



Quadratus Lumborum Block for Upper Tract Urological Surgery in Pediatric Patients

Bloqueo del cuadrado lumbar para cirugía urológica del tracto superior en pacientes pediátricos

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Urol Colomb 2022;31(2):e63–e67.

Abstract

Objective Among regional blocks, the quadratus lumborum fascial plane block (QLB) has been well described, but the description of its use and efficacy for pediatric patients undergoing upper abdominal urologic surgery is limited. We present a case series examining the use of the QLB for postoperative pain management in children undergoing upper tract surgery.

Methods From August 2019 to August 2020, through a chart review, we identified 5 patients who had undergone a QLB for upper urinary tract surgery via a flank incision. Posterior QLB was performed after induction of general anesthesia. A single injection of 0.5mL/kg of either 0.25% or 0.5% ropivacaine with 1mcg/kg of clonidine was administered. Patients received fentanyl IV (1 mcg/kg), and acetaminophen IV (15mg/kg) as adjuvants during the operation. Postoperative pain was managed with oral acetaminophen and ibuprofen.

Results The average postoperative pain score during the entire admission was 1, with the lowest being 0 and highest, 3. No administration of rescue narcotics was required in the postanesthesia care unit or on the floor. The average length of stay ranged from 0 to 1 day. No complications associated with the regional QLB were identified.

Conclusions Our series suggests the QLB may be considered as a regional anesthetic option to minimize narcotic requirements for children undergoing upper abdominal urological surgery via flank incision. Additional studies are needed to compare the efficacy of the QLB versus alternate regional anesthetic blocks for upper tract urological surgery via flank incision in children and to determine effective dosing and use of adjuvants.

Keywords

- ▶ regional anesthesia
- ▶ quadratus lumborum block
- ▶ pyeloplasty
- ▶ obstruction of the uteropelvic junction
- ▶ pediatric urology

Resumen

Objetivo Entre los bloqueos regionales, el bloqueo del plano fascial del cuadrado lumbar (BCL) ha sido bien descrito; sin embargo, tiene una descripción limitada de su

received
October 18, 2021
accepted
January 20, 2022

DOI <https://doi.org/10.1055/s-0042-1743510>.
ISSN 0120-789X.
e ISSN 2027-0119.

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Thieme Revinter Publicações Ltda., Rua do Matoso 170, Rio de Janeiro, RJ, CEP 20270-135, Brazil

uso y eficacia en pacientes pediátricos sometidos a cirugía urológica abdominal superior. Presentamos una serie de casos que examinan el uso del BCL en el manejo del dolor posoperatorio en niños sometidos a cirugía urológica del tracto superior.

Métodos De agosto de 2019 a agosto de 2020, mediante revisión de historias clínicas, se identificaron 5 pacientes sometidos al BCL para cirugía del tracto urinario superior por incisión en el flanco. El BCL posterior se realizó después de la inducción de la anestesia general. Solo se administró una inyección de 0,5 ml/kg de ropivacaína al 0,25% o al 0,5% con 1 mcg/kg de clonidina. Los pacientes recibieron fentanilo IV (1 mcg/kg) y acetaminofén IV (15 mg/kg) como adyuvantes durante la operación. El dolor posoperatorio se manejó con acetaminofén e ibuprofeno oral.

Resultados El puntaje promedio de dolor posoperatorio para todo el ingreso fue de 1, siendo el más bajo 0 y el más alto, 3. No se requirieron administraciones de narcóticos de rescate en la unidad de recuperación postanestésica ni en la planta de hospitalización. La estancia media fue de 0 a 1 día. No se identificaron complicaciones asociadas con el BCL regional.

Conclusiones Nuestra revisión sugiere que el BCL puede ser considerado una opción anestésica regional para minimizar los requerimientos de narcóticos en niños sometidos a cirugía urológica abdominal superior por incisión en el flanco. Se necesitan estudios adicionales para comparar la eficacia de BCL en comparación con la de los bloqueos anestésicos regionales alternativos para la cirugía urológica del tracto superior por incisión en el flanco en niños y para determinar la efectividad de la dosificación y del uso de adyuvantes.

Palabras Clave

- ▶ anestesia regional
- ▶ bloqueo del cuadrado lumbar
- ▶ pieloplastia
- ▶ obstrucción de la unión ureteropélvica
- ▶ urología pediátrica

Introduction

Acute pain in pediatric patients elicits a stress response that can have a deleterious effect on neurological, emotional, and behavioral development. Historically, opioids have been used to treat postsurgical pain; however, they can lead to a myriad of side effects, including apnea, sedation, hypotension, gastric motility dysfunction, tolerance, and withdrawal. Regional anesthesia techniques are gaining traction in a multimodal pain management approach to decrease opioid use and provide effective analgesia. Fascial plane blocks are replacing neuraxial methods (caudal) for postoperative analgesia due to ease of use with ultrasound guidance and increased duration of action.¹ Emerging literature² supports the feasibility, efficacy, and safety of pediatric regional anesthesia in the hands of experienced practitioners. The quadratus lumborum fascial plane block (QLB) is one of the more recently described truncal blocks that provides analgesia over a large truncal plane. The QLB provides effective truncal sensory blockade from dermatomal levels T6 to T12 for abdominal surgery. The QLB has been well described in the adult literature as well as the pediatric surgical literature.³ To date, there is limited description of its use and efficacy for pediatric patients undergoing upper abdominal urologic surgery.^{1,4} Herein we present a case series examining the use of the QLB for postoperative pain management in pediatric patients undergoing upper tract urological surgery via flank incision.

Methods

Following approval from the Institutional Review Board, the electronic medical record from our institution was queried from August 2019 to August 2020, to identify pediatric patients aged between 0 and 17 years who underwent open upper urinary tract surgery via a flank incision. Patients undergoing upper urinary tract surgery via a laparoscopic approach were excluded due to the different incisions used in laparoscopy. All patients undergoing open upper urinary tract surgery during the defined study period were offered and consented to undergo a QLB. Five patients were identified (► **Table 1**).

Upon induction of general anesthesia, patients received fentanyl IV (1 mcg/kg) and acetaminophen IV (15mg/kg) during the operation. After induction, a posterior QLB was performed. Patients were placed in position for their pyeloplasty, as dictated by the surgeon, and the skin site was prepped. A high-frequency (4.2–13 MHz) linear ultrasound probe was placed transversely in the midaxillary line to visualize the muscular plane and moved posteriorly until the aponeurosis of the transversus abdominis became visible and the quadratus lumborum (QL) muscle was identified. Using an in-plane approach, a 22-gauge, 50-mm echogenic needle was inserted and advanced posteriorly to the interfascial plane between the QL muscle and the thoracolumbar fascia (► **Fig. 1**). Hydrodissection was performed to confirm needle position and, after negative aspiration, a single injection of 0.5mL/kg of either 0.25% or 0.5% ropivacaine

Table 1 Characteristics of pediatric patients undergoing upper urinary tract urological surgery

Age/gender	Weight (kg)	BMI (kg/m ²)	ASA score	Diagnosis	Procedure	Incision	Surgical Technique	Postop drains	EBL (mL)	Operative time (minutes)
2 years/Female	14.3	16.2	2	L UPJO	Left open dismembered pyeloplasty	Flank	Spread muscles	Salle nephro-ureteral stent	5	173
8 months/Female	8.3	17.7	2	R UPJO	Right open ureterocalicostomy	Flank	Split muscles	JJ ureteral stent, Penrose, foley	5	227
7 months/Male	8.7	17.5	2	L UPJO	Left open dismembered pyeloplasty	Flank	Spread muscles	Salle nephro-ureteral stent	2	160
7 years/Male	27.6	16.3	2	L UPJO	Left open dismembered pyeloplasty	Flank	Spread muscles	Salle nephro-ureteral stent	4	163
5 years/Male	23	14.3	2	L UPJO	Left open dismembered pyeloplasty	Flank	Spread muscles	Salle nephro-ureteral stent	5	173

Abbreviations: ASA, American Society of Anesthesiologists; BMI, Body Mass Index; EBL, estimated blood loss; L UPJO, left ureteropelvic junction obstruction; Postop, postoperative; R UPJO, right ureteropelvic junction obstruction.

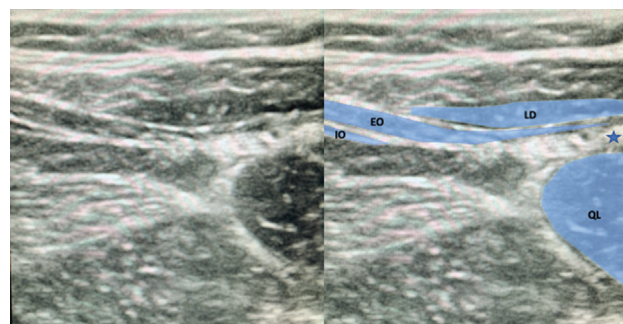


Fig. 1 Ultrasound image of the anatomical structures and local anesthetic injection point for posterior QLB. Abbreviations: EO, external oblique muscle; IO, internal oblique muscle; LD, latissimus dorsi muscle; QL, quadratus lumborum muscle. Note: *Injection point.

(concentration chosen at practitioner’s discretion) with 1mcg/kg of clonidine was administered (► **Fig. 1**).

Per hospital protocol, postoperative pain scores were obtained every 20 minutes in the postanesthesia care unit (PACU) and every 4 hours on the inpatient floor according to age-appropriate 10-point scales (Children’s Revised Impact of Event Scale [CRIES] for patients aged < 1 year; Face, Legs, Activity, Cry, Consolability [FLACC] for those aged between 1 and 5 years; and the Wong–Baker Faces Pain Rating Scale [FACES] for patients aged between 5 and 8 years) (► **Table 2**). Postoperative pain was managed with oral acetaminophen and ibuprofen. Oral narcotics were available for breakthrough pain scores > 4.

Results

From August 2019 to August 2020, 2 pediatric urologists within a single quaternary care institution performed a total of 12 upper urinary tract surgeries for management of primary or secondary obstruction of the ureteropelvic junction. Of these cases, five patients submitted to open flank surgery who underwent a preoperative unilateral QLB were identified. No QLB had to be aborted or crossed over to an alternative block. The performance of the block technique took less than ten minutes for all patients. All patients had either an internalized JJ ureteral stent or Salle nephroureteral stent. One patient had a postoperative foley catheter and Penrose drain.

The average postoperative pain score during the admission was 1, with the lowest being 0 and highest, 3. All blocks were considered successful because no patient required narcotics in the postoperative period. The average length of stay was of 0 to 1 day. No complications (such as hypertension, infection, hematoma) or technical difficulties associated with the regional QLB were identified.

Discussion

The present series supports the notable trends demonstrated elsewhere toward the use of regional anesthesia. The transversus abdominus plane (TAP) block has been described for

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