

ORIGINAL  
ARTICLE

ABSTRACT

## Efficacy of Quadratus Lumborum Block in Children with Laparoscopic-Assisted Pyeloplasty

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**Objective:** The quadratus lumborum block (QLB) is a new and effective truncal block used for postoperative analgesia in patients undergoing upper and lower abdominal surgeries. We aimed to evaluate and compare the efficacy of QLB and wound infiltration (WI) using postoperative Face, Legs, Activity, Cry, and Consolability (FLACC) pain scores and total 24-h analgesic consumption in pediatric patients who underwent laparoscopic-assisted pyeloplasty (LAP).

**Materials and Methods:** Patients who underwent LAP between May 2016 and June 2017 were retrospectively examined and were divided into two groups: QLB group and WI group. Patients' FLACC scores at 1, 6, 12, and 24 h; postoperative analgesic doses; and complications were evaluated from patient's records.

**Results:** A total of 31 patients who underwent LAP were identified from the records. Of them, 14 had QLB and 17 had WI. Demographic characteristics of patients and operation duration were similar between the two groups. FLACC scores at 1, 6, 12, and 24 h and postoperative total 24-h paracetamol consumption were significantly lower in the QLB group. No complications were seen in both groups.

**Conclusion:** According to the present study results, QLB provides a longer and more effective postoperative analgesia than WI in pediatric patients who have undergone LAP.

**Keywords:** Quadratus lumborum block, laparoscopic-assisted pyeloplasty, postoperative pain management, children

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### INTRODUCTION

Laparoscopic surgery has become the preferred modality for many surgical procedures in pediatric patients. Although the pain felt at the end of the operation is less than that felt after open surgeries, multimodal analgesia techniques are still needed to manage postoperative pain (1). Trunk blocks are included in multimodal analgesia techniques for abdominal surgeries (2).

The quadratus lumborum block (QLB) is a new and effective truncal nerve block used for postoperative analgesia in patients undergoing upper and lower abdominal surgeries (3). Few studies have reported utility of QLB for postoperative analgesia in pediatric patients (4, 5). At our clinic, laparoscopic-assisted pyeloplasty (LAP) is performed with QLB and wound infiltration (WI) for postoperative analgesia. The aim of the present study was to investigate and compare the analgesic effects of QLB and WI using postoperative Face, Legs, Activity, Cry, and Consolability (FLACC) pain scores and total 24-h analgesic consumption in pediatric patients who underwent LAP in a 1-year period (6).

### MATERIALS and METHODS

The study was approved by the Clinical Investigations Ethics Committee. Patients who underwent LAP between May 2016 and June 2017 were retrospectively examined using the anesthesia and pain follow-up forms. Patients were divided into two groups: QLB group and WI group. Although we aimed to perform QLB in all patients during the above-mentioned period, postoperative analgesia via WI was provided to patients who had skin lesions in the block area, had coagulopathy, and had no family approval. Patient's postoperative FLACC pain scores at 1, 6, 12, and 24 h; postoperative analgesic doses; and complications such as nausea, vomiting, hypotension, infection at the site of the block, and hematoma were evaluated from patients' records.

### Surgical Technique

The surgical procedure was performed at a 45° lateral decubitus position. In addition to the 5 mm umbilical optical port, two 3 mm working ports that were used in the iliac quadrant and below the last rib in the midclavicular line were used for the laparoscopic procedure.

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**Table 1.** Demographic and clinical data

	QL group (n=14)	WI group (n=17)	p
Age, year	5,57 (3,5)	6,35 (2,9)	0,57
Weight, kg	22,35 (9,9)	25,47 (8,6)	0,36
Sex, M/F	8/6	12/5	0,26
Operation, time	176,42 (25,06)	196,7 (33,2)	0,07

Data are presented as mean and standard deviation. QL: Quadratus lumborum group; WI: Wound infiltration group

Pneumoperitoneum was maintained at a flow rate of 0.5 L/min and a pressure of 8–12 mm Hg with CO<sub>2</sub> insufflation. After laparoscopic dissection of the ureteropelvic junction, renal pelvis was extracted with a tiny flank incision (1–2 cm), and then, pyeloplasty was extracorporeally performed using monofilament absorbable sutures. An appropriately sized ureteral stent (double-J stent) was placed into the ureter.

### QLB Administration

After the ultrasound probe was covered and the area to be blocked was sterilized, the probe was placed on the crista iliaca anterior superior. After the external oblique, internal oblique, and transversus abdominis muscles were seen, the probe was moved to the posterior and the quadratus lumborum muscle was observed. A 22-gauge, 80 mm insulated Quince-type needle (Uniplex; Pajunk, Geisingen, Germany) was moved from the anterolateral plane to the posteromedial plane, and confirmation was made using 0.5 mL/kg saline; after a negative aspiration, 0.7 mL/kg (0.25%) bupivacaine was applied to the posterior of the quadratus lumborum muscle and the thoracolumbar fascia in between the quadratus lumborum and latissimus dorsi muscles.

### Statistical Analysis

Statistical analysis was performed using the SPSS program for Mac, version 17.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics are presented as mean and standard deviation for normal variables, as median and interquartile range for non-parametric variables, and as number of cases (n) and corresponding percentage (%) for nominal variables. Shapiro–Wilk test was used to test normal distribution of variables. Levene's test was used to test variance homogeneity. Independent two samples t-tests were used for normally distributed continuous variables. Mann–Whitney U test was used for non-normally distributed variables. A p value of <0.05 was considered significant.

## RESULTS

A total of 31 patients who underwent LAP were identified from the records. Of them, 14 (8 males and 6 females) had QL and 17 (12 males and 5 females) had WI. The mean ages of the patients were 5.57±3.5 years in the QLB group and 6.35±2.9 years in the WI group (p=0.57). The mean body weights at operation were 22.35±9.9 kg and 25.47±8.6 kg in the QLB and WI groups, respectively (p=0.36) (Table 1). FLACC scores at 1, 6, 12, and 24 h were significantly lower in the QLB group. Postoperative 24-h total paracetamol consumption was significantly lower in the

**Table 2.** Face, Legs, Activity, Cry, and Consolability (FLACC) pain scores across postoperative time points and total analgesic consumption

	QL group (n=14)	WI group (n=17)	p
1 h	3 (2-4)	2 (1-2)	0.001*
6 h	3 (2-3)	2 (1-2)	0.001*
12 h	3 (2-3)	1 (1-2)	0.001*
24 h	3 (2-3)	1 (1-1)	0.001*
Paracetamol (mg/kg)	15 (15-30)	45 (45-45)	0.001*

Data are presented as median and IQR values (25%–75%). \*p<0.05 when comparing the QL and WI groups. QL: Quadratus lumborum group; WI: Wound infiltration group; IQR: Interquartile range

QLB group (p<0.001) (Table 2). The mean operation times were 176.42±25.06 min and 196.7±33.2 min in QL and WI groups, respectively (p=0.07). No block-related complications were seen in both groups.

## DISCUSSION

In this study, we found that the 24-h analgesic consumption and the FLACC scores every hour were significantly lower in patients who underwent LAP with QLB. To the best of our knowledge, no other study has reported using QLB in laparoscopy or LAP.

Baidya et al. have reported achieving effective analgesia using QLB in five children who underwent open pyeloplasty (7). Lee et al. have reported that they used paracetamol and ketorolac every 3 h to provide analgesia without using narcotic drugs in children who underwent robotic pyeloplasty and achieved effective and sufficient analgesia with low-dose narcotics (8).

At our clinic, pain management in patients undergoing LAP, which is less invasive and less painful than open surgery, is usually attempted without using narcotic analgesics. In our study, no analgesic medication was given to the patients until the first time they complained of pain and exhibited an FLACC score >3; intravenous 15 mg/kg paracetamol was given to patients who complained of pain. Notably, patients in the QLB group had no analgesic requirement for an average of 17 h. QLB is a newly defined block that can be used in upper and lower abdominal surgeries. Blanco et al. have suggested that the trunk nerve block defined as the QL2 block, which is applied between the posterior margin of the quadratus lumborum muscle and thoracolumbar fascia, is effective in between T6 and L1 and that local anesthetic spreads to the paravertebral area (3). In our previous study, we have reported that QLB is more effective than transversus abdominis plane block in children who have undergone lower abdominal surgery and that analgesic consumption and pain scores are significantly lower with QLB 5.

Visoiu et al. have reported that they successfully performed postoperative analgesia using a continuous QLB via catheter application in their patient, a child who had undergone colostomy repair (9). They administered QLB as a single injection, and its efficacy continued for 16–24 h. We think that catheter application in pyeloplasty is a suitable method for patients who may experience pain for up to 48 h. Baidya et al. used a transmuscular QLB and

administered 0.5 mL/kg of 0.2% local anesthesia between the psoas major and quadratus lumborum muscles in five children who underwent open pyeloplasty and reported the patients' postoperative pain management to be successful (7).

In the present study, we applied 0.7 mL/kg of 0.25% bupivacaine on the posterior aspect of the quadratus lumborum muscle and the middle layer of the thoracolumbar fascia, which is inserted on the quadratus lumborum muscle on the interfascial triangle that appears hyperechogenic. We prefer the QL2 block approach because it is safe and comfortable to perform block using this approach than using other approaches, and it is effective in postoperative pain after pyeloplasty. Although the extent of the local anesthetic is not fully understood in the QLB, complications seen in the paravertebral and lumbar plexus blocks such as hypotension and muscle weakness may be encountered. The anterior, posterior, lateral, and intramuscular methods of QLB have been reported (10, 11). In a study examining QLB complications, transient quadriceps muscle weakness was reported, and it was found to occur more frequently in cases where anterior (transmuscular) approach was used (12). At our clinic, we use the posterior approach for QLB. In the present study, no complications were found in any of our patients in both the groups.

The fact that there was no randomization of patients who were retrospectively scanned limits our study. We believe QLB to be a good alternative for postoperative analgesia in pediatric patients who have undergone LAP; randomized controlled prospective studies are needed in this area.

**Ethics Committee Approval:** This article does not contain any studies with human participants or animals performed by any of the authors.

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Conceived and designed the experiments or case: GÖ, ABD. Surgical procedures were performed by ABD and nerve blocks were performed by GÖ. Analyzed the data: GÖ. Wrote the paper: GÖ, ABD. All authors have read and approved the final manuscript.

**Conflict of Interest:** Ahmet Burak Doğan declares that he has no conflict of interest. Gözen Öksüz declares that she has no conflict of interest.

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