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CLINICAL INFORMATION

Ultrasound guided quadratus lumborum block for analgesia after cesarean delivery: case series

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KEYWORDS
Quadratus lumborum block;
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Abstract
Introduction: The majority of women having planned cesarean section receive spinal anesthesia for the procedure. Typically, spinal opioids are administered during the same time as a component of multimodal analgesia to provide pain relief in the 16–24 h period postoperatively. The quadratus lumborum block is a regional analgesic technique that blocks T5-L1 nerve branches and has an evolving role in postoperative analgesia for lower abdominal surgeries and may be a potential alternative to spinal opioids. If found effective, it will have the advantage of a reduction in opioid associated adverse effects while providing similar quality of analgesia.
Methods: We performed bilateral quadratus lumborum block in 3 women who received a spinal anesthetic for a cesarean delivery and evaluated their post-operative opioid consumption and patient satisfaction.
Results: In all 3 patients, there was no additional opioid consumption during the first 24 h after the block. Numeric Rating Scale (NRS) for pain was less than 6 for the first 24 h. Women were all very satisfied with the quality of pain relief.
Discussion: Quadratus lumborum block may be a promising anesthetic adjuvant for post-cesarean analgesia. Further randomized controlled trials are needed to compare the efficacy of the quadratus lumborum block with intrathecal opioids.

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PALAVRAS-CHAVE
Bloqueio do quadrado lombar;
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Analgesia multimodal

Bloqueio do quadrado lombar guiado por ultrassom para analgesia pós cesariana: série de casos

Resumo
Introdução: A maioria das mulheres agendadas para cesariana recebe anestesia raquidiana para o procedimento. Tipicamente, os opioides administrados por via espinhal (VE) são administrados ao mesmo tempo como um componente da analgesia multimodal para proporcionar alívio da dor no período pós-operatório de 16-24 horas. O bloqueio do quadrado lombar (QL) é uma técnica de analgesia regional que bloqueia os ramos nervosos T5- L1 e tem um papel crescente na analgesia pós-operatória de cirurgias abdominais inferiores, podendo ser uma potencial alternativa para os opioides VE. Se for considerado eficaz, esse bloqueio terá a vantagem de uma redução nos efeitos adversos associados aos opioides, proporcionando qualidade semelhante de analgesia.
Métodos: O bloqueio bilateral do quadrado lombar foi realizado em três mulheres que receberam raquianestesia para parto cesário, e o consumo de opioides no pós-operatório e a satisfação das pacientes foram avaliados.
Resultados: Em todos as três pacientes, não houve consumo adicional de opioide durante as primeiras 24 horas após o bloqueio. A escala de avaliação numérica (EAN) para dor foi inferior a 6 durante as primeiras 24 horas. Todas as mulheres ficaram muito satisfeitas com a qualidade do alívio da dor.
Discussão: O bloqueio do QL pode ser um adjuvante promissor para analgesia pós-cesariana. Estudos randomizados e controlados são necessários para comparar a eficácia do bloqueio do quadrado lombar com opioides administrados por via intratecal.

Introduction

Intrathecal morphine is considered the ''gold standard'' for postoperative pain relief after cesarean delivery. Its widespread use is due to its favorable pharmacokinetic profile, ease of administration (during spinal block for surgical anesthesia) and low cost.[1,2]

Nevertheless, subarachnoid use of morphine is not deprived of adverse effects. While dose-dependent respiratory depression is the most dreaded complication, other minor side effects such as pruritus, nausea, vomiting and urinary retention can be bothersome during early puerperium.

The Transversus Abdominis Plane (TAP) block has been used for postoperative analgesia for abdominal and pelvic surgical procedures, including cesarean deliveries. Nevertheless, the anterior approach to the TAP block has shown limited analgesic effect due to its short duration (up to 10 h) and mostly parietal pain relief profile.[3,4] The posterior approach, or quadratus lumborum (QL) block, first described in 2007 by Blanco, demonstrated a spread to the paravertebral space, thus leading to a more extensive and long lasting block, with the potential to provide visceral pain relief.[5]

As we strive to provide optimal post-operative analgesia with minimum side effects, we performed the QL block in three women undergoing cesarean delivery under spinal anesthesia in order to provide analgesia that would last beyond the duration of spinal opioids.

Methods

Written informed consent for publication was obtained from all women.

Subjects received standard care according to routine hospital protocols.

After the surgery, the patients were transferred to the recovery room and placed in the lateral position. The skin was prepared with clorhexidine 2% in a sterile fashion. Under ultrasound guidance (a SonoSite M-Turbo ultrasound machine using a curvilinear 5–2 MHz sterile transducer (SonoSite M-Turbo, Bothell, WA, USA), the lateral abdominal wall was scanned posteriorly and superiorly to the ipsilateral iliac crest (Fig. 1), following the transversalis fascia until quadratus lumborum muscle was identified (Fig. 2). Ropivacaine 0.25% 30 mL was injected through an 18 G Tuohy needle (Fig. 2), 15 mL on the anterior aspect of the muscle (Borglum approach)[6] and 15 mL on the posterior aspect (QL type 2, Blanco approach).[2] The same procedure was repeated on the contralateral side, with the same volume of local anesthetic.

All patients received multimodal analgesia with acetaminophen 650 mg every 6 h and Ketorolac 15 mg q 6 h. Oral morphine 5 mg was prescribed on a per request basis.

Numeric Rating Scale (NRS) for pain was recorded every hour in the first 24 h after surgery and patient satisfaction was recorded 24 h postoperatively.

In addition, opioid consumption during the first 24 h was recorded.

Case 1

A 34 year-old G3P1 woman with a singleton pregnancy with cephalic presentation at 37 + 6 weeks of gestation presented with decreased fetal movement. She was having irregular contractions at that time. Continuous fetal

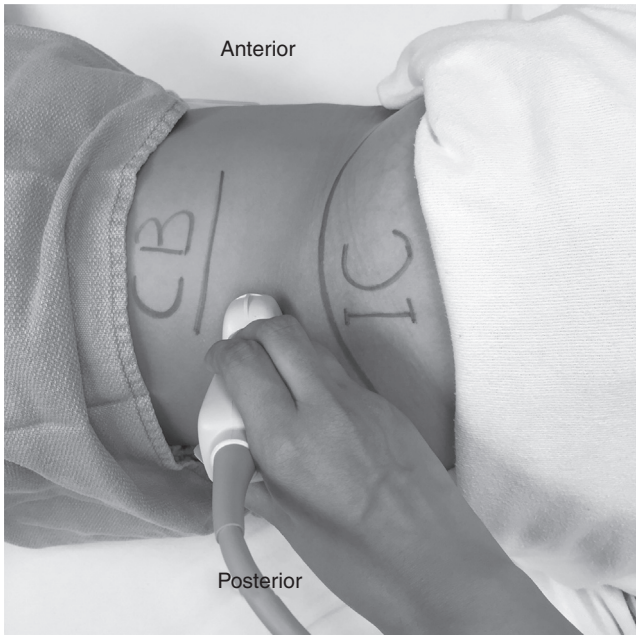

Figure 1 Surface anatomy of the posterior abdominal wall and flank. CB, (sub) Costal border; IC, iliac crest.

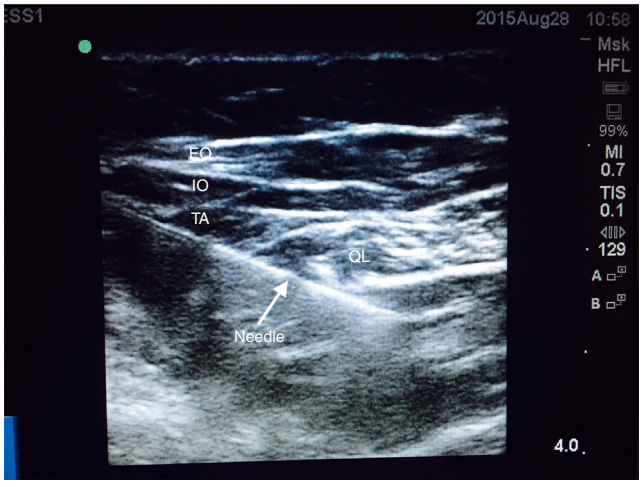

Figure 2 Sonoanatomy of the quadratus lumborum block. EO, external oblique; IO, internal oblique; TA, transversus abdominis.

monitoring revealed spontaneous fetal heart rate decelerations to 50 s. A biophysical profile revealed 2/8 for fluid. A cesarean delivery was recommended and performed within 1 h from arrival to the hospital. Neuraxial block was performed with a 25 g Whitacre needle in the sitting position. After clear cerebrospinal fluid was visualized, intrathecal hyperbaric bupivacaine 0.75% 10.5 mg, fentanyl 15 μg and morphine 150 μg were injected. After the surgery has finished, she was offered the QL block as she was concerned about postoperative need for parenteral opioids as well as a previous bad experience with parenteral opioid induced nausea and vomiting.

Case 2

A 36 year-old G3P2 woman with a singleton pregnancy at 39 + 4 weeks of gestation presented for elective repeat cesarean delivery. Neuraxial block was performed with a 25 g Whitacre needle in the sitting position. After clear cerebrospinal fluid was visualized, intrathecal hyperbaric bupivacaine 0.75% 10.5 mg, fentanyl 15 μg and morphine 150 μg were injected. After the surgery has finished, she was offered the QL block as an adjuvant for post-operative analgesia.

Case 3

A 33 year-old G3P2 woman with a singleton pregnancy at 39 + 2 weeks of gestation presented for elective repeat cesarean delivery. Neuraxial block was performed with a 25 g Whitacre needle in the sitting position. After clear cerebrospinal fluid was visualized, intrathecal hyperbaric bupivacaine 0.75% 11.25 mg, fentanyl 15 μg and morphine 150 μg were injected. After the surgery has finished, she was offered the QL block as an adjuvant for post-operative analgesia.

Results

NRS for pain (1–10) and patient satisfaction with the quality of the analgesia obtained (Unsatisfied/Satisfied/Very Satisfied) was recorded, as described in Table 1.

None of the patients received further opioids during the first 24 h after surgery.

Discussion

Post-cesarean analgesia can be challenging due to various reasons, including cultural factors and patients' expectations. Although intrathecal morphine is widely used successfully in most cases, the scientific community has been recently looking into chronic pain associated with intrathecal opioid use. Recent evidence shows that genetic polymorphism of the μ-receptor may lead to pharmacogenetic variability, ultimately altering the analgesic response to intrathecal morphine and possibly determining susceptibility to opioid induced hyperalgesia.[7,8] Wound hyperalgesia is a known risk factor for developing chronic postsurgical pain, and has been reported in up to 10% of women after cesarean delivery.[9–11]

In addition, duration of analgesia with intrathecal morphine is unclear. Previous studies in the obstetric and non-obstetric surgical population failed to demonstrate a linear relationship between morphine dose and duration of analgesia.[1,2] Despite the intrathecal morphine dose, most women in a dose-finding Randomized Controlled Trial (RCT) continued to use IV Patient Controlled Analgesia (PCA) pump of morphine at a slow but steady rate.[1] These findings suggest that intrathecal opioid administration may not provide sufficient analgesia.

In addition, adverse events such as pruritus, nausea, somnolence and respiratory depression are associated with escalating doses of morphine.

Table 1 NRS for pain (1–10) and patient satisfaction.

	NRS $T=1$	NRS $T=2$	NRS $T=3$	NRS $T=4$	NRS $T=5$	NRS $T=6$	NRS $T=9$	NRS $T=12$	NRS $T=18$	NRS $T=21$	NRS $T=24$	Patient satisfaction
Case 1	0	0	0	–[b]	1	1	0–2[a]	0	2–3[a]	–[b]	4–6[a]	Very satisfied
Case 2	0	0–2[a]	2–3[a]	2–3[a]	2–3[a]	2–3[a]	–[b]	–[b]	1	–[b]	2	Very satisfied
Case 3	0	0	0	0	–[b]	0	0	0–4[a]	0	–[b]	–[b]	Very satisfied

NRS, Numeric Rating Scale (0–10); *T*, number of hours post quadratus lumborum block.
[a] First number indicates pain at rest; second number indicates pain at movement. On the time points that indicate one number, only pain at rest was recorded.
[b] Patient asleep or not available in their room.

A recent case report of the use of the QL block for the treatment of chronic abdominal pain highlight its potential use for preventing and even treating chronic pain in the obstetric population.[12]

When Blanco first described the QL block as a variation of the more anterior TAP block, he recommended placement of the local anesthetic (LA) laterally to the muscle (QL type 1). Nevertheless, magnetic resonance imaging (MRI) looking into local anesthetic spread demonstrated that paravertebral spread is better with posterior injection of the LA (QL type 2).[5] In fact, his group recently published an RCT comparing opioid consumption after cesarean delivery in 25 patients that received a QL block with bupivacaine 0.125% 0.2 mL.kg^{-1} versus 23 patients that received a sham block.[13] They found that morphine consumption was significantly lower in the QL group during the first 6 and 12 h after the block, but the pain scores were significantly different up to 48 h post-procedure. External validity in this study is questionable as they used parenteral morphine patient controlled analgesia, instead of comparing the QL block with intrathecal morphine, considered the ''gold standard'' for post-cesarean analgesia.

In addition, Borglum et al. MRI studies revealed that a major portion of the LA administered on the lateral border of the QL muscle spreads in an antero-lateral direction, diverging from the injection point and defeating the purpose of obtaining paravertebral spread.[14] Furthermore, his group suggested a transmuscular approach, with the LA placed anteriorly to the QL muscle. This approach was associated with less redundant antero-lateral spread and achieved extensive thoracolumbar spread.[6] To the best of our knowledge, the Borglum approach has not yet been studied in obstetric patients.

In all three of our cases, we deposited half of the LA on the anterior (Borglum) and remaining half on the posterior (QL 2, Blanco) aspects of the muscle in order to optimize both cephalo-caudal and paravertebral spread.

Our results showed that this technique was associated with minimal pain during the first 24 h postoperatively. In addition, we found that the QL block analgesia was longer lasting than the published duration of intrathecal morphine analgesia. Our patients did not require any opioids during the first 24 h after surgery.

Randomized controlled trials comparing QL block with intrathecal morphine will be needed to confirm our findings of prolonged analgesic efficacy of QL block for post-cesarean analgesia.

Conflicts of interest

The authors declare no conflicts of interest.

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