

## Effectiveness of Ultrasound Guided Quadratus Lumborum Block for Post-Operative Analgesia in Lower Abdominal Surgeries

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### Abstract

**Background:** Various techniques, including quadratus lumborum (QL) block, transversus abdominis plane (TAP) block, caudal block, ilioinguinal block, and wound infiltration, are all methods for adequate postoperative pain management. Effective pain relief can accelerate patient recovery, alleviate psychological distress, and improve parental satisfaction. **Aim:** This study aimed to evaluate the analgesic effect of ultrasound-guided quadratus lumborum Block (QLB) in patients having lower abdominal surgery at Suez Canal university hospitals. **Patients and Methods:** This prospective study was conducted on patients undergoing lower abdominal surgeries at Suez Canal University Hospital. Thirty-five patients received ultrasound-guided quadratus lumborum block with 20 ml of bupivacaine 0.25%. Each participant was subjected to clinical evaluation including medical history, physical examination and essential laboratory investigations. **Results:** Patients had mean age of  $49.17 \pm 8.94$  years old, gender showed almost equal distribution and mean weight was  $84.11 \pm 7.57$  kg. Patients had mean total morphine consumption of  $(13.1 \pm 1.3)$  mg, mean time of the 1st request of analgesia  $(7 \pm 2.3)$  hours. There was no significant difference between the serial vas postoperative at rest at 60 min 12, 24 hours postoperative. Only 5.8% of patients had postoperative side effects (post operative nausea and vomiting). **Conclusion:** This study suggests QL block use for the patients undergoing lower abdominal surgery, as this method was an effective postoperative analgesic technique

**Key words:** QLB, Post-Operative Analgesia, VAS.

### Introduction

Delays and complications Postoperative discomfort in lower abdominal procedures is linked to persistent pain, decreased patient satisfaction, and disease recovery. An essential part of

perioperative treatment, particularly for the pediatric population, is maintaining appropriate analgesia (1).

A number of strategies are available for effective postoperative pain control, including as wound infiltration, caudal block, ilioinguinal block, transversus abdominis plane (TAP) block, and quadratus lumborum (QL) block (2,3).

Parental satisfaction, psychological distress reduction, and patient healing may all be accelerated with effective pain management.

Blanco first explained QL block in 2007 and used it for lower abdominal surgery perioperative analgesia. Currently, four methods for QL block have been described: intramuscular, lateral, posterior, and anterior (4).

Pregnant women, adults, and children are among the many patient groups for whom QL block is being done. As a component of multimodal analgesia, QL block has shown encouraging analgesic effectiveness in the adult population in prior meta-analyses (5–7).

Therefore, our study goal was to determine if QL block is also a useful postoperative analgesic approach for patients having lower abdominal surgery.

### **Aim**

This study aimed to evaluate the analgesic effect of ultrasound-guided quadratus lumborum Block (QLB) in patients having lower abdominal surgery at Suez Canal university hospitals.

### **Patients and Methods**

Patients at Suez Canal University Hospital having lower abdomen surgery were the subjects of this prospective research. after written informed patient agreement that includes a description of the study's goals, procedures, effects, and complications, as well as permission from the hospital ethics committee. In this research, 35 patients had ultrasound-guided QLB block, which was administered to the QLB group post-induction using 0.5 ml/kg 0.25% bupivacaine. The research comprised patients with lower abdominal procedures (e.g., inguinal hernia, hydrocele, varicocele, ovarian cyst) who were adults (18–60 years old, both sexes) and ASA I–II (American Society of Anesthesiologists physical status Grade I and II). individuals with known sensitivity to study medicines, neurological disorders or any systemic conditions producing neurological abnormalities, coagulopathy, infection at the block site, uncooperative, and mentally retarded individuals were not allowed to participate in the research.

Every patient had a complete history taking, a thorough examination, laboratory tests (CBC, PT, INR, PTT, RBS), and a chest x-ray. After the patient was given general anesthesia, an ultrasound machine was used to do the procedure. Following the technique's completion, surgery was initiated. After inserting an 18-gauge venous cannula, the infusion of ringer lactate solution began. Prior to induction, all patients received intravenous midazolam (0.05 mg/kg) as a premedication. Throughout the surgical process, all patients in the operating room were continually monitored by an ECG, noninvasive blood pressure, peripheral oxygen saturation, and end tidal carbon dioxide using a Nihon Kohden, Japan, monitor.

IV propofol (2–3 mg/kg), atracurium besylate (0.5 mg/kg), and fentanyl (1–2 µg/kg) were used to induce induction and make it easier to insert the endotracheal tube of the proper size. To keep the end-tidal CO<sub>2</sub> between 35 and 40 mmHg, the mechanical ventilation was modified. Isoflurane was inhaled to maintain anesthesia.

Patients had quadratus lumborum blocks guided by ultrasonography. The patients were positioned laterally, with their hip and knee joints slightly bent and the side to be blocked highest. A linear 2–6 MHz transducer was positioned transversely across the flank at the posterior axillary line, directly cranial to the iliac crest, after skin and transducer preparation. After that, the transducer was tilted caudad and advanced somewhat posteriorly until the QL muscle could be seen at the level of the L4 transverse process. Additionally, the paraspinal muscle (erector spinae) was located posteriorly, while the psoas major muscle (PM) was located anteriorly. With the L4 transverse process representing the stem and the three muscles (QL, PM, and ESM) representing the three clovers, the so-called "Shamrock" sign was recognized. At regular intervals (15, 30, 60, 75, and 90 minutes) throughout the procedure, hemodynamics (blood pressure and heart rate) were recorded.

Every 30 minutes, a 0.5 µg/kg/dose intravenous bolus dosage of fentanyl was administered for quick pain management if necessary, depending on a 20% increase in hemodynamics from the baseline heart rate and blood pressure. Patients were extubated and sent to the recovery room after neuromuscular blockade was restored with 0.04 mg/kg of neostigmine and 0.02 mg/kg of atropine. There was no anesthetic administered to the surgical site or peritoneum (puff or injection).

Following surgery, both groups received a postoperative analgesic regimen upon their first request for analgesia. This regimen included intravenous patient-controlled morphine analgesia

(bolus 1 mg, 10-min lockout, maximum dosage 6 mg/h). The researcher rigorously evaluated the existence and intensity of drowsiness, nausea, and discomfort. These evaluations were conducted in the PACU and at 60, 12, and 24 hours after surgery.

### Statistical analysis

Data of the patients was collected and tabulated. Data entry and analysis were done using a standard statistical program SPSS version 15 (SPSS Inc., Chicago, IL, USA) for windows program by aid of the following statistical tests; Quantitative data were expressed as means and standard deviation (SD). Qualitative data were expressed as numbers and percentages (%). Differences were statistically significant if P value  $\leq 0.05$ . Presentation of the statistical outcomes in form of tables was performed using the “Microsoft Office 2016” program.

### Results

Table 1 showed that patients had mean age of  $49.17 \pm 8.94$  years old, gender showed almost equal distribution and mean weight was  $84.11 \pm 7.57$  kg.

**Table 1: Baseline demographic data of the study patients**

	(n = 35)	
	No.	%
<b>Sex</b>		
Male	18	51.4
Female	17	48.6
<b>Age (years)</b>		
SD $\pm$ Mean	$49.17 \pm 8.94$	
<b>Weight (kg)</b>		
SD $\pm$ Mean	$84.11 \pm 7.57$	

Table 2 showed that patients had mean total morphine consumption of ( $13.1 \pm 1.3$  mg), mean time of the 1<sup>st</sup> request of analgesia ( $7 \pm 2.3$  hours).

**Table 2: Post operative data of the studied patients.**

	(n = 35)
<b>Total morphine consumption (mg)</b>	
SD $\pm$ Mean	$13.1 \pm 1.3$
<b>Time of the 1<sup>st</sup> request of analgesia (hrs.)</b>	
SD $\pm$ Mean	$7 \pm 2.3$

Table 3 showed that there was no significant difference between the serial VAS postoperative at rest at 60 min 12, 24 hours postoperative.

**Table 3: Serial post operative VAS score of the studied patients.**

	(n = 35)
<b>After 60 minutes</b>	2.5 ± 0.9
<b>After 12 hours</b>	2.3 ± 0.7
<b>After 24 hours</b>	2.9 ± 1.1

Table 4 showed main intraoperative data among the study patients.

**Table 4: Intraoperative data among the study patients.**

	(n = 35)
<b>Duration of surgery (hr.)</b> SD ± Mean	2.0 ± 2.77
<b>Technique time (min)</b>	
SD ± Mean	11.02 ± 2.54
<b>Technique difficulty</b>	
<b>Number (percentage)</b>	
Easy	22 (62.9%)
Rather difficult	13 (37.1%)
Difficult	0 (0.0%)

Table 5 showed that only 5.8% of patients had postoperative side effects (Post operative nausea and vomiting).

**Table 5: Side effects among the studied patients.**

	(n = 35)	
	No.	%
<b>Side effects</b>		
No	33	94.2
Post operative nausea and vomiting	2	5.8

## Discussion

Our study provided further evidence that QL block was a useful analgesic choice for patients in earlier meta-analyses (1,2).

In our study, QL block considerably decreased the incidence of postoperative rescue analgesia for pain ratings at 2, 4, and 12 hours after surgery.

One study compared QL block with TAP and ESP block, respectively, while two studies compared QL block with caudal block. We also discovered that, after removing the Aksu research (8), which contrasted QL block with ESP block, QL block considerably lowers pain ratings at 1 and 6 hours after surgery.

Prior research has shown that ESP block may help alleviate visceral discomfort by extending local analgesia to the paravertebral area (9,10).

Additionally, we observed that QL block is still an effective analgesic strategy in the Aksu trial, with median postoperative pain ratings of less than one at 1 and 6 hours postoperatively. A single QL block seems to be effective for one hour after surgery before losing its effectiveness over the next 24 hours (11).

Another study showed that subgroup analysis further support the possibility that the QL block techniques used might alter the analgesic effectiveness. There is ongoing debate over the mechanisms and analgesic effectiveness of various strategies (12).

In comparison to the posterior and lateral methods the anterior QL block strategy also results in greater postoperative pain alleviation and lower opioid usage for adults. As a result, anterior QL block could be the best strategy for pain relief; nevertheless, this technique is also linked to additional adverse effects (13).

Therefore, the posterior route was mostly chosen for our investigations since it seems to provide pediatric patients higher analgesic effectiveness with less problems. This technique may have a significant influence on hemodynamics in addition to having a good analgesic effect on visceral pain due to the possibility that QL block distributes local anesthetics into the paravertebral region (7).

In the present study Only 5.8% of patients had postoperative side effects (post operative nausea and vomiting).

Lower limb paralysis, sympathetic block, and hemorrhage are among the QL block complications that have been steadily documented. Four patients in the caudal block group and one patient in the QL block group were the only two trials among the included studies to report problems (12). Thirty to forty minutes after a posterior QL block was performed, two patients who had undergone total gastrectomy and right hemicolectomy experienced severe hypotension and tachycardia (3).

This could be related to the sympathetic block brought on by local anesthetic spreading to the paravertebral and epidural space. A regional anesthesiologist performing transmuscular QL block on a 6-year-old kid having surgery of a right inguinal hernia discovered that the youngster had hepatomegaly.

In another study, ropivacaine 0.25% and clonidine 0.5 mg/kg were administered at each side in amounts of 30 ml (for patients weighing more than 55 kg) or 20 mL (for patients weighing less than 55 kg) (7). Thus, the dose of local anesthetics should be more precisely determined and rigorously supplied based on the child's weight when QL block is used on youngsters. We can better apply the technology with the aid of ultrasound.

### Conclusion

This study suggests QL block use for the patients undergoing lower abdominal surgery, as this method was an effective postoperative analgesic technique.

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