatively.

2.2. Statistical Analysis

Descriptive analysis aims to describe the characteristics of the subjects and research variables based on the treatment group. Variables that are on a numeric data scale are displayed as the mean and standard deviation (SD) if they are normally distributed, while if they are not normally distributed, they use the median and interquartile range. The normality test aims to assess whether variables such as age (years), height (cm), weight (kg), BMI (kg/m²), distribution of pain scale variables, total intravenous opioid use, time interval to first postoperative PCA use and quality of postoperative recovery follows a normal distribution. This analysis was conducted using the Shapiro-Wilk test at a significance level of 0.05, where data is considered normal if $p > 0.05$. The homogeneity test is used to evaluate whether the variances between groups are homogeneous. The homogeneity of variance is tested using Levene's test. Variances are considered homogeneous if $p > 0.05$ and not homogeneous if $p \leq 0.05$. Differences in The effectiveness of the block in terms of pain scale, total use of intravenous opioids, time interval between first PCA use postoperatively, quality of postoperative recovery were assessed based on mean differences, so an independent t-test was used. If the data between the control and treatment groups are not normally distributed, the Mann-Whitney test is applied in the data analysis. Percentages and figures are used to represent qualitative data such as gender, ASA physical status, and intubation conditions using 2x2 cross-tabulation analysis. The statistical test applied is the Chi-Square test. The results will be presented as Relative Risk (RR). Conclusions are drawn based on a 95% Confidence Interval (CI) and a P-value with a significance level of $\alpha < 0.05$. The entire data analysis process is performed using SPSS statistical software.

3. Result

The sample's characteristics can be seen in Table 1. All the subjects between the case and the control group were comparable.

Table 1 Subject Characteristics

Patient Characteristics	Group		p-value
	Case (n=20)	Control(n=20)	
Age (years), mean $\pm$ SD	58.5(±3)	59.3(±3.6)	0.452 ^T
Gender			0.342 ^C
Female, n (%)	8 (42.1)	11 (57.9)	
Male , n (%)	12 (57.1)	9 (42.9)	
BMI (kg/ m ²) , mean $\pm$ S D	21.9 (±2.6)	20.2 (±3.2)	0.092 ^T
ASA Physical Status			0.752 ^C
I, n (%)	11 (52.4)	10 (47.6)	
II, n (%)	9 (47.4)	10 (52.6)	
Surgery duration (minute)	175 [140-210]	171 [140-210]	0.841 ^M

Total Fentanyl intraoperative (mcg)	175 [150-250]	150 [150-250]	0.478 ^M
Type Surgery			
<i>LAR And Ultra LAR</i>	6 (35.3)	11 (64.7)	0.070 ^C
Colectomy	3 (33.3)	6 (66.7)	
Procedure making Stoma	8 (80)	2 (20)	
Others (biopsy , adhesiolysis)	3 (75)	1 (25)	

T Test independent t-test . C Pearson Chi-Square Test . M Test Mann Whitney, significant if $p < 0.05$

In this study, an evaluation was conducted at 1, 6, 12, 24 and 48 hours after colorectal laparotomy assessed by VAS. After conducting the Shapiro-Wilk and Levene tests, an abnormal data distribution was obtained ($p < 0.005$) in the VAS data at 1 and 6 hours, to determine a significant difference between the two groups, a non-parametric Mann-Whitney test was used. The Shapiro-Wilk test showed a normal data distribution ($p > 0.05$) in the VAS data at 12, 24 and 48 hours, so an independent t-test was performed to determine the mean difference. Based on the results of statistical analysis (Table 2), there was a significant difference between the median VAS values of group P1 and group P2 at 6, 12 and 24 hours postoperatively ($p < 0.001$) but there was no significant difference at 1 and 48 hours postoperatively ($p > 0.05$). From the statistical tests conducted, it can be concluded that groups P1 and P2 showed similar levels of pain at 1 hour post-surgery, but at 6, 12 and 24 hours showed lower levels of pain in group P1 and at 48 hours showed similar levels of pain again.

Table 2 Comparison Table of VAS values at 1, 6, 12, 24 and 48 hours postoperatively

VASE	Group		p-value
	Case (n=20)	Control(n=20)	
VASE 1 st hour	0 [0 – 0.48]	0 [0 – 0.95]	<0.565 ^M
VASE 6 th hour	0 [0 – 1.48]	3.0 [2.0 – 3.0]	<0.001 ^M
VASE 12 th hour	2.42 (± 0.59)	3.36 (± 0.63)	<0.001 ^T
VASE 24 th hour	2.46 (± 0.33)	3.18 (± 0.53)	<0.001 ^T
VASE 48 th hour	2.31 (± 0.55)	2.42 (± 0.60)	0.566 ^T

Description : Mann-Whitney test; independent T-test. t, Data displayed as median [IQR] And mean (± SD). significant if $p < 0.05$

The duration of the analgesic effect was calculated from the time the TAP block, either the semilunar or lateral line approach, was completed infiltrated until the patient pressed the PCA button for the first time. Due to the non-normal distribution of data based on the Shapiro-Wilk test ($p < 0.01$), a non-parametric Mann-Whitney test was performed. From the statistical test performed (Table 3), a significant difference was found in the duration of the analgesic effect parameters in groups P1 and P2 ($p < 0.05$). The analgesic effect in group P1 was an average of 460 (385-487.5) minutes, while in group P2 it was an average of 215 (180-240) minutes. This analysis showed that the duration of the analgesic effect after colorectal laparotomy surgery in group P1 was longer than in group P2. Therefore, it can be said that the group that received TAP block with a semilunar line approach after colorectal laparotomy surgery experienced a longer pain-free period compared to the group that received TAP block with a lateral approach after colorectal laparotomy surgery.

Table 3 Analysis Duration data Effect Analgesia Post-operative

Variables	Group Intervention		Mark p
	P1 (n=20)	P2 (n=20)	
Effect Duration Analgesia (minute)	460 [385 – 487.5]	215 [180 – 240]	<0.001 ^M

Data displayed as median [IQR]. $p < 0.05$ set as meaningful.

Total opioid requirements were assessed at 24 and 48 hours after colorectal laparotomy surgery. Data were found to be abnormally distributed ($p < 0.05$) in the data on morphine opioid requirements for 0 to 24 hours and morphine opioid requirements for 24 to 48 hours and normally distributed in the data on total morphine opioid requirements for 48 hours ($p > 0.05$) with the Shapiro-Wilk normality test, so that a comparison test will be performed using the Mann-Whitney test on the data on total morphine opioid requirements for 0 to 24 hours and morphine opioid requirements for 24 to 48 hours, as well as an independent t test on the data on total morphine opioid requirements for 48 hours. From the statistical tests performed, there was a significant difference in total opioid requirements for 24 and 48 hours after colorectal laparotomy surgery ($p < 0.05$) in group P1 compared to group P2, but there was no significant difference in opioid requirements for the period 24 to 48 hours after surgery in both groups. Thus, it can be concluded that the group receiving TAP block using the semilunar line approach required less total intravenous opioids in 24 and 48 hours, with a median value of 3 and 5 mg postoperatively for colorectal laparotomy, but there was no difference in opioid requirements in the 24-48 hour postoperative period.

Table 4 Data analysis of the amount of intravenous opioid requirements 0-24, 24-48 and 0-48 hours postoperatively

	Group Intervention		
Variables			Mark p
	P1 (n=20)	P2 (n=20)	
Amount morphine (mg) 0-24 hours	3 [3 – 4]	5 [5 – 6]	<0.001 ^M
Amount morphine (mg) 24-48 hours	4 [3 – 5]	3.5 [3 – 5]	1,000 ^M
Amount total morphine (mg) in 48 O'clock	7.15 ($\pm$ 1.39)	8.8 ($\pm$ 1.58)	<0.005 ^T

^MTest Mann-Whitney; ^TTest independent T test

Data displayed as median [IQR] And mean ($\pm$ SD). Mark $p < 0.05$ set as meaningful.

In this study, an evaluation of the quality of recovery after colorectal laparotomy surgery was carried out based on the QoR-40 questionnaire at 24 and 48 hours after surgery. After the Shapiro-Wilk test, an abnormal data distribution was obtained ($p < 0.05$) apart from the QoR-40 comfort and independence data in 24 hours and QoR-40 comfort in 48 hours, to determine a significant difference between the two groups, a non-parametric Mann-Whitney test was performed on data that was not normally distributed and an independent t test on data that was normally distributed. Based on the results of statistical analysis (Table 5.5), there was a significant difference in the total QOR-40 value which was higher in group P1 compared to group P2 ($p < 0.001$). In addition to the total QOR-40 value, all aspects assessed were found to be statistically higher ($p < 0.001$) in group P1 compared to group P2 (Figure 5.4). Thus, it can be concluded that the recovery quality produced by the TAP block semilunar line approach is higher compared to the lateral approach.

Table 5 Analysis data QoR-40 Score 24 and 48 Hours Post-operative

Variable	P1 (n=20)	P2 (n=20)	p-value
QoR-40 score 24th hour	180 [175.2 - 184]	147.5 [138- 155.5]	<0.001M
Comfort	52 ($\pm$ 3.11)	43.1 ($\pm$ 4.76)	<0.001T
Feeling	42 [39 – 43.8]	36 [34 – 38.8]	<0.001M
Physical Independence	21.15 ($\pm$ 1.93)	17.25 ($\pm$ 2.149)	<0.001T
Patient's support	32 [31.3 – 34.8]	25.5 [24 - 28]	<0.001T
Pain	32 [30.5 – 34.8]	25 [22.3 - 28]	<0.001M
QoR-40 score 48th hour	181.5 [117.3 - 186]	151.5 [143.5 – 162.8]	<0.001M
Comfort	52.75 ($\pm$ 3.23)	44.15 ($\pm$ 4.68)	<0.001T
Feeling	42 [40 - 44]	36.5 [35.3 - 39]	<0.001M

Physical Independence	22 [20.5 – 23.8]	18 [17 – 21]	<0.001M
Patient's support	32 [31.3 – 34]	27 [24.3 – 31.8]	<0.001M
Pain	32.5 [32 – 34.8]	25.5 [23.3 – 28]	<0.001M

MMann Whitney Test; T Test independent T test; Data displayed as median [IQR] And mean ($\pm$ SD). Mark $p < 0.05$ set as meaningful.

4. Discussion

The findings in this study indicate that bilateral TAP block with semilunar line approach after colorectal laparotomy surgery is more effective in reducing pain intensity compared to lateral approach at 6, 12 and 24 hours, but there is no significant difference at 1 and 48 hours after colorectal laparotomy surgery. The low pain intensity at 1 hour in both groups indicates adequate analgesic effect in both treatments, but at 6 hours, there is a higher pain intensity in the lateral TAP approach group indicating that the analgesic effect of TAP with semilunar line approach is more durable than lateral approach. This is in accordance with the research of Xu et al. (2023) which stated that with semilunar line technique, the highest median [IQR] VAS score was 4 [4-5] and the lowest was 2 [1-2] with an effective block duration of 8.0 [6.8-9.2] hours⁷.

TAP block with both approaches showed similar analgesic effect in the first hour after the procedure. These results are supported by previous studies. A radiological study found that after injection of local anesthetic (0.5% lidocaine) with a radiological agent for TAP block, there was a sensory deficit that worked maximally 90 minutes after injection, this effect began to decrease after 4 hours and completely disappeared at 24 hours post-injection. ⁸ In a clinical trial study conducted by Bharti et al. (2011) it was found that subjects who received a lateral approach TAP block after colorectal laparotomy surgery with a midline incision had low pain intensity (VAS 1-2/10) in the first hour after surgery, but then the pain intensity increased to be similar to subjects who did not receive TAP block treatment 24 hours after surgery.⁹ However, the additional findings that we obtained were by using the semilunar line approach, showing lower pain intensity compared to the lateral approach until 24 hours after surgery, so it can be concluded that the semilunar line approach TAP block is superior to reducing the intensity of patient pain in the first 24 hours.

One factor that may influence the difference in pain intensity at 6, 12 and 24 hours is the suboptimal placement of local anesthetic drugs. Studies aimed at assessing the success rate of TAP block placements are few. One study found that with the use of catheters, the failure rate of continuous TAP block therapy reached 30%.^{10,11} A study conducted to assess ilioinguinal and iliohypogastric blocks with a blind technique found that although only 14% of blocks were targeted at the nerve, injection into adjacent structures, namely m. Transversus Abdominis and m. Internal Oblique can also provide analgesia with unpredictable effects.¹² Even with the use of ultrasound guidance and the Seldinger technique, catheter placement for the purpose of continuous TAP block has a catheter success rate of 88%. ¹³ In this study, local anesthetic drug placement was carried out under ultrasound guidance which is expected to reduce the risk of displacement, but the limitation of using ultrasound is its operator-dependent nature, making it difficult to assess whether the injection of local anesthetic drug is in the right location or not.¹⁴

Drug uptake factors also play a role in reducing the pain intensity of the study subjects. The aponeurosis tissue in the semilunar line is an extension of the muscle that is similar to a tendon, and when compared to muscle tissue itself has lower vascularization.¹⁵ Local anesthetic drugs have the property of being absorbed more quickly into the systemic circulation in tissues with higher vascularization.¹⁶ The placement of local anesthetic drugs in the semilunar line will theoretically take longer to deposit because the vascularization properties in the aponeurosis are lower than in the muscle, so that the analgesia provided will last longer. The findings in this study also showed that bilateral TAP block with a semilunar line approach was associated with a significantly longer duration of analgesia than the lateral approach. The time to the first PCA button press postoperatively in the bilateral TAP group with a semilunar line approach had a median time of 460 minutes, while the lateral approach had a median time of 215 minutes. This indicates a longer analgesic effect which is likely due to longer retention of local anesthetic drug in the semilunar line approach.

Factors that influence the duration of analgesia are thought to be the deposition factor of local anesthetic drugs that are right on target and the longer drug uptake factor in the aponeurosis area. ^{12,13} The placement of local anesthetic drugs in the semilunar line will theoretically take longer to deposit because the vascularization properties in the aponeurosis are lower than the muscles and this is supported by the findings in this study. In this study, it was found that there was a statistical difference in the amount of opioid consumption in the first 24 hours and a total of 48 hours, but there was no significant difference in total opioid consumption in the 24-48 hour period between the bilateral TAP block treatment groups with the semilunar line approach compared to the lateral approach. Although the total morphine consumption in 24 and 48 hours in the TAP block treatment group with the semilunar line approach (total morphine 3 mg in 24 hours

and 7.15 mg in 48 hours) tended to be less than the lateral approach (total morphine 5 mg in 24 hours and 8.8 mg in 48 hours), clinically there was only a slight difference (2 mg in 24 hours and 1.65 mg in 48 hours).

The use of lateral TAP block in colorectal surgery was found to reduce the total opioid consumption 24 hours after surgery. In the study, the amount of 24-hour opioid consumption was found to be 6.45 ± 3.26 mg in the Lateral TAP group and 17.55 ± 5.78 mg in the control group (Bharti et al., 2011). A similar study also found that the amount of morphine consumption in the use of lateral TAP block in colorectal laparotomy surgery in 24 hours was 17.7 ± 11.8 mg and in the control group was 22.3 ± 20.7 mg. 15 Ultrasound-guided TAP block blocks the intercostal nerves and provides analgesia where LA deposition in the TAP block causes myocutaneous sensory blockade to the midaxillary line and lateral cutaneous branches to the anterior. TAP block has also been found to consistently reduce morphine requirements by up to 70% in patients undergoing colorectal laparotomy.14

The opioid requirement reduction effect seen in this study may be related to the sensitization suppression effect of the analgesic agent used, namely bilateral TAP semilunar line or lateral TAP block. Good analgesia technique will provide a strong analgesic effect with a duration long enough to prevent sensitization from occurring, this concept is also known as the concept of preventive analgesia. TAP block with either the semilunar or lateral line approach showed an opioid reduction effect, but the effect was better with the semilunar line approach. Although the analgesic effect with TAP semilunar line was better than lateral TAP, in the next 24-48 hours, the analgesic effect was similar, as were the patients' opioid requirements. This may be because although the analgesic effect due to TAP semilunar or lateral line block was gone, the sensitization that occurred had also decreased, as indicated by a decreasing pain curve after 24 hours.15

In this study, it was found that the group that received bilateral TAP block with a semilunar line approach postoperatively had better postoperative recovery quality compared to the group of patients who received bilateral TAP with a lateral approach postoperative colorectal laparotomy. This is evidenced by the average median total QoR-40 score at 24 and 48 hours of the lateral TAP approach group (147.5 and 151.5) and the semilunar line approach group (180 and 181.5), statistically analyzed found to be significantly different ($p < 0.001$). This study found a difference in the median QoR-40 score at 24 and 48 hours totaling 32.5 and 30. The difference in the QoR-40 score has passed the Minimum Clinically Important Difference (MCID) set in a study, which is 6.3, indicating that there is a difference that has implications for the quality of clinical recovery of patients. 13 The assessment of the effectiveness of the anesthetic technique received by the patient includes the intensity of pain felt by the patient along with the side effects that appear consisting of the presence or absence of physiological disorders that occur, such as hemodynamic disorders, pain, nausea and vomiting, and the length of the patient's recovery period. However, these postoperative complications are very rare, so an instrument was created that focuses on the patient's quality of life (the ability to carry out activities as usual) and one of the instruments that is quite recognized is the QoR-40. The QoR-40 score has a negative correlation between the length of hospitalization compared to the patient's QoR-40 score, indicating that the higher the patient's QoR-40 score, the shorter the patient's duration of hospitalization.11,14

5. Conclusion

TAP block with semilunar line approach is an effective and safe analgesia adjuvant for colorectal laparotomy.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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