Ultrasound-guided lower thoracic erector spinæ block for postoperative analgesia in complex colorectal surgery in a pediatric patient

ABSTRACT

The erector spinæ plane (ESP) block is a relatively novel regional anesthetic technique first described in 2016. There are limited data regarding its use in pediatric surgeries although ESP blocks can likely be safely used to provide effective postoperative analgesia for major thoracic and abdominal surgeries, especially in cases where neuraxial anesthesia is contraindicated. In this report, we describe a case in which bilateral lower thoracic erector spinæ plane blocks were performed in a pediatric patient with vertebral anomalies undergoing posterior sagittal anorectoplasty and reconstruction of cloacal malformation.

Key words: Erector spinæ plane block, pediatric anesthesia, postoperative analgesia

Introduction

Complex colorectal surgeries are associated with significant postoperative pain, which has led to the development of enhanced recovery after surgery (ERAS) protocols. The mainstay for postoperative pain management in open abdominal surgery is neuraxial anesthesia; however, many patients with anorectal malformations (ARM) have associated anomalies of the spine in which neuraxial anesthesia is contraindicated. The erector spinæ plane (ESP) block is a relatively novel regional technique with limited data in pediatric surgeries. We present the case of successful use of bilateral ESP catheters for postoperative pain management in a pediatric patient undergoing extensive colorectal surgery.

Case History

The patient was a 17-month-old, 11 kg female patient with a history of the cloaca and anorectal malformation presenting for posterior sagittal anorectoplasty and reconstruction of cloacal malformation. The patient’s history was also notable for repaired tracheoesophageal fistula and vertebral anomalies. Spinal imaging was not immediately available. General anesthesia was planned for the procedure, and bilateral lower thoracic ESP catheters were planned for postoperative analgesia. As the operation required flipping the patient from supine to prone several times during the operation, catheters were placed at the end of the procedure.
to avoid accidental dislodgement. After mask induction, peripheral IV access and intubation, the patient was placed in the prone position and a midline incision extending from the coccyx to the perineal body was made to complete the posterior sagittal anorectoplasty. Subsequently, she was placed in the supine position and a laparotomy was performed via a lower midline incision. The procedure lasted approximately 7 h without any complications. She received 6.4 µg/kg IV fentanyl and 0.1 mg/kg IV morphine intraoperatively, with the last narcotic given 3 h before extubation. Additionally, a ketamine infusion of 0.1 mg/kg/h was started intraoperatively and was turned off approximately 1 h before extubation. At the completion of the surgical procedure, the patient was placed in the prone position for ESP catheter placement. Placement of the ESP catheters at the T10 level was based on the location of the abdominal incision. An 18g Tuohy needle was inserted in-plane 2 cm lateral to the spine in the craniocaudal direction and needle position was visualized contacting the tip of the T10 transverse process utilizing ultrasound [Figure 1]. A 20 g catheter was threaded through the needle and secured at a skin depth of 8 cm. The catheter was bolused with 5 mL of 0.1% ropivacaine, and the spread of local anesthetic was visualized between the erector spinae muscle and transverse process using ultrasound. The process was repeated on the right side; however, the needle and catheters were inserted in the caudocranial direction due to difficulties accessing the tip of the transverse process. The patient was then extubated and transported to the post-anesthesia care unit.

Postoperatively, the patient was started on a continuous infusion of 0.1% ropivacaine at 2 mL/h through each catheter, for a total amount of 4 mL/h (0.35 mg/kg/h). The patient was started on scheduled acetaminophen 15 mg/kg IV every 6 h and scheduled ketorolac 0.5 mg/kg every 6 h for 2 days. After 2 days, these medications were given as needed. The patient’s pain was scored using the Face, Legs, Activity, Cry, Consolability (FLACC) score. She received fentanyl 5 µg once in the immediate postoperative period for a FLACC score of 6. POD 1 FLACC scores ranged from 0 to 4 and she received one dose of diazepam 0.5 mg/kg IV. POD 2 FLACC scores ranged from 0 to 5, with one score of 8 that required no medication intervention. She received morphine 0.05 mg/kg only twice postoperatively, both times on postoperative day 3 for FLACC scores of 8. The ESP catheters remained in place for 4 days and during that time no adjustments were made to the ropivacaine infusions. They were inspected daily by our acute pain service for complications, and none were observed. The parents expressed high satisfaction levels regarding the treatment of the patient’s pain.

**Discussion**

Anorectal malformations (ARM) involve a wide spectrum of congenital anomalies involving the anus, rectum, urinary and genital tract. Approximately, 30 to 50% of ARM patients have associated sacrovertebral or neurospinal cord anomalies making neuraxial anesthesia challenging and often contraindicated. The ESP block offers a safe alternative when neuraxial anesthesia is not possible.

The ESP block is a regional technique first described in 2016 for the treatment of acute and chronic thoracolumbar pain as well as for postoperative analgesia. Although studies are limited, it is used with increasing frequency in complex pediatric abdominal surgeries. It is a paraspinal plane block that requires the placement of a local anesthetic between the erector spinae muscles and the thoracic transverse processes. Analgesia is accomplished due to the dermatomal spread of local anesthesia into the paravertebral space, providing anesthesia within several dermatomes. Although the efficacy of the block has been difficult to evaluate in young, non-verbal children, one study has suggested that 0.1 mL/kg of a local anesthetic is required for each dermatome to achieve surgical anesthesia.

The ESP block is a relatively safe block, with easily visualized sonographic landmarks, and no structures at the risk of needle injury in the immediate vicinity. Because it does not require manipulation of the spine, it may be more appropriate in patients with spinal cord abnormalities. It also allows for the insertion of an indwelling catheter allowing the prolonged duration of analgesia, as was done in our patient. We conclude that bilateral ESP blocks for major abdominal surgery are a safe and reliable alternative.
to epidurals in pediatric patients with contraindications to neuraxial anesthesia.

Key Messages
1. Erector spinae plane blocks are relatively easy to perform with relatively few complications or contraindications.
2. Continuous erector spinae plane blocks can provide postoperative pain control for complex colorectal surgery.
3. Erector spinae plane blocks can be a safe alternative to neuraxial anesthesia in pediatric patients with spinal anomalies.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient’s parents have given their consent for her images and other clinical information to be reported in the journal. The patient’s parents understand that her name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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