Case Report

Bilateral Ultrasound-Guided Continuous Ilioinguinal-Iliohypogastric Block for Pain Relief After Cesarean Delivery

Gligor Gucev, MD, MSEd
Grant M. Yasui, MD
Tien-Yu Chang, MD
Jeffrey Lee, MD

We present three cases in which continuous ilioinguinal-iliohypogastric nerve block with 0.2% ropivacaine, together with oral ibuprofen, was used to provide analgesia after cesarean delivery. The catheters were placed under ultrasound guidance in the plane between the internal oblique and transversus abdominis muscles on both sides of the abdomen. Numeric pain rating was used for the assessment of postoperative pain. Low pain scores, minimal use of supplemental opioid, and the absence of nausea and vomiting suggests that continuous ilioinguinal-iliohypogastric nerve blockade deserves further study as a possible component of multimodal analgesia after cesarean delivery.
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Different analgesic modalities have been used for treatment of pain after cesarean delivery. A multimodal approach often incorporates regional anesthetic techniques, in addition to traditionally used systemic opioid analgesia. Single-shot ilioinguinal-iliohypogastric (IIIH) blockade has been used for pain relief after Pfannenstiel incisions; however, its duration is limited to the duration of action of the local anesthetic. We report three cases of bilateral, ultrasound-guided, continuous IIIH nerve blockade for pain relief after cesarean delivery. The reporting of these cases was approved by our institution's IRB.

CASE REPORTS

Case 1

A 27-yr-old parous patient at term was admitted for elective cesarean delivery and bilateral tubal ligation. The patient had no relevant medical or surgical history. Physical examination revealed a well developed, well nourished parturient with negative clinical findings. Spinal anesthesia with 0.75% hyperbaric bupivacaine 13.5 mg was administered for the cesarean delivery. At the completion of the surgical procedure, the sensory block to cold was distributed to T11–12 on the right side and T12–L1 on the left side.

Case 2

A 15-yr-old nullipara at term presented with lower abdominal pain. She was admitted for evaluation of a fetal hygroma found on ultrasound, which was subsequently confirmed as a meningocele. No significant medical or surgical history was reported and physical examination was unremarkable. An elective primary cesarean delivery was planned secondary to the fetal anomaly. Spinal anesthesia with 0.75% hyperbaric bupivacaine 12 mg was administered for the delivery. After the continuous catheters were placed, the residual sensory block from the spinal anesthetic was distributed to the L3–4 dermatome.

Case 3

A 21-yr-old nullipara presented at term with epigastric pain. The patient was admitted for further evaluation of preeclampsia and subsequently underwent a cesarean delivery for failed induction of labor. The cesarean delivery was performed under epidural anesthesia with 2% lidocaine 20 mL and fentanyl 50 μg.

The risks and benefits of continuous IIIH blockade were discussed with the patients and they agreed to proceed.

After completion of the surgical procedure, the wound was covered with a transparent dressing. Chlorhexidine was applied to the lower abdomen, and the block site was draped with sterile towels. A linear ultrasound probe 8–13 MHz, (12-l, Logiq e, General Electric Healthcare, Pewaukee, WI) with a sterile cover was placed on the right abdomen in the axial (transverse) plane just above the anterior superior iliac spine (ASIS). The three abdominal wall muscles were distinguished on the ultrasound scan (Fig. 1). In all three cases, we were able to identify the deep iliac circumflex artery and vein or their branches. We identified the ultrasound appearance of the iliohypogastric nerve in two of three cases but did not insist on identification of the ilioinguinal nerve, as we were using relatively high volumes of local anesthetic. Using real-time ultrasound guidance and an in-plane technique, a 17-gauge Tuohy needle was introduced through the skin at the medial end of the transducer and advanced into the fascial plane between the internal oblique muscle and transversus abdominis muscles. Needle tip position was confirmed with injection 1% lidocaine 5 mL and observation of a hypoechogenic pocket between the muscles (Fig. 2). A 19-gauge wire-embedded epidural catheter (FlexTip, Arrow International Inc., Reading, PA) was advanced to 12 cm at the skin and was secured with a transparent dressing (Fig. 3). The same steps were repeated

From the Department of Anesthesiology, Keck School of Medicine, University of Southern California, Los Angeles, California.

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Address correspondence to Gligor Gucev, MD, MSEd, Department of Anesthesiology, Keck School of Medicine, University of Southern California, 1200 N. State St., GNH 14901, Los Angeles, CA 90033. Address e-mail to gucev@usc.edu.

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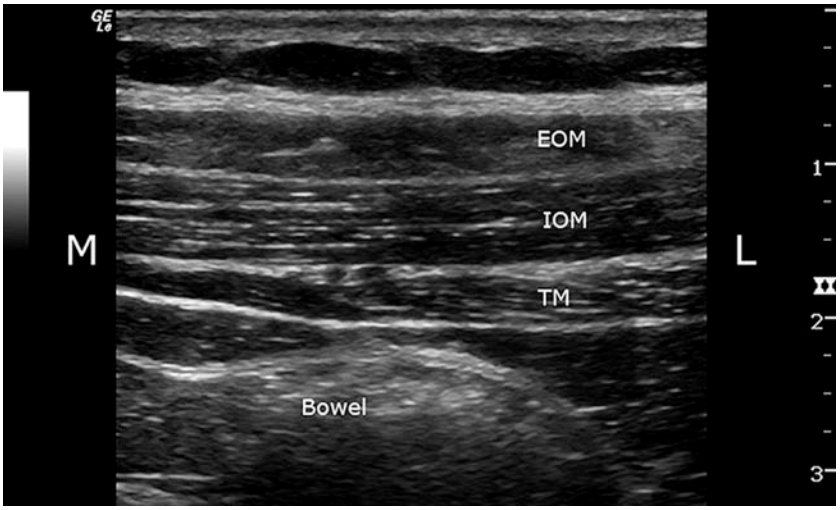

Figure 1. Axial (transverse) abdominal ultrasound scan above the anterior superior iliac crest. EOM = external oblique muscle; IOM = internal oblique muscle; TM = transversus muscle; M = medial; L = lateral.

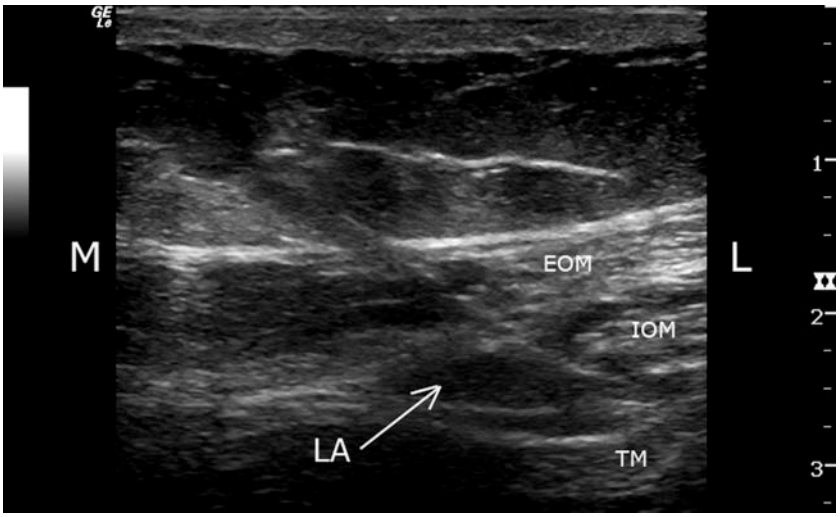

Figure 2. Local anesthetic pocket (LA) between internal oblique (IOM) and transversus muscles (TM). EOM = external oblique muscle; M = medial; L = lateral.

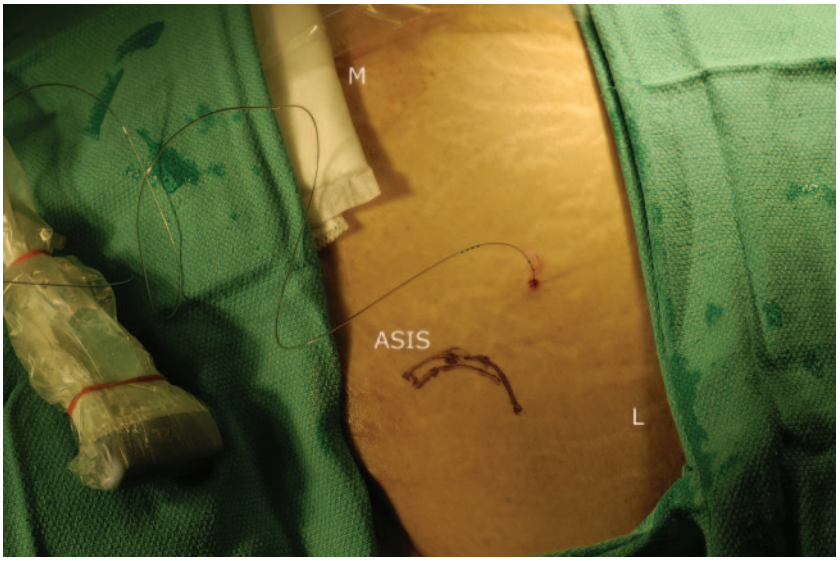

Figure 3. Catheter placement. ASIS = anterior superior iliac spine; M = medial; L = lateral.

on the contralateral side. After arrival in the postanesthesia care unit, a continuous infusion of 0.2% ropivacaine at 4 mL/h was initiated through each catheter with an elastomeric pump. At this point, the abdomen was examined for sensory blockade to cold. None of the three patients had sensory deficit at or above the umbilicus. The local anesthetic was administered for 72 h after which time the catheters were removed. Oral ibuprofen 600 mg was administered every 6 h, and breakthrough pain was treated with IV morphine 2 mg or oral hydrocodone bitartarate/acetaminophen 5 mg/500 mg.

Pain scores were assessed with a numeric rating scale (0–10; 0 = no pain, 10 = worst pain imaginable) every 4 h for 72 h by

Table 1. Numeric Rating Scale (NRS) Scores Are Presented as Median (Range)

				Breakthrough medication used over 72 h	
	NRS day 1	NRS day 2	NRS day 3	Morphine (mg)	VCD (tablets)
Case 1	0 (5–0)	0 (0–0)	0 (0–0)	0	1
Case 2	0 (6–0)	0 (3–0)	0 (2–0)	8	0
Case 3	2 (4–0)	0 (0–0)	0 (2–0)	0	2

VCD = hydrocodone bitartarate 5 mg and acetaminophen 500 mg.

a nurse on the maternity ward. The pain scores and the medication used for breakthrough pain are summarized in Table 1.

DISCUSSION

Bilateral IIIH nerve blockade has been used for pain management after cesarean deliveries. To our knowledge, use of continuous bilateral IIIH blockade for this purpose has not been reported.

The pain after cesarean delivery is often described as moderate to severe. If used as single treatment modality, morphine consumption averages 79 ± 25 mg for the first 24 h.[1] Morphine consumption was decreased to 49 ± 30 mg/24 h in the presence of IIIH blockade.[1] Even with this reduced morphine consumption, however, significant side effects such as nausea and pruritus were reported.

Anatomically, both the IIIH nerves originate from the first lumbar nerve. They share a path from the lateral border of the psoas muscle, crossing obliquely in front of the quadratus lumborum muscle to penetrate the transversus abdominis muscle near the iliac crest, and then continue between the transversus abdominis and the internal oblique muscles. More medially, they perforate the internal and external oblique muscles providing cutaneous branches to the hypogastric region, upper medial thigh, mons pubis, and labium majus.[2] Recently, McDonnell et al.[3] described the single-shot transversus abdominis plane block. By injecting 20 mL of local anesthetic in the plane between the internal oblique muscle and the transverse muscle at the triangle of Petit, they achieved reduced morphine requirements, lower pain scores and longer time to first request for morphine in 16 patients undergoing large bowel resection. The technique that we used to block the IIIH nerves uses the same plane for injection of local anesthetic and presumably results in continuous nerve blockade of the same nerves. The shortcoming of single application methods is their limited duration. After the analgesia provided by the single-shot nerve block or neuraxial morphine dissipates, patients may require significant supplemental analgesia to achieve satisfactory pain relief. Continuous infusion of local anesthetic in this setting may offer a clear advantage.

Ultrasonography has been used to improve the quality and safety of the IIIH blockade in both pediatric[4] and adult patients.[5] Instead of relying on fascial "clicks" and "pops," ultrasound offers real-time guidance and precision in needle placement. When performing an ultrasound examination of the lower abdominal region, it is important to realize that below the level of the ASIS the external oblique muscle is often present only as an aponeurosis. The usual three layers of muscles typical for the wall above the spine are therefore seen as two. Air introduced into the subcutaneous and interfascial planes with the surgical retraction may impair the ultrasound image. To avoid this phenomenon, we used an alternative approach to those described previously.[4–6] We scanned the abdominal wall above the ASIS and lateral to the linea semilunaris for the best air-free image in which the three layers of muscles were clearly distinguishable.

There are no studies demonstrating the safety of ropivacaine for nursing mothers and caution should be exercised, as with any drug administered to nursing mothers. Data derived from animal studies suggest that excretion of ropivacaine in colostrum is 4% of the dose administered to the mother.[7] In addition, ropivacaine is highly protein bound; therefore, the ropivacaine exposure of the nursing infant is likely to be significantly lower than exposure of the fetus whose mother is receiving ropivacaine epidural labor analgesia, as the placental transfer of ropivacaine is close to 100%.

In summary, we found that ultrasound-guided bilateral continuous IIIH blockade used in conjunction with oral ibuprofen resulted in satisfactory analgesia without nausea and vomiting after cesarean delivery in three cases. Prospective randomized studies are underway to evaluate the safety and effectiveness of continuous IIIH blockade for postcesarean delivery analgesia.

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