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Quadratus lumborum and erector spinae plane blocks are effective for analgesia in laparoscopic hysterectomy: a randomized controlled trial

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Abstract. – OBJECTIVE: Total laparoscopic hysterectomy is the preferred technique for hysterectomy in obstetrics and gynecology clinics. However, patients who undergo these procedures often experience acute pain that may progress to chronic pain over time. Erector spinae plane block (ESPB) and anterior quadratus lumborum block (QLB) under ultrasound guidance are reported to be effective as part of the multi-modal analgesia protocol. Therefore, this study aimed to compare the effectiveness of erector spinae plane block and anterior quadratus lumborum block in reducing postoperative opioid consumption and pain scores in patients undergoing total laparoscopic hysterectomy.

PATIENTS AND METHODS: Eighty-one patients who met the inclusion criteria were divided into three groups: the erector spinae plane block, anterior quadratus lumborum block, and control groups. All patients received general anesthesia and tramadol-based patient-controlled analgesia (PCA) during the postoperative period. Tramadol consumption and pain scores during the first 24 h were evaluated by a blinded researcher. Postoperative opioid consumption was the primary outcome of the study.

RESULTS: Postoperative tramadol consumption was lower in the erector spinae plane block and quadratus lumborum block groups than that in the control group, with no significant differences observed between the two interventional groups. Postoperative pain scores were lower for at least 12 h in both block groups, with no significant differences observed between both groups.

CONCLUSIONS: Erector spinae plane block and quadratus lumborum block improved postoperative pain management as part of the multi-modal analgesia protocol; however, erector spinae plane block may be preferable due to its rapid procedure time. The findings suggest that incorporating erector spinae plane block and quadratus lumborum block into multi-modal analgesia protocols for laparoscopic hysterectomy would have important implications for the development and standardization of pain management protocols.

Key Words:
Nerve block, Postoperative pain, Ultrasonography, Pain management, Regional Anesthesia, Plane block.

Introduction

Total laparoscopic hysterectomy is the preferred technique for hysterectomy in gynecology clinics[1]. However, postoperative pain management following gynecologic laparoscopic surgery remains difficult as acute pain may progress to chronic pain over time in some patients[2,3]. Titration of the opioid dosage for postoperative pain is complex due to side-effects such as nausea and vomiting. Thus, effective postoperative analgesic regimes are essential[3,4].

Epidural analgesia is the gold standard for postoperative pain management after abdominal surgeries; however, it can lead to side-effects, such as hypotension, hematoma, motor weakness of the lower limbs, paresthesia, and urinary retention, that could prolong hospitalization[5]. Thus, several alternative techniques, including the transversus abdominis plane block (TAPB), rectus sheath block, wound infiltration of local anesthetics, erector spinae plane block (ESPB), and quadratus lumborum block (QLB), have been employed to achieve analgesic effects comparable with those of epidural analgesia and mitigate the potential complications associated with epidural analgesia and epidural catheter placement. Nevertheless, these plane blocks have several limitations.

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QLB for pain management after abdominal surgery was introduced as a variant of the TAPB by Blanco et al[6] in 2007, and posterior QLB in 2013[7]. Børglum et al[8] described the anterior QLB (QLB III) technique, in which the local anesthetic is injected into the anterior thoracolumbar fascia that lies between the quadratus lumborum muscle and psoas major muscle[9].

Ultrasound-guided regional anesthesia techniques, such as ESPB and QLB, have been used increasingly as ultrasound guidance makes the interventions safer and easier to perform, contributing to better pain control and patient experience[10].

Since its introduction by Forero et al[11] for controlling analgesia in thoracic neuropathic pain in 2016, ESPB has been increasingly used for abdominal and thoracic surgeries[12,13]. The local anesthetic is injected between the transverse process of the relevant thoracic or lumbar vertebrae and the erector spinae muscle in ESPB, resulting in the spread of the local anesthetic cephalad and caudally[14,15].

Randomized controlled trials (RCTs) comparing the postoperative effects of ultrasound-guided QLB and ESPB after total laparoscopic hysterectomy are scarce. Thus, this study aimed to evaluate the effects of ultrasound-guided QLB and ESPB on postoperative analgesia in patients undergoing laparoscopic hysterectomy under general anesthesia. It is hypnotized in this study that these techniques would decrease postoperative opioid consumption. Postoperative opioid consumption was the primary outcome, whereas the secondary outcomes were visual analog scale (VAS) scores, time of first rescue analgesic request, and incidence of nausea and vomiting in the postoperative 24 h.

Patients and Methods

Ethics Approval and Consent to Participate

This prospective randomized double-blinded controlled study was registered with ClinicalTrials.gov (NCT05465525) on July 19, 2022 and conducted at the Tekirdağ Namık Kemal University Research Hospital from July 25, 2022, to April 01, 2023. The study protocol was approved by the Tekirdağ Namık Kemal University Ethical Committee (reference number 2022.74.05.01). Written informed consent was obtained from all patients at least 24 h prior to participation.

Study Participants

Female patients aged 18-75 years with a body mass index (BMI) of ≤ 35 kg/m^2 and American Society of Anesthesiologists (ASA) status I and II scheduled for elective total laparoscopic hysterectomy with bilateral salpingo-oophorectomy under general anesthesia were enrolled in this study. Patients who declined participation, whose BMI was > 35 kg/m^2, who were unable to cooperate, or who were deemed to have mental deficits, low cardiac capacity, history of hypersensitivity or allergy to the agents used, coagulopathy, local infection at the injection site, opioid addiction history, or uncontrolled systemic disease were excluded (Figure 1).

Sample Size Calculation

The sample size was calculated based on the primary outcome of tramadol consumption at 24 h postoperatively. Based on the results of a preliminary study with six patients in each group considering a confidence level of 95% and a power of 80%, the effect size was determined as 0.77 and the sample size was calculated as 27 patients for each group using G-Power v3.1.

Randomization and Masking

Using the sealed envelope method, 27 patients each were designated to the control, anterior QLB, and ESPB groups. Patients in the control group underwent routine surgical procedures without any blocks, patients in the QLB group received 30 ml of 0.25% bupivacaine on each side, and patients in the ESPB group received the block at the tenth thoracic (T10) level in addition to 30 ml of 0.25% bupivacaine on each side. All general anesthesia providers, care providers, and outcome assessors were blinded to the block type and procedure.

Preoperative Assessment

All patients underwent a comprehensive physical and laboratory examination pre-operatively for routine anesthesia assessment. The study purpose and protocol, including the study outcomes, possible side-effects, and contraindications, were explained in detail.

QLB and ESPB Groups

All patients allocated to the QLB and ESPB groups were monitored using a three-way electrogram, non-invasive blood pressure measurements, and pulse oximetry in the preoperative block room. A 0.09% saline infusion was

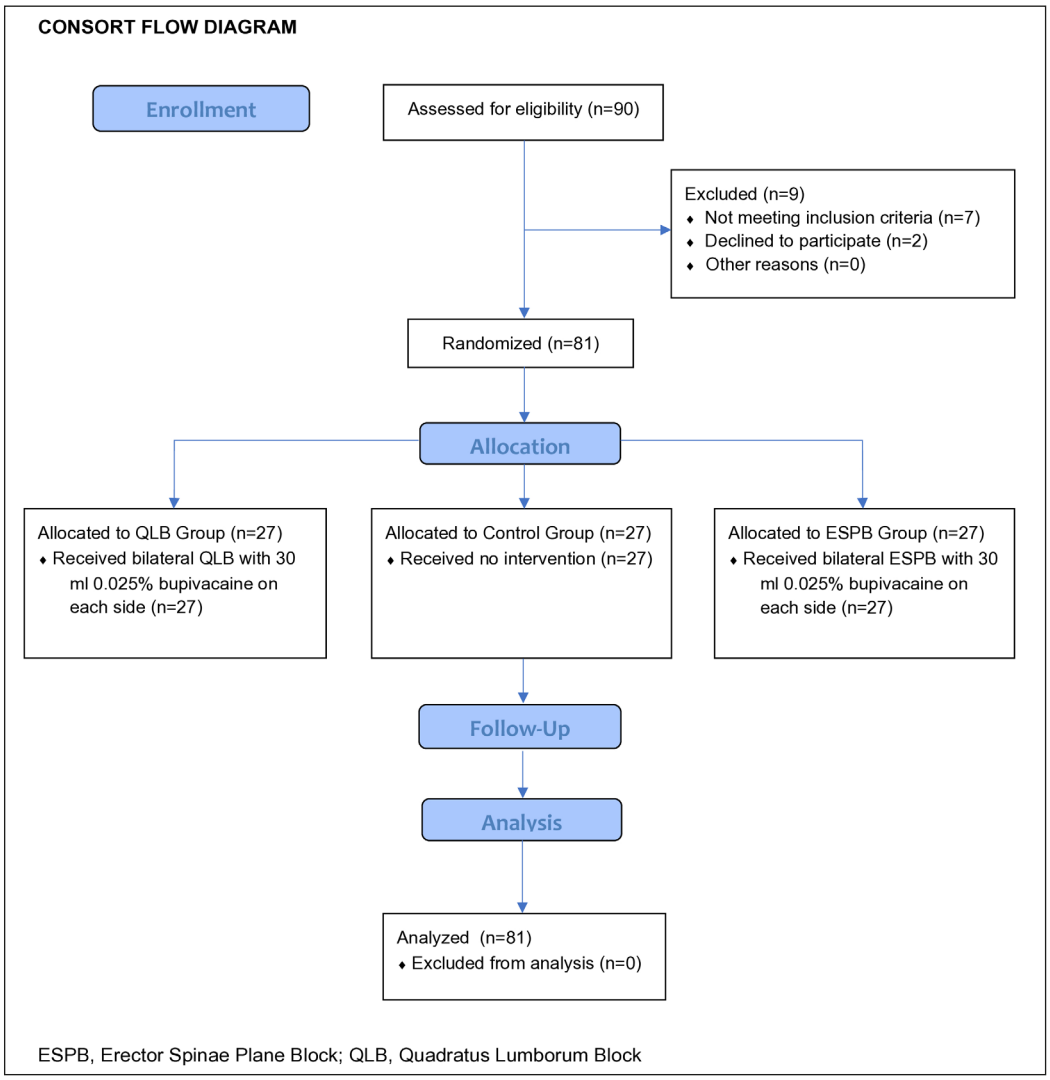


Figure 1. CONSORT flow of the study.

performed; patients were sedated with 0.02 mg/kg midazolam and placed in a lateral decubitus position with the side to be anesthetized turned upward in the QLB group and in a prone position in the ESPB group. Following sterile draping and injection site preparation, the low-frequency convex probe (Esaote MyLab Six, Genova, Italy) was placed in a transverse orientation between the subcostal margin and iliac crest in the QLB group, as described by Børglum et al[8]. A high-frequency linear probe (Esaote MyLab Six, Genova, Italy) was placed on the spinous process level of the T10 vertebrae in a cephalocaudal orientation in the ESPB group. The probe was moved to best visualize the transverse process of the vertebrae and erector spinae muscle in the ESPB group and the intended transverse process of the vertebrae, quadratus lumborum, erector spinae, and psoas major muscles in the QLB group. A 22-gauge 100-mm sonovisible needle was inserted from the posterior to the anterior plane, penetrating through the quadratus lumborum muscle to reach the fascial plane between the quadratus lumborum and psoas major muscles in the QLB group and cephalocaudally to the tip of the transverse process of the intended vertebrae in the ESPB group. After confirming negative blood aspiration, 1 ml saline was injected to confirm whether the needle tip was in the plane; subsequently, 30 ml of 0.25% bupivacaine was injected. The deposition of the local anesthetic was

visualized in the fascial interspace between the quadratus lumborum and psoas major muscle in the QLB group and underneath the fascial plane of the erector spinae plane muscle in the ESPB group. The same procedure was repeated on the opposite side in each group.

Control Group

The patients in the control group were directly transferred to the operation theater for general anesthesia induction preparation, as no block procedure was required. The general anesthesia appliers and care providers in the post-anesthesia care unit (PACU) and the ward were blinded to the group allocation.

Intraoperative Procedures

Standard monitoring included three-way electrography, non-invasive blood pressure measurements, pulse oximetry, and end-tidal carbon dioxide level assessment. Following a 2-min preoxygenation with 4 L/min of 100% oxygen, anesthesia was induced with 2.5 mg/kg of propofol, 1 mcg/kg of fentanyl, and 0.6 mg/kg of rocuronium. The patients were ventilated with 6-7 ml/kg volume in volume-controlled ventilation mode after confirming endotracheal intubation. Anesthesia was maintained at 4 L/min of the oxygen-sevoflurane mixture.

During the surgery, 0.1-1 mcg/kg/min of remifentanil was infused if an increase in the baseline measurements of the mean arterial pressure (MAP) or heart rate was observed. Bolus doses of 10 mg of rocuronium were administered intravenously if required.

Regardless of the group allocations, all patients received 100 mg of tramadol 30 min before the end of the surgery for postoperative pain management.

Postoperative Procedures

Postoperative pain was managed with an intravenous patient-controlled device with 45 minutes of the lockout time, which contained 3 mg/ml of tramadol that was infused at 3 ml/h with a bolus of 5 ml. The total tramadol consumption was recorded. Postoperative pain was further controlled using a non-steroidal anti-inflammatory drug (NSAID) every 6 h and paracetamol as an analgesic rescue agent. If the VAS score was ≥4 or if additional analgesia was required despite the patient-controlled analgesia (PCA) regime and rescue analgesia, 50 mg of pethidine was administered.

Parameter Evaluation

Demographic information, such as age, sex, BMI, and ASA status, was recorded. Time elapsed till performing the block procedure (probe placement to end of drug deployment) was noted in minutes. Total surgery time was also documented. The heart rate and MAP were recorded before and after inducing anesthesia, after intubation, at 1, 2, and 4 postoperative hours, at the end of the surgery, and in the PACU. The VAS scores were assessed at rest, with movement in the PACU, and at 2, 6, 12, and 24 postoperative hours. Cold sensation to ice was assessed by a blinded researcher at 2 postoperative hours. The PCA device was used to measure and record the total tramadol consumption after 24 h. The time to first rescue analgesic, despite the PCA regime, was recorded along with the incidence of postoperative nausea and vomiting.

Statistical Analysis

Mean, standard deviation, median lowest and highest, frequency, and ratio values were used to represent the descriptive statistical data. The distribution of variables was assessed using the Kolmogorov-Smirnov test. Analysis of variance (Tukey's test) and the Kruskal-Wallis and Mann-Whitney U tests were used to analyze independent quantitative data. The Chi-square test was used to analyze independent qualitative data, and Fischer's test was used if Chi-square test could not be performed. SPSS 28.0 (IBM Corp., Armonk, NY, USA) was used for all statistical analyses. p-values < 0.05 were considered statistically significant.

Results

Among 90 patients assessed for eligibility, two patients declined participation and seven patients were excluded based on exclusion criteria. Thus, 81 patients were randomly allocated to three study groups.

Demographical characteristics, such as patient age, height, weight, BMI, and ASA status, did not differ significantly between the three groups. Block-performing time in the QLB group was significantly higher than that in the ESPB group. However, operative time did not differ significantly between the three groups (Table I).

No significant difference was observed in the heart rate at pre-induction, post-induction, the

Table I. Demographic and operational characteristics of the included patients.

Variable			Control group (n = 27)		ESPB group (n = 27)		QLB group (n = 27)		*p*-value
Age (yr)	Mean ± SD		49.6 ± 10.0		50.9 ± 6.2		48.5 ± 8.3		0.590*
	Median		48.0		51.0		49.0		
Height (cm)	Mean ± SD		160 ± 10		160 ± 0		160 ± 10		0.111*
	Median		160		160		160		
Weight (kg)	Mean ± SD		69.5 ± 8.8		71.6 ± 7.7		70.3 ± 8.5		0.467†
	Median		69.0		74.0		71.0		
BMI (kg/m^2)	Mean ± SD		27.5 ± 3.0		27.2 ± 2.9		27.1 ± 3.0		0.356†
	Median		28.4		28.0		27.9		
ASA status	I	n-%	3	11.1%	4	14.8%	2	7.4%	0.687‡
	II	n-%	24	88.9%	23	85.2%	25	92.6%	
Block time (s)	Mean ± SD				387.8 ± 69.9		448.7 ± 114.6		**0.007**§
	Median				420.0		480.0		
Operation time (min)	Mean ± SD		153.9 ± 28.2		168.1 ± 37.6		156.1 ± 61.5		0.457*

Values are presented as mean ± SD and median or number (%). ESPB: erector spinae plane block, QLB: quadratus lumborum block, BMI: body mass index, ASA: American Society of Anesthesiologist. *ANOVA; † Kruskal–Wallis test; ‡Chi-square test; §Mann-Whitney U test. *p*-values in bold represents statistically significant difference.

second hour, end of the surgery, and in the PACU between the three groups. The first-hour heart rate was significantly higher in the QLB group than those in the control and ESPB groups; however, it did not differ significantly between the ESPB and control groups (Table II).

MAP at pre-induction, post-induction, the second hour, end of the surgery, and in the PACU did not differ significantly between the three groups. MAP at the first hour was significantly higher in the QLB group than in the control and ESPB group; however, it did not differ significantly between the ESPB and control groups (Table II).

The resting and movement VAS scores at the PACU, 2, 6, and 12 h were significantly lower in the QLB and ESPB groups than those in the control group. However, resting VAS scores at PACU, 2, 6, and 12 h did not differ significantly between the ESPB and QLB groups. The movement VAS scores at 2, 6, and 12 h did not differ significantly between the ESPB and QLB groups. The resting and movement 24 h VAS scores did not differ significantly between the three groups (Table III; Figure 2).

Opioid consumption in the QLB and ESPB groups was significantly lower than in the control group, even if pethidine consumption was not taken into account for postoperative opioid consumption; however, there was no significant difference between the ESPB and QLB groups. Time to first rescue analgesic requirement was significantly higher in the QLB and ESPB groups than in the control group; however, it did not differ significantly between the ESPB and QLB groups (Table IV). 50 mg pethidine was administered in five of the patients in the control group, while none was needed in the ESPB and QLB groups.

The incidence of postoperative nausea and vomiting was significantly lower in the QLB and ESPB groups than in the control group; however, it did not differ significantly between the ESPB and QLB groups (Table IV).

Discussion

This study showed that ESPB and anterior QLB relieved pain in patients who underwent total laparoscopic hysterectomy. No block-related complications, such as motor weakness, hematoma, or infection, were encountered intraopera-

Table II. Hemodynamic parameters of the included patients.

Variable		Control group (n = 27)	ESPB group (n = 27)	QLB group (n = 27)	*p*-value
Heart beats per min					
Pre-induction	Mean ± SD	80.6 ± 11.9	80.1 ± 13.0	81.7 ± 15.9	0.911*
	Median	78.0	82.0	80.0	
Post-induction	Mean ± SD	80.1 ± 17.0	83.3 ± 12.3	81.6 ± 12.1	0.698*
	Median	81.0	85.0	80.0	
1st hour	Mean ± SD	74.6 ± 12.7	74.4 ± 12.7	82.5 ± 13.0	**0.035***
	Median	76.0	74.0	81.0	
2nd hour	Mean ± SD	73.3 ± 12.0	72.7 ± 10.5	76.9 ± 9.8	0.324*
	Median	74.0	72.0	80.0	
End of surgery	Mean ± SD	79.0 ± 22.8	77.6 ± 12.8	80.0 ± 15.5	0.883*
	Median	75.0	75.0	78.0	
In the PACU	Mean ± SD	74.7 ± 14.6	72.2 ± 10.5	77.4 ± 13.0	0.335†
	Median	77.0	73.0	80.0	
Mean arterial pressure (mmHg)					
Pre-induction	Mean ± SD	96.4 ± 12.8	100.8 ± 13.4	100.1 ± 14.5	0.506†
	Median	96.7	97.7	98.0	
Post-induction	Mean ± SD	85.7 ± 15.0	86.5 ± 15.6	87.9 ± 14.3	0.885†
	Median	86.0	87.0	87.7	
1st hour	Mean ± SD	82.5 ± 10.5	84.7 ± 11.1	90.9 ± 11.7	**0.024†**
	Median	83.3	82.0	91.3	
2nd hour	Mean ± SD	82.5 ± 9.8	79.7 ± 19.3	87.8 ± 10.5	0.123†
	Median	80.0	81.3	87.7	
End of surgery	Mean ± SD	85.8 ± 11.6	90.1 ± 14.6	89.6 ± 10.9	0.426†
	Median	86.3	87.7	91.3	
In the PACU	Mean ± SD	90.5 ± 10.9	93.6 ± 16.1	94.1 ± 12.0	0.620†
	Median	90.0	91.3	94.7	

Values are presented as mean ± SD and median. ESPB: erector spinae plane block, QLB: quadratus lumborum block, PACU: post anesthesia care unit. *ANOVA; †Kruskal-Wallis test. *p*-values in bold represents statistically significant difference.

tively or during follow-up. Both blocks reduced postoperative opioid consumption and postoperative VAS scores for at least 12 h compared with those in the control group. Furthermore, no differences were observed in the postoperative opioid consumption and VAS scores among the intervention groups.

Multi-modal analgesia regimes reduce opioid consumption perioperatively and avoid opioid-related complications[16,17]. As per the PROSPECT recommendations, acetaminophen and NSAIDs are recommended for postoperative pain management in patients undergoing laparoscopic hysterectomy[17]. Thus, this study utilized a tramadol-based patient-controlled device, supplemented with an NSAID every 6 h and paracetamol as a rescue analgesic agent.

The afferent visceral fibers of the uterus originate from the T11-T12 level. Therefore, ESPB was performed at the T10 level despite some reports

Table III. Rest and movement VAS scores of the included patients.

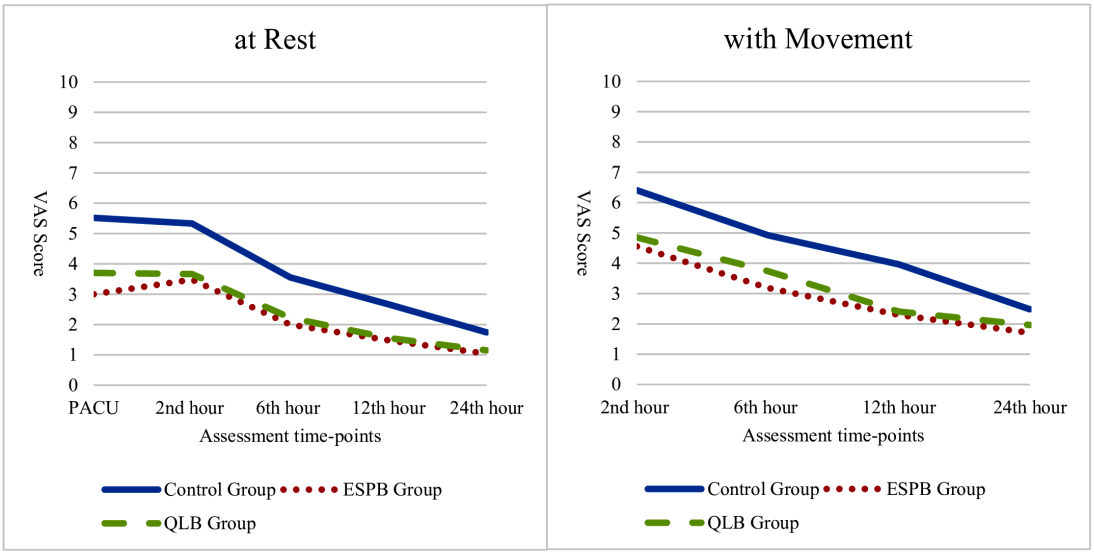
Variable	Control group (n = 27)	ESPB group (n = 27)	QLB group (n = 27)	*p*-value
Resting VAS score				
PACU	5.5 ± 2.8	3.0 ± 1.9	3.7 ± 2.4	**0.003**†
	6.0	3.0	4.0	
2nd hour	5.3 ± 2.9	3.5 ± 1.1	3.7 ± 1.7	**0.047**†
	5.0	4.0	4.0	
6th hour	3.6 ± 2.2	2.0 ± 1.3	2.2 ± 1.7	**0.037**†
	3.0	2.0	2.0	
12th hour	2.7 ± 1.9	1.5 ± 0.9	1.6 ± 1.5	**0.021**†
	2.0	1.0	1.0	
24th hour	1.7 ± 1.6	1.0 ± 1.1	1.1 ± 1.2	**0.161**†
	1.0	1.0	1.0	
Movement VAS score				
2nd hour	6.4 ± 2.1	4.6 ± 1.3	4.9 ± 2.0	**0.003**†
	7.0	5.0	4.0	
6th hour	4.9 ± 2.2	3.2 ± 1.4	3.7 ± 1.9	**0.034**†
	4.0	4.0	4.0	
12th hour	4.0 ± 2.0	2.3 ± 1.1	2.4 ± 1.6	**0.003**†
	4.0	2.0	2.0	
24th hour	2.5 ± 1.8	1.7 ± 1.1	2.0 ± 1.2	**0.293**†
	2.0	2.0	2.0	

Values are presented as mean ± SD and median. ESPB: erector spinae plane block, QLB: quadratus lumborum block, VAS: visual analog scale, PACU: post anesthesia care unit. *ANOVA; †Kruskal–Wallis test. *p*-values in bold represents statistically significant difference.

recommending targeting the T8 level for total laparoscopic hysterectomy[18]. As QLB reportedly affects the thoracic paravertebral space, somatic nerves, thoracic sympathetic trunk, and L1-L3 nerve roots[19-21], it was considered effective for managing pain after total laparoscopic hysterectomy.

QLB is used in laparoscopic surgeries, laparoscopic inguinal hernia, appendectomy, nephrectomy, cholecystectomy, and gynecological surgeries, such as missed intrauterine contraceptive device extraction and ovarian vein ligation[22-25]. Karadeniz et al[23] used continuous local anesthetic infusion *via* a catheter placed laparoscopically between the quadratus lumborum and psoas major muscles in patients undergoing laparoscopic living-related donor nephrectomy and reported a 70% reduction in morphine requirement during the first 24 postoperative hours. Moreover, compared with the intravenous morphine infusion utilizing a patient-controlled device group, the intervention group exhibited significantly lower numeric rating scale values at 45 min and 1 h postoperatively.

In this study, QLB under ultrasound guidance pre-operatively in the block area as a single injection just before anesthesia induction to prevent catheter-related complications was performed. Fujimoto et al[26] evaluated the efficacy of the QLB block in patients undergoing major gynecological laparoscopic surgery. After anesthesia induction, QLB was performed with 30 ml of 0.25% levobupivacaine on each side. In contrast with this current study, they reported no statistical difference



VAS: visual analog scale, ESPB: erector spinae plane block, QLB: quadratus lumborum block.

Figure 2. Resting and movement VAS scores of included patients.

between the QLB and control groups on postoperative day one using the Quality of Recovery-40 questionnaire or the cumulative fentanyl dose. The authors claimed that over 50% of patients underwent total laparoscopic hysterectomy and experienced severe postoperative pain. The patients enrolled in this study also underwent total laparoscopic hysterectomy; however, QLB was effective within the multi-modal analgesia regimen.

The cumulative morphine dose was significantly lower in Fargaly et al[22] who compared the effectiveness of QLB with that of TAPB for various laparoscopic surgeries using 20 ml of 0.25% bupivacaine injected bilaterally in both blocks. Similar to this study and the PROSPECT recommendations, all patients received 1000 mg of paracetamol thrice daily and 30 mg of ketorolac twice daily. QLB was effective for various laparoscopic surgeries, thereby supporting the results of this current study.

Huang et al[27] randomized 60 patients to receive anterior QLB with 20 ml of 0.375% ropivacaine on each side or a subcostal TAPB. Cumulative morphine consumption and the numerical rating scale scores were significantly lower than that of the subcostal TAPB in the first 24 h.

Table IV. Data regarding postoperative opioid consumption, nausea, and vomiting.

Variable		Control group (n = 27)	ESPB group (n = 27)	QLB group (n = 27)	*p*-value
Opioid consumption (mg)	Mean ± SD	230.9 ± 44.3	178.7 ± 75.7	190.4 ± 61.7	**0.020**†
	Median	220.0	201.0	190.0	
Time to first rescue analgesic need (min)	Mean ± SD	157 ± 265	427 ± 293	407 ± 359	**< 0.001**†
	Median	60	360	285	
Postoperative nausea/vomiting	(-) n-%	13 48.1%	21 77.8%	22 81.5%	**0.015**‡
	(+) n-%	14 51.9%	6 22.2%	5 18.5%	

Values are presented as mean ± SD and median or number (%). ESPB: erector spinae plane block, QLB: quadratus lumborum block. †Kruskal-Wallis test; ‡Chi-square test.

Jadon et al[16] performed QLB with 40 ml of 0.375% bupivacaine in 69 female patients aged 30-60 years and reported that it was more effective for postoperative analgesic management after total laparoscopic hysterectomy. The mean dose of fentanyl required at 24 h and the rest and movement pain scores were significantly lower in the QLB group than in the control group. The mean dose of the required opioids and pain scores differed between the groups; however, postoperative nausea, sedation, and pruritis scores were similar.

ESPB has also been investigated for pain management after total laparoscopic hysterectomy[28-30]. Rosato et al[30] and Frassanito et al[29] reported successful pain management in laparoscopic hysterectomy with ESPB at the T8 and T10 levels, respectively, with no complications and low VAS scores. Similarly, low opioid consumption and low VAS scores was achieved with ESPB at the T10 level by injecting 30 ml of 0.25% bupivacaine bilaterally.

In a prospective, double-blinded RCT comparing ESPB with TAPB[28], the rest and movement pain scores did not differ between the interventional groups; opioid usage, sedation, and nausea scores were also similar. Although the mean VAS scores in both groups were 3-4 and no differences were reported, the surgeon observed better pain control with ESPB. However, this study lacked a control group.

Jiang et al[19] randomized 106 patients into three groups to receive either ESPB, QLB, or no intervention before general anesthesia in an RCT. For ESPB, 25 ml of 0.4% ropivacaine was injected bilaterally at the T10 level. The same local anesthetic volume and concentration were used for QLB bilaterally in the present study. To compare the two interventional groups, the control group only received premedication. However, dexamethasone was not injected, rather, ondansetron was injected intravenously to prevent postoperative nausea and vomiting. Jiang et al[19] reported no significant difference between the QLB and control groups in postoperative sufentanil consumption at 12 h; however, it differed between the ESPB and control groups. Postoperative VAS scores were significantly lower in the ESPB group for at least 4 h at rest and 6 h with movement, whereas pain scores were only significantly lower at 0.5 h at rest and at least 4 h with movement. In contrast, lower VAS scores at almost 12 h post-operatively in both groups were observed in this study.

Limitations

This study has certain limitations. Although the attempt to ensure blinding of the anesthesia providers, postoperative caregivers, and outcome assessors, blinding could not be guaranteed. The dermatomal coverage of patients to ensure blinding in the ward was not analyzed, as this would have resulted in the outcome assessors identifying the group allocation.

Second, although patients with BMI > 35 kg/m^2 were excluded due to difficulty in localizing and visualizing the needle tip in overweight patients, visualizing the quadratus lumborum muscle in some patients in the QLB group was difficult due to their physical characteristics. To further minimize this issue, all block procedures were performed by the most experienced anesthesiologist.

Conclusions

ESPB and anterior QLB reduced postoperative opioid consumption and improved pain scores following total laparoscopic hysterectomy. Nevertheless, ESPB may be a more favorable choice as it requires less time to perform.

Conflict of Interest

The authors declare that they have no conflict of interests.

Ethics Approval

This prospective randomized double-blinded controlled study was registered with ClinicalTrials.gov (NCT05465525) on July 19, 2022 and conducted at the Tekirdağ Namık Kemal University Research Hospital from July 25, 2022, to April 01, 2023. The study protocol was approved by the Tekirdağ Namık Kemal University Ethical Committee (reference number 2022.74.05.01).

Informed Consent

Written informed consent was obtained from all patients at least 24 h prior to participation.

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Availability of Data and Materials

The datasets used and analyzed during the current study are available from the corresponding author on a reasonable request.

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