Case Report

Bilateral continuous posterior quadratus lumborum block for analgesia after open abdominal surgery: A prospective case series

ABSTRACT

The quadratus lumborum (QL) block provides analgesia to the abdominal wall while sparing the side effects of neuraxial blocks. We describe a case series of eight patients treated with a continuous infusion of local anesthetic via bilateral posterior QL catheters infusion block for analgesia after abdominal surgeries. We found that the median duration of the procedure was 26 min and the median opioid consumption over the first postoperative 72 h was 110 mg of morphine equivalents. The bilateral continuous posterior QL block is a feasible analgesic intervention and can be considered as a component of multimodal analgesic pathways.

Key words: Acute pain; quadratus lumborum block; regional anesthesia

Introduction

Uncontrolled pain after abdominal surgery increases the incidence of postoperative complications, as it prolongs hospitalization, and increases health care costs and the use of opioids.[1] Abdominal wall interfacial plane blocks have evolved during the last decade. Several approaches to the quadratus lumborum (QL) block have been described.[2] Although the evidence base is still growing, the data thus far suggest that the QL block potentially results in adequate coverage required for abdominal and hip surgeries. Due to the important role of unilateral posterior QL blocks in pain management for abdominal surgery, we believe that bilateral posterior QL blocks should effectively cover midline abdominal incisions.[3,4]

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After obtaining approval from the Cleveland Clinic Institutional Review Board (IRB # 15-1273), written informed consent to report the procedure was obtained from each patient prior to the procedure, we describe a prospective case series of patients receiving continuous bilateral posterior QL blocks for analgesia after open abdominal surgery.

Case Report

All cases were conducted at the Cleveland Clinic Main Campus. The procedure was conducted on adult opioid-naïve patients undergoing laparotomy via a midline incision. To avoid delaying surgical workflow, the nerve block procedures

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were performed postoperatively within 1 h of arrival to the post-anesthesia care unit (PACU).

Patients were placed in a lateral decubitus position, and mild sedation with midazolam up to 2 mg was used as necessary. A low frequency (2–6 MHz) curved array ultrasound transducer was used. The probe was initially placed horizontally at the midaxillary line between the costal margin and iliac crest and was then moved posteriorly until the three abdominal muscle layers (external oblique, internal oblique, and transversus abdominis muscles) were tapered and the fascia transversalis that covers the anterior side of QL muscle appeared.

After skin infiltration with lidocaine 1%, a 17G, 3-inch long block needle was inserted in-plane. The needle was targeted toward the posterior lateral aspect of the QL muscle (between the QL and latissimus dorsi muscles) inside the middle thoracolumbar fascia (TLF) [Supplemental Figure 1]. Slow injection of 20 mL of 0.25% bupivacaine was then deposited. Using the Seldinger technique, a 19 gauge echogenic peripheral nerve catheter with a stylet was threaded into the plane 3–5 cm. The patient was then repositioned, and the procedure was repeated on the opposite side.

Each catheter was connected to a patient-controlled infusion pump (PCA) containing 0.1% bupivacaine at a basal rate of 6 mL/h to be started 1 h after the operation, with an additional on-demand bolus of 5 mL every 60 min, as needed. Patients were also provided with hydromorphone via intravenous PCA pump (starting settings 0.2 mg every 6 min with no basal rate and a maximum of 10 doses per hour). The hydromorphone PCA pump was started within 1 h from arrival to the PACU; however, they were instructed to depend mainly on the bilateral QL PCA pump and to only use the hydromorphone PCA pump if their pain score was greater than 5/10. All patients were followed for 72 postoperative hours. At rest, pain scores were collected per clinical routine, with a minimum frequency of once every 4 h and are reported as a time-weighted average over 24 h. The patients' postoperative recovery was evaluated by the research team. The evaluations were done every morning using the opioid-related symptom distress scale tool[5] during the first three postoperative days and the quality of recovery 15 questionnaire[6] on postoperative days 1 and 3. Also, we evaluated the patients for possible side effects from the procedure including bleeding, hematoma, hypotension, internal organ injury, and catheter site infection.

A total of eight patients received the intervention (six females, mean age 48.5 years [range: 24–68 years]). The median (interquartile range [IQR]) duration of the entire bilateral procedure, starting from skin sterilization with chlorhexidine to securing both catheters to the skin, was 26 (18, 30) minutes. The median (IQR) postoperative opioid consumption was 110 mg (44, 169) of morphine equivalents during the initial 72 postoperative hours. No adverse events were reported in any of the cases. Nearly all patients reported improved quality of recovery on postoperative day 3 compared to day 1 [Supplemental Table 1].

Discussion

We describe a prospective case series of adult opioid-naïve patients having laparotomy via a midline incision and treated with continuous bilateral posterior QL blocks. The intervention was found to be applicable in daily clinical practice, of reasonable duration (median duration 26 min), and well-tolerated by patients.

Different approaches to QL blocks have been reported in the literature with authors using varying nomenclature when describing each block.[7] In our case series, we used the posterior QL approach. The TLF is divided into three layers (anterior, middle, and posterior) around the muscles of the back. The anterior layer lies anterior to both the QL and psoas muscles, the middle layer passes between the QL and latissimus dorsi then QL and erector spinae muscles, and the posterior TLF layer surrounds the erector spinae and latissimus dorsi muscles. It was recently described that in the area where the middle TLF joins the deep lamina of the posterior TLF on the lateral border of the erector spinae, a triangular structure named the lumbar interfascial triangle (LIFT) can be targeted as the point of injection for a posterior QL block.[8] The LIFT provides a theoretical pathway for the injectate to spread deep to the middle TLF. A study by Elsharkawy *et al*. investigated the spread of the posterior QL block given at the L3–L4 level. They observed the spread of the dye from T10 to L4 dermatomes with deep staining of the iliohypogastric, ilioinguinal, and subcostal nerves, as well as the T11, T12, and L1 nerve roots.[9]

We did not prospectively asses for the dermatomal sensory loss on a daily basis and are therefore unable to report it. Nevertheless, this technique was shown to be beneficial for patients scheduled for laparotomy via midline incision as it attained the desired hospital course of recovery regarding opioid consumption, opioid-related side effects, and the quality of recovery for these patients.

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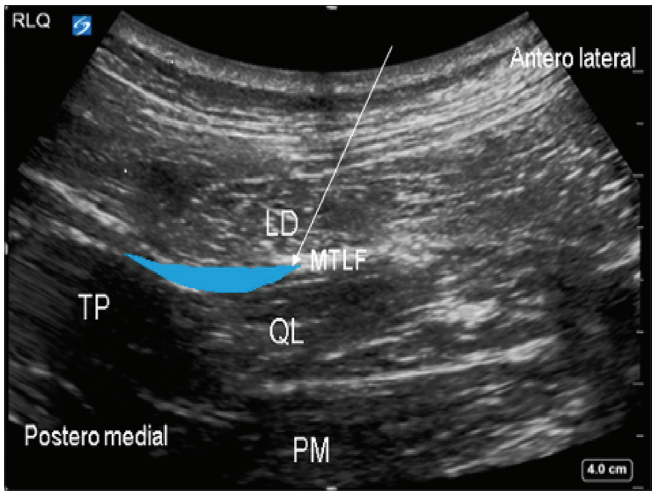
Conflicts of interest

There are no conflicts of interest.

References

1. Bulka CM, Shotwell MS, Gupta RK, Sandberg WS, Ehrenfeld JM. Regional anesthesia, time to hospital discharge, and in-hospital mortality: A propensity score matched analysis. Reg Anesth Pain Med. 2014;39:381-6.
2. Elsharkawy H. Quadratus lumborum block with paramedian sagittal oblique (subcostal) approach. Anaesthesia 2016;71:241-2.
3. Blanco R, Ansari T, Riad W, Shetty N. Quadratus lumborum block versus transversus abdominis plane block for postoperative pain after cesarean delivery: A randomized controlled trial. Reg Anesth Pain Med 2016;41:757-62.
4. 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;117:387-94.
5. YaDeau JT, Liu SS, Rade MC, Marcello D, Liguori GA. Performance characteristics and validation of the opioid-related symptom distress scale for evaluation of analgesic side effects after orthopedic surgery. Anesth Analg 2011;113:369-77.
6. Stark PA, Myles PS, Burke JA. Development and psychometric evaluation of a postoperative quality of recovery score: The QoR-15. Anesthesiology 2013;118:1332-40.
7. El-Boghdadly K, Elsharkawy H, Short A, Chin KJ. Quadratus lumborum block nomenclature and anatomical considerations. Reg Anesth Pain Med 2016;41:548-9.
8. Elsharkawy H, El-Boghdadly K, Barrington M. Quadratus lumborum block: Anatomical concepts, mechanisms, and techniques. Anesthesiology 2019;130:322-35.
9. Elsharkawy H, El-Boghdadly K, Kolli S, Esa WAS, DeGrande S, Soliman LM, *et al*. Injectate spread following anterior sub-costal and posterior approaches to the quadratus lumborum block: A comparative cadaveric study. Eur J Anaesthesiol 2017;34:587-95.



Supplemental Figure 1: Ultrasound image demonstrating sonographic landmarks, needle approach (white arrow) and dye (blue shaded area) spread between the quadratus lumborum and latissimus dorsi muscles. MTLF middle thoracolumbar fascia, LD, latissimus dorsi; QL, quadratus lumborum, TP transverse process

Supplemental Table 1: Patients' characteristics and main outcomes

#	Gender	Age	NRS pain POD 1/POD 2/POD 3	OR SDS POD 1	OR SDS POD 2	OR-SDS POD 3	QoR15 POD 1	QoR15 POD 3
1	F	68	4.9/4.7/3.4	-	43.6	24.6	-	104
2	F	60	3.1/3.4/1.5	29	20.8	20.8	91	118
3	F	54	4.6/5.3/0.4	14.8	9	16.6	116	118
4	F	53	6.8/5.9/6.8	91.4	44.4	65.6	54	72
5	F	53	5.1/3.5/3.8	32.8	38.8	35	74	101
6	M	26	4.9/6.8/3.2	23	30.2	36.6	98	114
7	M	50	5.9/5.7/5.8	8.2	19.8	9.4	86	100
8	F	24	4.6/4.6/4.1	27	28.2	4.6	123	126

The Numerical Rating Pain Scales are reported as a time-weighted average over 24 h for the first 3 days after surgery. The opioid-related symptom distress scale contains 10 opioid-related symptoms: Fatigue, drowsiness, inability to concentrate, confusion, nausea, dizziness, constipation, itching, difficulty with urination, retching/vomiting. Scores are calculated using symptom frequency, severity, and how bothersome it is. The score ranges from 0 (no symptoms) to 144 (worst symptoms). The Quality of Recovery 15 questionnaire is a 15-point numerical rating scale assessing the subjective feeling of the patient concerning different aspects of their recovery in the last 24 h. The score ranges from 0 (worst) to 150 (best). NRS: Numeric rating scale (0-10); ORSDS: Opioid-related symptom distress scale; QoR15: Quality of recovery 15 questionnaire; POD: Postoperative day