

# Opioid-Free Cesarean Section with Bilateral Quadratus Lumborum Catheters

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**Introduction:** Post-operative pain control following cesarean section delivery (CD) is an important topic of discussion given the lack of consensus on a narcotic-sparing analgesic regimen. We describe the case of an elective CD with narcotic-free pain control using continuous bilateral posterior quadratus lumborum (QL) blockade as the primary mode of analgesia.

**Case Report:** The patient is a 36-year-old female, G3P1, who presented at 37 weeks of gestation in active labor scheduled for elective primary CD. A spinal anesthetic was performed at L4–L5 with hyperbaric 0.75% bupivacaine, without intrathecal morphine. Bilateral posterior QL catheters were placed under sterile conditions with 20 mL of 0.25% bupivacaine per side. Continuous infusion of 0.2% ropivacaine was then started at 10 mL/hour per side. The patient's pain was controlled with QL catheters and a multimodal pain regimen consisting of non-steroidal anti-inflammatory drugs and acetaminophen. The patient reported a resting pain score of 0 with a dynamic pain score of 3 out of 10 throughout her recovery. She was discharged on post-operative (post-op) day 3 and the catheters were removed without any complications.

**Discussion:** The gold standard for pain control following CD is intrathecal morphine; however, its use has many adverse effects. Bilateral single-shot QL blocks following CD have been proven to decrease opioid consumption but its limited duration has minimal advantage over intrathecal morphine and patients continue to require oral narcotics for analgesia. With the use of QL catheters and a multimodal pain regimen, it may be possible to achieve opioid-free CD for the post-op period.

**Keywords:** obstetric anesthesia, pain management, quadratus lumborum, peripheral nerve block, peripheral nerve block catheters, cesarean section, cesarean section recovery

## Introduction

Cesarean section deliveries (CD) are the most common major operating room procedure world-wide.<sup>1</sup> The first CD in the United States was described in 1794, and to date, there is no adequate narcotic-sparing analgesic regimen for post-operative (post-op) pain control. In the current climate regarding the opioid crisis in the United States, the need to develop a narcotic-free pathway for CD patients has arisen. Other considerations include the need for quality postoperative recovery to improve mobility, reduce risk of postpartum depression, and allow for breast-feeding by minimizing the risk of transmission of sedating medications to the neonate. In this case report, we describe the case of an elective primary CD with effective, narcotic-free pain control in which we used bilateral continuous posterior quadratus lumborum (QL) blockade as the primary mode of post-op analgesia.

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## Case Report

The patient is a 36-year-old female, G3P1, who presented at 37-weeks of gestation in active labor scheduled for elective primary CD. Indication for CD was previous third-degree laceration during spontaneous vaginal delivery. A spinal anesthetic was performed at L4-L5 with 1.6 mL hyperbaric 0.75% bupivacaine hydrochloride, without intrathecal morphine. The surgical procedure was uneventful. The patient received 1 gram of intravenous (IV) acetaminophen following delivery of the placenta, before skin closure. In order to facilitate narcotic-free analgesia, the decision was made to place bilateral posterior QL catheters post-operatively. She consented to this plan for analgesia and signed consent for regional anesthesia.

After application of surgical dressings, while the patient was on the operating room table, a wedge was placed under the right flank and hip to achieve 30-degree lateral rotation. A high-frequency linear ultrasound probe (Sonosite, Bothell, WA, USA) was placed in a transverse orientation on the lateral abdomen between the costal margin and iliac crest for identification of the three abdominal wall muscles: external oblique (EO), internal oblique (IO), and transversus abdominus (TA). The ultrasound was moved laterally and posteriorly until the abdominal muscles were seen to terminate superficial to the QL muscle. A right-sided posterior QL block was performed using an echogenic Touhy needle (BBraun, Bethlehem, PA, USA) under sterile conditions. The needle was advanced in-plane from lateral to medial until the needle tip was anterior to the termination of the IO and posterior to the QL, as described by Blanco et al.<sup>2</sup> Once the appropriate plane was confirmed with injection of 1 mL of normal saline, 20 mL of 0.25% bupivacaine hydrochloride and 3 mg preservative-free dexamethasone was deposited into this plane. Then, a continuous nerve block (CNB) catheter (BBraun, Bethlehem, PA, USA) was threaded through the needle, and the needle was removed over the catheter. Localization of the catheter tip in the correct plane was confirmed by injecting 1 mL of normal saline through the catheter under ultrasound visualization. The catheter was secured with a sterile chlorhexidine-impregnated transparent dressing (3M Health Care, St Paul, MN, USA). This procedure was repeated on the left side, and the patient was transferred to her hospital bed and then to the post-anesthesia care unit (PACU). While in PACU, CNB infusions of 0.2% ropivacaine hydrochloride were started on each side, at a rate of 10 mL per hour per side, without demand dose. Post-operatively, the patient was prescribed ketorolac 15 mg

IV every 6 hrs for the first 24 hrs, ibuprofen 800 mg every 8 hrs to begin after ketorolac, and acetaminophen 1 gm PO every 6 hrs until discharge. She had orders for as-needed tramadol and oxycodone, however, none of these analgesics were requested by the patient; she was happy with the analgesia from her posterior QL catheters. No narcotics were prescribed for discharge.

Post-operatively, the patient reported a resting pain score of 0 with a dynamic pain score of 3 out of 10 on numeric rating scale (NRS). She was discharged on post-op day 3. Both catheter tips were intact upon removal, and the skin at the site was normal in appearance, without erythema or induration. The patient provided written, informed consent for publication of a case report detailing her care. Institutional review board approval for publication of the case details was not required.

## Discussion

Severe untreated post-operative pain following CD results in an increased consumption of opioids, decreased mobility, increased incidence of postpartum depression, and persistent post-surgical pain.<sup>3-5</sup> Complete narcotic-free post-operative analgesia for CD has never been described in the literature. The mainstays of treatment of post-cesarean pain are intrathecal and systemic opioids. The current gold standard for postoperative pain control is intrathecal single-shot preservative-free morphine.<sup>6</sup> However, intrathecal morphine has a short duration of action (24 hrs) and has many adverse side effects including a bimodal pattern of respiratory depression and has a high incidence of pruritis, nausea and vomiting.<sup>7</sup> The use of regional anesthesia, in the form of transversus abdominal plane (TAP) blocks,<sup>8</sup> has become popular for analgesia in obstetrics, but TAP blocks represent a technique which provides limited analgesia, as they only cover somatic pain.<sup>9</sup> As expected, neuraxial morphine has historically been considered superior for analgesia after CD relative to bilateral TAP blocks due to its ability to cover somatic and visceral pain.<sup>10</sup> However, intrathecal morphine is still inadequate for treatment of post CD pain as the duration of the pain is longer than the action of intrathecal morphine.

In light of inadequate analgesia by TAP blocks and intrathecal morphine, women discharged to home following CD are typically prescribed an abundance of narcotic medication. Batement et al describe practices across 6 institutions included in their study, women were discharged to home with between 30 and 40 tablets of either oral oxycodone or hydrocodone, and still only achieved a median pain score of 4 in

the first week at home following CD.<sup>11</sup> They also showed that at two weeks following discharge, the patients reported a median of 15 remaining unused tablets, which they had not yet disposed of,<sup>11</sup> and it is documented in the literature that leftover medications are frequently shared or otherwise diverted.<sup>12,13</sup> Other women report that the narcotics they were prescribed after their CD resulted in persistent, chronic usage.<sup>14</sup> Persistent pain is present in 40% of mothers at 3 months post-partum, and 10–20% of mothers experience persistent pain up to a year after CD.<sup>13–15</sup> Poorly controlled post-cesarean pain also increases the risk of postpartum depression. The incidence of post-partum depression has been quoted to be as high as 19% from childbirth to 3-months postpartum<sup>16</sup> and uncontrolled pain is implicated as a contributing factor.<sup>6</sup> Given that TAP blocks, intrathecal morphine, and oral narcotics continue to provide inadequate analgesia and contribute to the over-prescription of oral narcotic medications at discharge, an alternative analgesic technique must be identified. As described in our case report, this patient did not take any narcotics during her admission, nor after discharge.

In posterior QL block as described by Blanco local anesthetic has been shown to spread to the paravertebral space, resulting in both visceral and somatic analgesia.<sup>2</sup> Blanco et al demonstrated QL block is superior to TAP block in providing analgesia.<sup>9</sup> Single-shot QL block has been shown to reduce opioid consumption following CD when used in combination with a multimodal analgesic regimen, but did not completely eliminate narcotic consumption due to its limited duration.<sup>9</sup> Pelvic pain resulting from CD persists longer than the analgesia provided by any single-shot technique including intrathecal morphine, TAP block, or QL block, despite combining additives with the local anesthetic. Thus, indwelling CNB catheters were chosen to provide extended analgesia, and is what makes our case report novel. Placement and management of continuous nerve block catheters does carry some additional procedural risk; however, anesthesiologists familiar with the performance of peripheral nerve blocks and threading of epidural catheters should be able to perform it with relative ease after an introduction to the continuous nerve block kit. The risks of local anesthetic systemic toxicity and bleeding from needle insertion sites should also be familiar to anesthesiologists who perform obstetric anesthesia with any frequency. Unfortunately, if the patient has a coagulopathy which deems them inappropriate for neuraxial analgesia, they will have the same contraindication to continuous nerve block catheter placement due to risk of hematoma formation.

Recovery for CD patients must take into account that there is a newborn to care for so improving mobility is important as is avoiding medications that are excreted in breast milk with harmful side effects for the neonate. Eighty-one percent of all women in the United States feed their infants by breastfeeding (BF). Early BF promotes maternal-neonatal bonding, and effective pain control promotes successful BF; therefore, it is important to consider quality pain control for post-cesarean patients. Additionally, consideration must be placed on the medications given to the mother as they may transfer to the breast-fed infant. A relative-infant dose (RID) is expressed as a percentage and is weight-adjusted for the neonate. RIDs quantify the amount of neonatal drug exposure relative to the mother's dose. A RID greater than 10% is considered high.<sup>6</sup> Highly protein-bound drugs like non-steroidal anti-inflammatory drugs and local anesthetics have limited transfer to the neonate. Acetaminophen provides effective analgesia with minimal side effects. It has an opioid-sparing effect and has a RID of 1.3%. Ketorolac also has a low RID of 0.2 to 0.4%. Ibuprofen has a short half-life, and the RID is 0.6% in colostrum and <0.38% in mature breast milk. Our use of indwelling CNB QL catheters allowed this patient to take only safe medications which are not transferred in significant doses to the breast-fed infant. Hydrocodone, oxycodone, and morphine have RIDs of 3.7, 8, and 10.7%, respectively. Rates of central nervous system (CNS) depression, defined as lethargy, sleepiness, and not awakening for feeds, in breastfeeding infants whose mothers were taking oxycodone or codeine have been reported as 20% and 16%, respectively, whereas the rate of CNS depression in infants whose mothers were only taking acetaminophen is 0.5%.<sup>17</sup>

From this case, we conclude that posterior QL catheters must be considered for post-operative analgesia for patients who are status post CD; in patients where catheter management is not possible, liposomal bupivacaine could be considered in future studies to provide extended posterior QL blockade. Further studies to show efficacy and feasibility are needed.

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## Author Contributions

All authors contributed to the design and analysis of the work, drafting and revising of the work, gave final approval of the work, and are accountable for any and all aspects of the work.

## Disclosure

The authors report no conflicts of interest in this work.

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