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Comparative Study between Ultrasound-Guided Quadratus Lumborum Block Type 2 Versus Lumbar Epidural Analgesia as a Perioperative Analgesic Technique for Pelvic Cancer Surgeries

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Abstract

BACKGROUND: The effect of the quadratus lumborum block (QLB) is believed to result from a spread of LA from its lumbar deposition cranially into the thoracic paravertebral space.

AIM: The aim of this study is to compare the analgesic efficacy of an ultrasound-guided quadrates lumborum Type II block versus lumbar epidural analgesia or conventional analgesia after pelvic cancer surgeries regarding intraoperative fentanyl consumption, post-operative pain scores, and morphine consumption in the first 24 h.

METHODS: This study was conducted on 90 patients of the American Society of Anesthesia physical status II scheduled for elective pelvic cancer operations. Patients were randomized into three equal groups of 30 patients: Group Q: Received bilateral QLB by 20 ml of 0.25% bupivacaine in each side, Group E: Received continuous lumbar epidural block analgesia (0.125% bupivacaine at infusion rate of 6 ml/h for 24 h), and Group C (control group): Were transferred to operation room without further intervention.

RESULTS: End-tidal sevoflurane was significantly decreased in Group Q than Group C and in Group E than Group C at all time measurements. Visual analog scale (VAS) at 0.5, 1, 8, 16, and 24 h was significantly increased in Group C than Group Q and Group E. Time to first rescue dose of morphine was significantly increased in Group E than Group Q ($p1 < 0.001$) and was significantly decreased in Group C than Group Q ($p2 < 0.001$) and was significantly decreased in Group C than Group E ($p3 < 0.001$). Total dose of morphine in the first 24 h was significantly increased at Group C than Group Q and Group E ($p < 0.001$) but there was an insignificant difference between Group Q and E.

CONCLUSIONS: When compared to the control group, QLB and epidural block resulted in decreased VAS, intraoperative sevoflurane and fentanyl use, and post-operative morphine consumption with a greater level of patient satisfaction. Epidural block, on the other hand, resulted in less intraoperative sevoflurane usage than QLB.

Introduction

Patients experience invalidation and anxiety due to somatic post-surgical pain, which also increases the probability of serious consequences. Surgery involving the anterior abdominal wall includes general surgery, gynecologic surgery, obstetrics surgery, urology surgery, vascular surgery, as well as pediatric surgery. For effective pain management, a combination of multimodal treatments comprising nerve blocks, opiates, as well as nonsteroidal anti-inflammatory medications for systemic analgesia is required [1].

As indicated by the presence of a contrast agent in TPVS following quadratus lumborum (QL) block administration, it is suggested that diffusion of LA from lumbar deposits cranially into TPVS is one of the reasons for the QL block's (QLBs) influence. It suggests that the QLB is beneficial in relieving both somatic and visceral pain [2].

Using QLB in abdominoplasties, cesarean sections, and lower abdominal surgeries reduces overall pain in the distribution area from Th6–L1 dermatomes and in the lower abdomen. It may be seen as a lumbar approach to the thoracic paravertebral space. The block seems to provide a local anesthetic distribution that spreads proximally and over both sides of the QL muscle's (QLM) surface, in between the anterior and intermediate layers of the thoracolumbar fascia [3].

In pain management, ultrasound adds a new dimension to interventions; portable devices produce high-resolution and high-quality photographs. Ultrasound imaging provides real-time visualization of the needle and surrounding structures and visualizes all peripheral neuronal structures and soft tissue in a 2D format, which is very useful [4].

The aim of this study is to compare the analgesic efficacy of ultrasound-guided QL Type II block versus lumbar epidural analgesia or conventional analgesia after pelvic cancer surgeries regarding intraoperative

fentanyl consumption, post-operative pain scores, and morphine consumption in the first 24 h.

Patients and Methods

This study was conducted in National Cancer Institute Hospital after the approval of the ethical committee and obtaining a written informed consent. The study included 90 patients American Society of Anesthesia (ASA) physical status II scheduled for elective pelvic cancer operations.

Exclusion criteria

Patient refusal, BMI >31, local infection at the site of injection, allergy to study medications, sepsis, anatomic abnormalities, systemic anticoagulation or coagulopathy, and inability to comprehend or participate in pain scoring system were excluded from the study.

History taking, physical examination, CBC, and coagulation profile were done for all patients. Patients fulfilling inclusion criteria were informed about the procedure and its possible complications.

Patients were randomized into three equal groups of 30 patients: (Group Q) (n = 30) received bilateral QLB by 20 ml of 0.25% bupivacaine in each side [5]. (Group E) (n = 30) Epidural group received continuous lumbar epidural block analgesia (0.125% bupivacaine at infusion rate of 6 ml/h for 24 h). (Group C) (n = 30) Control group patients were transferred to operation room without further intervention.

All enrolled participants received 500 ml lactated Ringer's solution; the block was administered in a pre-operative holding region equipped with IV access, ECG, blood pressure, as well as blood oxygen tracking through pulse oximetry, as well as full resuscitation equipment's as well as medications.

The ultrasound machine used in the study was Sonosite M-Turbo © Ultrasound System (FUJIFILM Sonosite, Inc., USA).

Group Q – QL group, the patient was placed in a lateral position with the side to be blocked facing upwards [5]. Pre-medicated with midazolam (0.02 mg/kg IV), the ultrasound probe was properly sterilized and with sterile covers. A 20 gauge blunt tipped block needle was advanced under ultrasound guidance on the posterior aspect of the QL (Figure 1). The QL muscle is identified with its attachment to the lateral edge of the transverse process of the L4 vertebral body. With the psoas major (PM) muscle anteriorly, the erector spinae muscle posteriorly and the QL muscle adherent to the apex of the transverse process, a well recognizable pattern of a shamrock

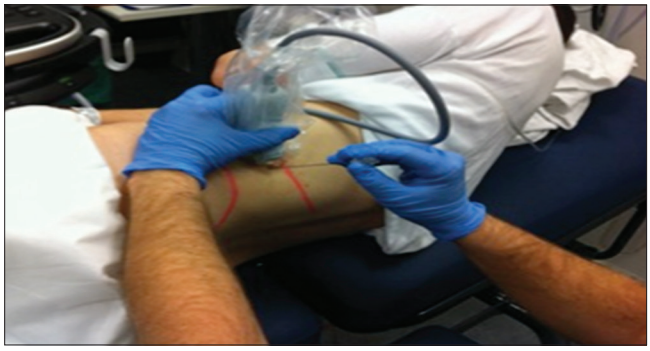

Figure 1: Quadratus lumborum block. The needle is inserted in-plane to the transducer (lateral edge)

with three leaves can be seen [6]. Following negative aspiration, 20 ml of 0.25% bupivacaine was injected in each side with intermittent aspiration and the spread of injectate followed on ultrasound. Lateral position provided more space to move the ultrasound probe toward the spine and improved visualization of the QLM and local anesthetic spread. The advancement of the needle was carried out at all times under ultrasound visualization to avoid kidney and/or large bowel puncture Figure 2.

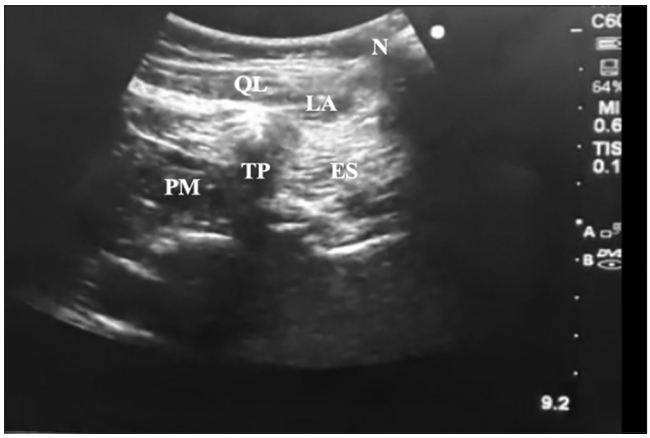

Figure 2: Ultrasound image of the QL block (shamrock sign). PM = Psoas major, ES = Erector spinae, QL = Quadratus lumborum, TP: Transverse process of L4, LA: Local anesthetic, N: Needle

Group E – Epidural group received continuous lumbar epidural block analgesia (0.125% bupivacaine at infusion rate of 6 ml/h for 24 h).

Group C – Control group was transferred to operation room without further intervention.

Anesthesia was induced with IV. fentanyl 1–2 μg/kg I.V., thiopental (3–6 mg/kg), and IV. bolus of atracurium 0.5 mg/kg was also given to facilitate tracheal intubation. Anesthesia was maintained with sevoflurane and additional bolus doses of fentanyl 0.5–1 μg/kg were given if MAP rises above 20% of baseline. The patients were mechanically ventilated at appropriate setting that keeps end-tidal CO2 at (30–35 mmHg). After reversal of neuromuscular blocking agent and response to verbal command, patients were extubated in the operating theater. They were then transferred to the PACU.

Post-operative analgesia was provided by 30 mg ketorolac IV if visual analog scale (VAS) <4 or by 5 mg IV morphine for VAS ≥4 for the first 24 h. Patients were discharged to surgical ward after fulfilling Aldrete criteria for discharge from the PACU. A total score of 9 out of a possible 10 is considered to be adequate for discharge from recovery [7].

The three groups were compared for: Demographic characteristics, total fentanyl consumption during surgery, average end-tidal sevoflurane percentage, hemodynamic parameters (heart rate, blood pressure, respiratory rate, and oxygen saturation), pain assessment was done every 30 min in the PACU by a standard 0–10-point VAS where 0 means no pain and 10 being worst pain then at 2, 4, 8, 16, and 24 h post-operative (at rest and during coughing or movement), sedation score, urinary retention, and post-operative nausea and vomiting (PONV) as side effects of morphine. They were rated on a 4-point verbal scale (none = no nausea, mild = nausea but no vomiting, moderate = vomiting one attack, and severe = vomiting > one attack) which was also observed in the PACU. Any complications were detected, opioid consumption measured by time to first rescue dose of morphine administered IV when VAS is ≥4 and total requirement per 24 h was recorded. Patients with VAS <4 were given analgesia using ketorolac 30 mg IV (to be repeated maximum every 8 h if required), hospital stay, and patient satisfaction using patient satisfaction score (PSS) which is a linear scale where 0, not at all satisfied; 100, extremely satisfied [8].

Data were gathered and compared between the three studied groups at 2, 8, 16, and 24 h post-operative. (Hemodynamics were also checked every 5 min and recorded every 30 min intraoperative).

Statistical analysis

The sample size for this study was based on a 50% reduction in the morphine requirement in 24 h from the previous study data (mean 36.8 mg, standard deviation [SD] 20.5 mg). This calculation assumed the use of Student's t-test, Type I error of 0.05, and a power of 80%. A minimum sample size of 72 participants was required and we aimed to recruit 90 subjects [6].

Data were analyzed using SPSS version 20. Numerical data were expressed as mean and SD or median and range as appropriate. Qualitative data were expressed as frequency and percentage. Chi-square test was used to examine the relation between qualitative variables. For quantitative data, comparison between three groups was done using either parametric or non-parametric t-test as appropriate. Comparison of repeated measures between the three groups was done using two-way ANOVA with repeated measures test. The test was two tailed, p <0.05 was considered statistically significant.

Results

In this study, 104 patients were assessed for eligibility, 11 patients did not meet the criteria, and three patients refused to participate in the study. The remaining 90 patients were randomly allocated into three groups (30 patients in each one). All 90 patients were followed up and analyzed statistically Figure 3.

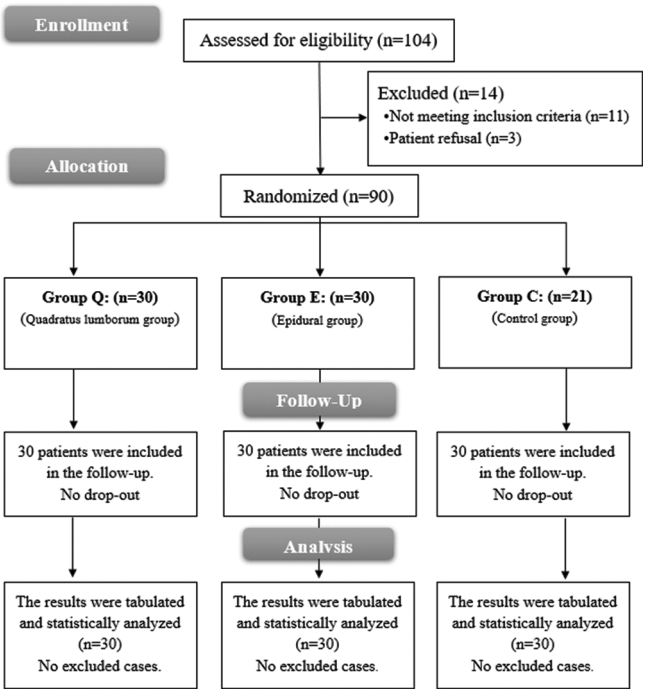

Figure 3: CONSORT flow diagram of the participants through each stage of the trial

There were insignificant differences among the three groups as regard to age, sex, BMI, and ASA, Table 1.

Table 1: Patients' characteristics in the three groups

Variables	Group Q (n = 30)	Group E (n = 30)	Group C (n = 30)	p-value
Age (years)				
Mean ± SD	53.87 ± 6.46	53.40 ± 5.90	53.87 ± 6.46	0.948
Range	44–65	44–64	44–65	
Sex				
Male	14 (46.67%)	14 (46.67%)	14 (46.67%)	0.556
Female	16 (53.33%)	16 (53.33%)	16 (53.33%)	
BMI				
Mean ± SD	27.97 ± 3.63	25.17 ± 5.18	28.2 ± 3.31	0.890
Range	25–31	20–31	25–31	
ASA physical status				
1	0	0	0	---
2	30 (100%)	30 (100%)	30 (100%)	
2	22 (73.33%)	22 (73.33%)	22 (73.33%)	

Group Q: Quadratus lumborum group, Group E: Epidural group, Group C: Control group. SD: Standard deviation, ASA: American Society of Anesthesia.

Intraoperative mean blood pressure showed insignificant differences among the three groups at 0 and 30 min. Intraoperative mean blood pressure showed significant differences among the three groups at 60, 90, 120, 150, and 180 min ($p < 0.001$). Intraoperative mean blood pressure showed a significant increase in Group C than Group Q and Group E ($p2 < 0.001$ and $p3 < 0.001$, respectively) but there were insignificant differences between Groups Q and C (Table 2).

As regards, heart rate showed insignificant differences among the three groups at 0 and 30 min.

Table 2 : Intraoperative mean blood pressure (mmHg) in the three groups

Groups	0	30 min	60 min	90 min	120 min	150 min	180 min
Group Q (n = 30)							
Mean ± SD	82.17 ± 6.65	78.53 ± 5.17	73.27 ± 6.07	70.97 ± 5.65	71.03 ± 6.59	70.87 ± 4.65	72.79 ± 5.75
Group E (n = 30)							
Mean ± SD	81.60 ± 6.22	78.83 ± 4.82	74.80 ± 4.68	71.87 ± 5.75	72.00 ± 7.57	71.97 ± 5.84	71.92 ± 5.59
Group C (n = 30)							
Mean ± SD	83.57 ± 5.64	79.17 ± 4.93	82.57 ± 5.30	80.67 ± 6.05	80.63 ± 7.95	79.87 ± 7.05	87.15 ± 6.33
p-value	0.463	0.889	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
p1	---	---	0.526	0.826	0.827	0.760	0.929
p2	---	---	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
P3	---	---	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*

Group Q: Quadratus lumborum group, Group E: Epidural group, Group C: Control group. SD: Standard deviation, IQR: Interquartile range *significant as p < 0.05, P1: p value between Group Q and Group E, p2: p value between Group Q and Group C, p3: p value between Group E and Group C.

Heart rate showed significant differences among the three groups at 60, 90, 120, 150, and 180 min (p = 0.002, 0.003, 0.001, and <0.001, respectively).

Heart rate showed significant increases in Group C at 60, 90, 120, 150, and 180 min than Group Q (p = 0.004, 0.003, 0.001, 0.001, and 0.002, respectively) and Group E (p = 0.006, 0.025, 0.005, 0.004, and <0.001, respectively) (Table 3).

Heart rate showed insignificant differences between Groups Q and E at 60, 90, 120, 150, and 180 min.

As regards, end-tidal sevoflurane showed significant differences among the three groups at all time measurements (p < 0.001). End-tidal sevoflurane was significantly decreased in Group E than Group Q at all time measurements (p1 = 0.001).

End-tidal sevoflurane was significantly decreased in Group Q than Group C at all time measurements (p2 < 0.001, 0.001, 0.005, and <0.001, respectively).

End-tidal sevoflurane was significantly decreased in Group E than Group C at all time measurements (p3 < 0.001) (Table 4).

VAS showed significant differences among the three groups at 0.5, 1, 2, 8, 16, and 24 h (p = 0.009, <0.001, 0.001, 0,001, 0.002, and 0.004, respectively); VAS at 0.5, 1, 2, 8, 16, and 24 h was significantly increased in Group C than Group Q and Group E (p2 = 0.036, <0.001, <0.001, <0.001, <0.001, 0.014, and 0.028, respectively, p3 = 0.013, <0.001, <0.001, <0.001, 0.003, and 0.004, respectively) (Table 5).

There were insignificant differences among the three groups as regard to Ramsay sedation score and PONV. Time to first rescue dose of morphine, total dose of morphine in the first 24 h and PSS showed significant differences among the three groups at 0.5, 1, and 8 h (p < 0.001). Time to first rescue dose of morphine was significantly increased in Group E than Group Q (p1 < B0.001) and was significantly decreased in Group C than Group Q (p2 < 0.001) and was significantly decreased in Group C than Group E (p3 < 0.001). Total dose of morphine in the first 24 h and hospital stay was significantly increased at Group C than Group Q and Group E (p2 < 0.001 and p3 < 0.001). However, there was insignificant difference between Group Q and E. Intraoperative fentanyl consumption and patients satisfaction score were significantly increased in Group C than Group Q and Group E (p2 < 0.001 and p3 < 0.001). However, there were insignificant differences between Groups Q and E Table 6.

Discussion

A range of ultrasound-guided abdominal wall blocks are administered to adults for different abdominal surgeries, such as the transversus abdominis plane (TAP), rectus sheath, and QL. Due to its satisfactory somatic and visceral analgesia and ease of use, the QLB still seems to be favored for use with abdominal surgeries [9].

In agreement with our results, Srivastava *et al*. (2020) In agreement with our results, Srivastava et al. (2020) showed Ultrasound-guided anterior QLB is more effective in comparison to traditional technique of port-site local anesthetic infiltration for providing analgesia after laparoscopic pyeloplasty with less end-tidal sevoflurane consumption and lower VAS [10].

In agreement with our results, Jin et al. (2020) [11] identified 22 studies for inclusion: 16 studies

Table 3: Heart rate (beats/min) in the three groups

Groups	0	30 min	60 min	90 min	120 min	150 min	180 min
Group Q (n = 30)							
Mean ± SD	85.47 ± 9.51	84.97 ± 9.01	78.37 ± 9.33	79.43 ± 9.96	80.60 ± 8.97	78.67 ± 7.03	76.50 ± 5.60
Group E (n = 30)							
Mean ± SD	84.83 ± 10.16	83.93 ± 8.80	78.63 ± 9.79	81.30 ± 10.03	81.53 ± 7.98	79.63 ± 8.53	74.62 ± 6.46
Group C (n = 30)							
Mean ± SD	85.37 ± 10.94	83.93 ± 8.80	84.63 ± 9.79	88.30 ± 10.03	88.53 ± 7.98	86.63 ± 8.53	86.31 ± 7.48
p-value	0.968	0.877	0.023*	0.003*	0.001*	<0.001*	<0.001*
p1	---	---	0.994	0.758	0.905	0.892	0.753
p2	---	---	0.040*	0.003*	0.001*	0.001*	0.002*
p3	---	---	0.052	0.052	0.005*	0.004*	<0.001*

Group Q: Quadratus lumborum group, Group E: Epidural group, Group C: Control group. SD: Standard deviation *significant as p < 0.05, p1: p value between Group Q and Group E, p2: p value between Group Q and Group C, p3: p value between Group E and Group C.

Table 4: End-tidal sevoflurane (%) in the three groups

Groups	0	30 min	60 min	90 min	120 min	150 min	180 min
Group Q (n = 30)							
Mean ± SD	2.42 ± 0.27	2.10 ± 0.23	2.10 ± 0.20	2.09 ± 0.24	2.16 ± 0.19	2.18 ± 0.23	1.99 ± 0.28
Group E (n = 30)							
Mean ± SD	1.69 ± 0.35	1.52 ± 0.29	1.51 ± 0.25	1.55 ± 0.24	1.43 ± 0.27	1.60 ± 0.18	1.58 ± 0.23
Group C (n = 30)							
Mean ± SD	2.94 ± 2.42	2.35 ± 2.10	2.34 ± 2.10	2.41 ± 2.09	2.37 ± 2.16	2.49 ± 2.18	2.36 ± 1.99
p-value	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
p1	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
p2	<0.001*	0.001*	0.001*	<0.001*	0.005	<0.001*	0.001*
p3	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*

Group Q: Quadratus lumborum group, Group E: Epidural group, Group C: Control group. SD: Standard deviation, *significant as p < 0.05, p1: p value between Group Q and Group E, p2: p value between Group Q and Group C, p3: P value between Group E and Group C.

compared QL block to GA with systemic analgesia, four studies compared the QL block with the TAP block, and the rest on other comparisons (such as femoral block and continuous wound infiltration). They found that QLB is associated with decrease end-tidal sevoflurane consumption. Also, it reported that QL block significantly reduced the opioid requirement in cesarean deliveries and renal surgeries.

In agreement with our results, Sindwani et al. (2020) [12] showed type-1 QLB significantly reduces end-tidal sevoflurane in QLB than control group, also it showed that type-1 QLB significantly reduces fentanyl consumption at 1, 4, 8, 12, and 24 h in the postoperative period in renal transplant recipients than conventional analgesia group, also it showed that type-1 QLB significantly reduces hemodynamic in QLB than conventional analgesia, also it showed Type-1 QLB significantly increased patients satisfaction score in renal transplant recipients than conventional analgesia group.

In contrast to our results, Hansen et al. (2021) showed No significant intergroup differences were observed for end-tidal sevoflurane consumption. Mean (SD) oral morphine equivalent consumption in the first 12 postoperative hours was 58.4 mg (48.3) vs 62.9 mg (48.5), p=0.70, for group ropivacaine versus group saline. Also it showed No significant intergroup differences were observed for Mean (SD) oral morphine equivalent consumption in the first 12 postoperative hours was 58.4 mg (48.3) vs 62.9 mg (48.5), p=0.70, for group QLB versus control group. Also it showed No significant intergroup differences were observed for hemodynamic changes nor for VAS between QLB and control group [13].

In contrast with our result, Aoyama et al. (2020), found that both groups showed no difference in intraoperative inhalational consumption of anaesthetic requirements. The study was done on patients alternately received either bilateral ultrasound guided QLB type 2 (QLB2) or posterior TAPB using 0.375% levobupivacaine 20 ml for each side. Forty patients completed the study [14].

In line with our results, Dam et al. (2020) reported that Preoperative bilateral QL block significantly reduce postoperative opioid consumption by 43% and significantly prolonged time to first opioid, also it reported that preoperative bilateral QLB significantly lower heart rate and MAP than conventional analgesia [15].

In contrary with our results, Aditianingsih et al. (2019) this prospective randomized controlled study compared the effectiveness of QLB with the epidural analgesia technique in relieving postoperative pain following transperitoneal laparoscopic nephrectomy. They found that the 24-h cumulative morphine requirement and pain scores after surgery were comparable between the QLB and epidural groups [16].

In contrast with our results, Tan et al 2020 [17] showed that no significant intergroup differences were observed for hemodynamic changes between QLB and control group, but in line with our results it showed increased patients satisfaction score in QLB than control group.

In line with our results, Kukreja et al [18] compared QL block with control (no block) in patients undergoing primary Total Hip Arthroplasty. They found that VAS pain score at 24 hours were significantly lower in the QL group.

In contrast Sato et al 2019 [19], reported No significant difference was observed in the incidence of interventions to treat nausea and vomiting during the entire period and No postoperative complication was observed.

In our study, hospital stay was significantly increased in the control group than QLB Group and

Table 5: VAS in the three groups

Groups	0.5 h	1 h	2 h	8 h	16 h	24 h
Group Q (n = 30)						
Mean ± SD	3.03 ± 0.95	3.70 ± 0.94	3.33 ± 1.04	3.17 ± 0.90	3.53 ± 0.96	3.17 ± 0.90
Group E (n = 30)						
Mean ± SD	2.93 ± 0.93	4.27 ± 1.15	2.80 ± 0.82	2.90 ± 0.98	3.40 ± 0.95	3.00 ± 0.86
Group C (n = 30)						
Mean ± SD	3.70 ± 1.13	5.63 ± 1.08	4.77 ± 0.98	4.60 ± 0.95	4.27 ± 1.00	3.83 ± 1.13
p-value	0.009*	<0.001*	<0.001*	<0.001*	0.002*	0.004*
p1	0.924	0.110	0.731	0.531	0.860	0.790
p2	0.036*	<0.001*	<0.001*	<0.001*	0.014*	0.028*
p3	0.013*	<0.001*	<0.001*	<0.001*	0.003*	0.004*

Group Q: Quadratus lumborum group, Group E: Epidural group, Group C: Control group. SD: Standard deviation, *significant as p < 0.05, p1: p value between Group Q and Group E, p2: p value between Group Q and Group C, p3: p value between Group E and Group C.

Table 6: Intraoperative fentanyl consumption, time to first rescue dose of morphine, total dose of morphine in the first 24 h (mg), Ramsay sedation score, PONV, patients satisfaction score, and hospital stay

Outcomes and Time	Group Q (n = 30)	Group E (n = 30)	Group C (n = 30)	p value	
Intraoperative fentanyl consumption (mcn)					
Mean ± SD	171.67 ± 58.71	173.33 ± 35.9	308.33 ± 56.4	<0.001*	p1 = 0.635
Range	100–300	100–250	200–400		p2<0.001*
					p3<0.001*
Time to first rescue dose of morphine (min)					
Mean ± SD	159.67 ± 34.01	165.50 ± 40.79	117.50 ± 19.27	<0.001*	p1<0.001*
Range	90–210	100–250	90–150		p2<0.001*
					p3<0.001*
Total dose of morphine in the first 24 h (mg)					
Mean ± SD	14.17 ± 6.07	12.33 ± 3.50	25.5 ± 9.07	<0.001*	P1 = 0.544
Range	5–30	9–19	10–40		p2<0.001*
					p3<0.001*
Ramsay sedation score					
1	23 (76.67%)	18 (60.00%)	17 (56.67%)	0.556	---
2	7 (23.33%)	12 (40.00%)	13 (43.33%)		
PONV					
0	9 (30.00%)	0 (0.00%)	0 (0.00%)	<0.001	---
1	14 (46.67%)	0 (0.00%)	0 (0.00%)		
2	6 (20.00%)	18 (60.00%)	17 (56.67%)		
Patients satisfaction score					
Mean ± SD	82.33 ± 8.03	86.67 ± 4.71	65.67 ± 12.57	<0.001*	P1 = 0.167
Range	60–90	80–90	40–90		P2<0.001*
					P3<0.001*
Hospital stay (days)					
Mean ± SD	4.70 ± 1.13	4.43 ± 0.88	6.23 ± 0.96	<0.001*	P1 = 0.566
Range	3–7	3–6	4–8		P2<0.001*
					P3<0.001*

Group Q: Quadratus lumborum group, Group E: epidural group, Group C: Control group. SD: Standard deviation, IQR: Interquartile range, PONV: *Significant as p value <0.05, p1: p value between Group Q and Group E, p2: p value between Group Q and Group C, p3: p value between Group E and Group C

in the control group than epidural group and showed insignificant difference between QLB and epidural groups..

Limitations

1. A few prior trials have reported analgesia lasting up to 48 h following single-shot QLB. Nevertheless, in our research, we observed patients for only 24 h. As a result of our investigation, it is difficult to determine the true period of analgesia following a single-shot QLB.
2. There is currently no agreement on the amount of medication required to give sufficient analgesia following QLB in patients experiencing pelvic surgery. We employed 20 mL of 0.25 % bupivacaine in our investigation based on previous research findings [20]. Murouchi *et al*. established the safety of this volume in a trial in which they discovered that when 20 ml of 0.0375% ropivacaine was given in QLB, the plasma concentration of local anesthetic was considerably below lethal limits [21].
3. Since this study used a single strategy for QLB, in which the local anesthetic was given posterior to the QL muscle, it was unknown whether alternative QLB strategies would produce comparable findings.
4. There was a lack of blinding because the epidural block required the insertion of a catheter and the QLB required bilateral injections even without catheter, however, this is the standard strategy in our clinical practice.
5. We genuinely think that further patients are necessary to compare the problems associated with QLB and epidural procedures.

Conclusions

When compared to the control group, QLB with epidural block resulted in decreased VAS, intraoperative sevoflurane and fentanyl use, post-operative morphine consumption, and hospitalization, with a greater level of patient satisfaction. Epidural block, on the other hand, resulted in less intraoperative sevoflurane usage than QLB.

References

1. Bonnet F, Marret E. Postoperative pain management and outcome after surgery. Best Pract Res Clin Anaesthesiol. 2007;21(1):99-107. https://doi.org/10.1016/j.bpa.2006.12.007
   PMid:17489222
2. Carney J, Finnerty O, Rauf J, Bergin D, Laffey JG, Mc Donnell JG. Studies on the spread of local anaesthetic solution in transversus abdominis plane blocks. Anaesthesia. 2011;66(11):1023-30. https://doi.org/10.1111/j.1365-2044.2011.06855.x
   PMid:21851346
3. Finnerty O, Carney J, McDonnell JG. Trunk blocks for abdominal surgery. Anaesthesia. 2010;65 Suppl 1:76-83. https://doi.org/10.1111/j.1365-2044.2009.06203.x
   PMid:20377549
4. Marhofer P, Greher M, Kapral S. Ultrasound guidance in regional anaesthesia. Br J Anaesth. 2005;94(1):7-17. https://doi.org/10.1093/bja/aei002
   PMid:15277302
5. Kadam VR. Ultrasound-guided quadratus lumborum block as a postoperative analgesic technique for laparotomy. J Anaesthesiol Clin Pharmacol. 2013;29(4):550-2. https://doi.org/10.4103/0970-9185.119148
   PMid:24249997

6. Sauter A, Ullensvang K, Bendtsen T, Børglum J. The “shamrock method” a new and promising technique for ultrasound guided lumbar plexus block. Br J Anaesth. 2013;111:9814. https://doi.org/10.1093/bja/el_9814
7. Aldrete JA. The post-anesthesia recovery score revisited. J Clin Anesth. 1995;7(1):89-91. https://doi.org/10.1016/0952-8180(94)00001-k
   PMid:7772368
8. Hudak PL, Wright JG. The characteristics of patient satisfaction measures. Spine (Phila Pa 1976). 2000;25(24):3167-77. https://doi.org/10.1097/00007632-200012150-00012
   PMid:11124733
9. Kumar GD, Gnanasekar N, Kurhekar P, Prasad TK. A comparative study of transversus abdominis plane block versus quadratus lumborum block for postoperative analgesia following lower abdominal surgeries: A prospective double-blinded study. Anesth Essays Res. 2018;12(4):919-23. https://doi.org/10.4103/aer.AER_158_18
   PMid:30662131
10. Srivastava D, Verma R, Singh T, Verma A, Chandra A, Sahu S, *et al*. Ultrasound-guided anterior quadratus lumborum block for postoperative pain after laparoscopic pyeloplasty: A randomized controlled trial. Anaesth Essays Res. 2020;14(2):233-8. https://doi.org/10.4103/aer.AER_45_20
    PMid:33487821
11. Jin Z, Liu J, Li R, Gan TJ, He Y, Lin J. Single injection quadratus lumborum block for postoperative analgesia in adult surgical population: A systematic review and meta-analysis. J Clin Anesth. 2020;62:109715. https://doi.org/10.1016/j.jclinane.2020.109715
    PMid:31968297
12. Sindwani G, Sahu S, Suri A, Sureka S, Thomas M. Efficacy of ultrasound guided quadratus lumborum block as postoperative analgesia in renal transplantation recipients: A randomised double blind clinical study. Indian J Anaesth. 2020;64(7):605-10. https://doi.org/10.4103/ija.IJA_21_20
    PMid:32792737
13. Hansen C, Dam M, Nielsen MV, Tanggaard KB, Poulsen TD, Bendtsen TF, *et al*. Transmuscular quadratus lumborum block for total laparoscopic hysterectomy: A double-blind, randomized, placebo-controlled trial. Reg Anesth Pain Med. 2021;46(1):25-30. https://doi.org/10.1136/rapm-2020-101931
    PMid:33082286
14. Aoyama Y, Sakura S, Abe S, Wada M, Saito Y. Analgesic effects and distribution of cutaneous sensory blockade of quadratus lumborum block Type 2 and posterior transversus abdominis plane block: An observational comparative study. Korean J Anesthesiol. 2020;73(4):326-33. https://doi.org/10.4097/kja.19404
    PMid:32008278
15. Dam M, Hansen C, Poulsen TD, Azawi NH, Laier GH, Wolmarans M, *et al*. Transmuscular quadratus lumborum block reduces opioid consumption and prolongs time to first opioid demand after laparoscopic nephrectomy. Reg Anesth Pain Med. 2021;46(1):18-24. https://doi.org/10.1136/rapm-2020-101745
    PMid:33106280
16. Aditianingsih D, Pryambodho, Anasy N, Tantri AR, Mochtar CA. A randomized controlled trial on analgesic effect of repeated quadratus lumborum block versus continuous epidural analgesia following laparoscopic nephrectomy. BMC Anesthesiol. 2019;19(1):221. https://doi.org/10.1186/s12871-019-0891-7
    PMid:31805855
17. Tan HS, Taylor C, Weikel D, Barton K, Habib AS. Quadratus lumborum block for postoperative analgesia after cesarean delivery: A systematic review with meta-analysis and trial-sequential analysis. J Clin Anesth. 2020;67:110003. https://doi.org/10.1016/j.jclinane.2020.110003
    PMid:32738583
18. Kukreja P, MacBeth L, Sturdivant A, Morgan CJ, Ghanem E, Kalagara H, *et al*. Anterior quadratus lumborum block analgesia for total hip arthroplasty: A randomized, controlled study. Reg Anesth Pain Med. 44(12), 1075-1079:rapm-2019-100804. https://doi.org/10.1136/rapm-2019-100804
    PMid:31653800
19. Sato M. Ultrasound-guided quadratus lumborum block compared to caudal ropivacaine/morphine in children undergoing surgery for vesicoureteric reflux. Pediatric Anesth. 2019;29(7):738-43. https://doi.org/10.1111/pan.13650
    PMid:31034730
20. Carline L, McLeod GA, Lamb C. A cadaver study comparing spread of dye and nerve involvement after three different quadratus lumborum blocks. Br J Anaesth. 2016;117(3):387-94. https://doi.org/10.1093/bja/aew224
    PMid:27543534
21. Murouchi T, Iwasaki S, Yamakage M. Quadratus lumborum block: Analgesic effects and chronological ropivacaine concentrations after laparoscopic surgery. Reg Anesth Pain Med. 2016;41(2):146-50. https://doi.org/10.1097/AAP.0000000000000349
    PMid:26735154