



Single Shot Erector Spinae Plane Block for Pediatric Surgery

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Introduction

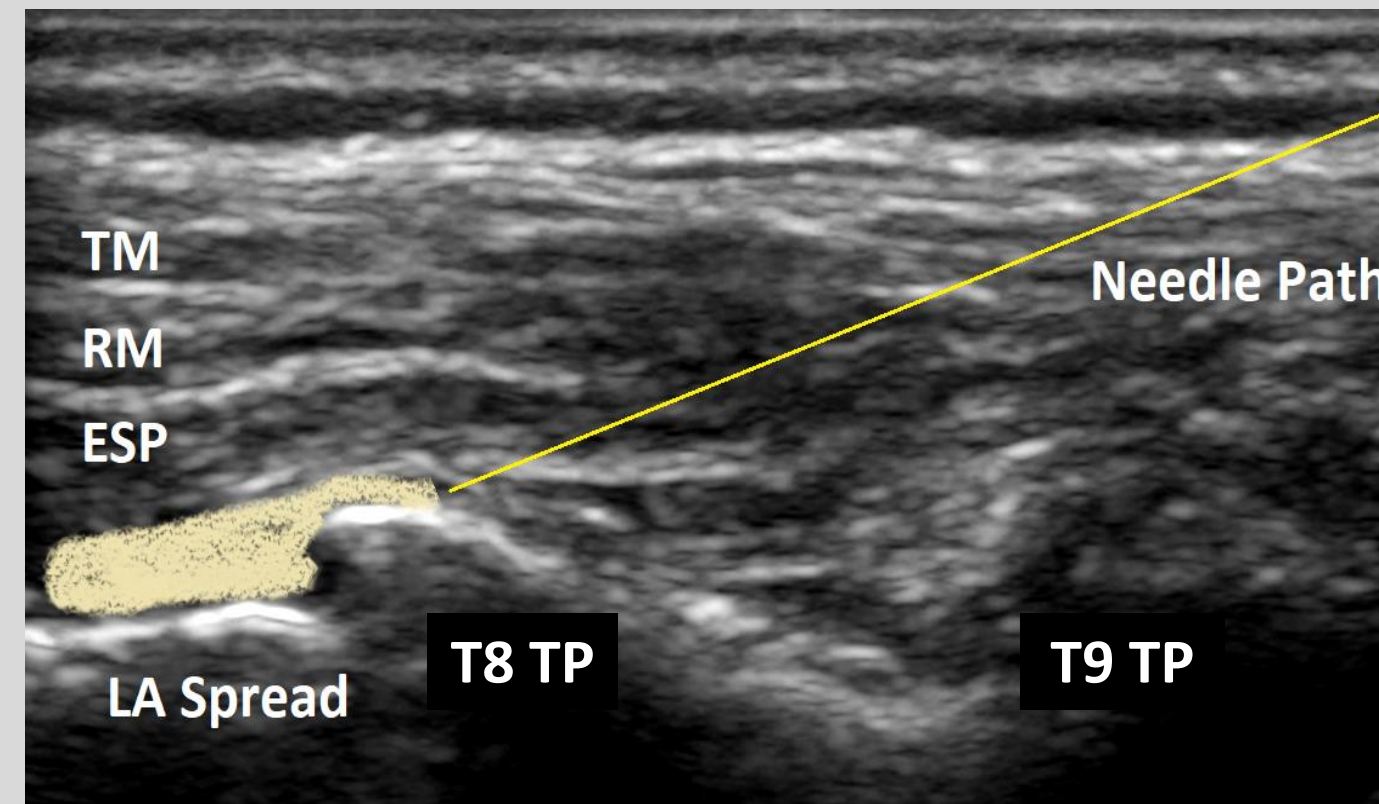
The erector spinae plane (ESP) block is an ultrasound-guided regional technique involving injection of local anesthetic deep to the erector spinae muscle at the thoracic transverse processes (Figure 1, 2). Its successful use has been described in adult thoracic and abdominal surgery in place of neuraxial or truncal blocks, but literature regarding pediatric use is limited. Here we describe our early experience with 8 cases utilizing ESP blocks for abdominal and thoracic surgery in children under 5 years of age.

Methods

Data regarding block details, hemodynamic response to incision, opioid consumption, and postoperative pain scores were collected using retrospective data from the Pediatric Regional Anesthesia Network (PRAN) database and the medical record.

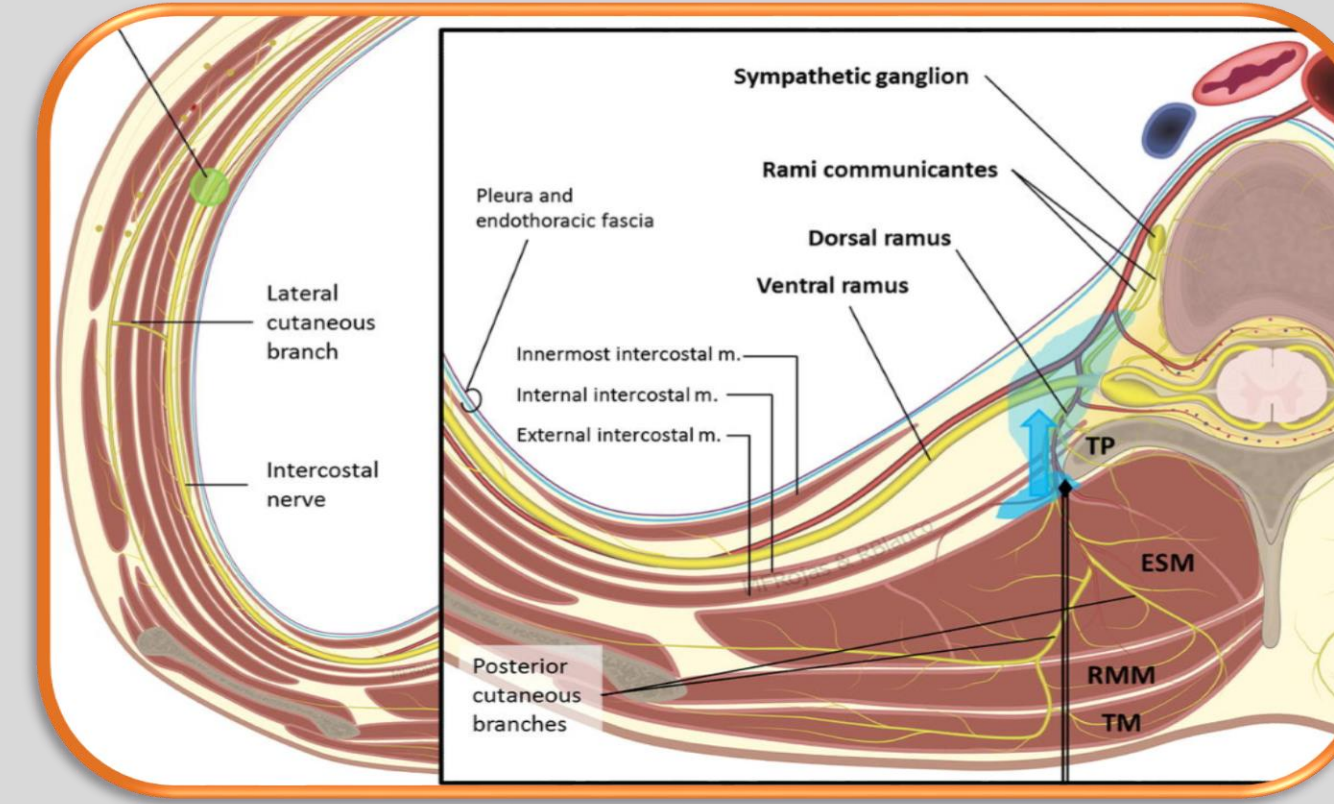
All blocks were performed under general anesthesia with the patient in lateral decubitus position, operative side up. Ultrasound images were obtained using a Sonosite L25 high-frequency transducer, and blocks were performed using a 27 gauge 3 cm hypodermic needle

Figure 1



TP – Transverse Process; ESM – Erector spinae muscle;
RM – Rhomboid muscle; TM – Trapezius Muscle
LA – local anesthetic;

Figure 2



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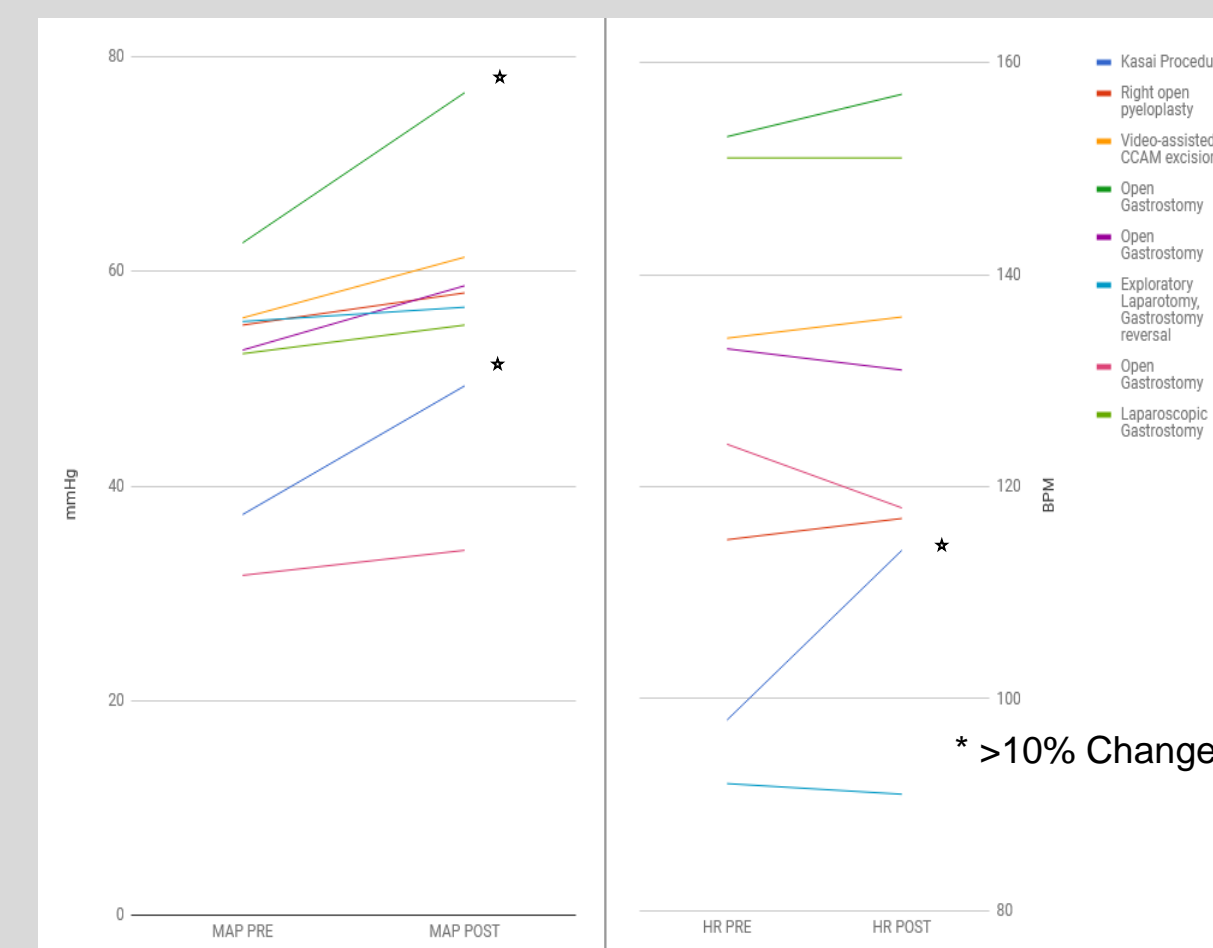
Results

8 patients age 2 months to 5 years received ESP block (Figure 3). Average block time was 6.8 +/- 1.8 min. Average local anesthetic dose was 0.47 +/- 0.13 (0.32 - 0.67) mL/kg. No opioid was given prior to incision. Only 1/8 patients demonstrated >10% change in heart rate and blood pressure following incision (Figure 4). Intraoperative opioid use was minimal and initial postoperative pain scores low. Average maximum pain score in the first four hours was 5 (2-10) and average 12-hour morphine requirement was 0.13 +/- 0.22 mg/kg (0 - 0.7). No major complications were noted.

Figure 3

	Age	Wt (kg)	Procedure	Local Anesthetic	Level	Dose (mL)	Dose/Wt (mL/kg)	Initial FLACC	Morphine Equivalent (mg/kg)	
1	2 mo	5.2	Kasai Procedure	0.25% Bupr+Epi	Right T8	3.5	0.67	0	0.10	0.70
2	2 yr	12.5	Right open pyeloplasty	0.25% Bupr+Epi	Right T12	7	0.56	8	0.00	0.10
3	8 mo	7.8	Video-assisted CCAM excision	0.25% Bupr+Epi	Left T10	3.5	0.45	0	0.03	0.10
4	9 mo	7.5	Open Gastrotomy	0.25% Bupr+Epi	Left T10	4	0.53	7	0.00	0.03
5	10 mo	6	Open Gastrotomy	0.25% Bupr+Epi	Left T8	2	0.33	0	0.05	0.00
6	5 yr	15.6	Exploratory Laparotomy	0.5% Bupr+Epi	Left T9	5	0.32	0	0.01	0.00
7	4 mo	5.6	Open Gastrotomy	0.25% Bupr+Epi	Left T9	3	0.54	1	0.00	0.05
8	11 mo	11	Laparoscopic Gastrotomy	0.25% Bupr+Epi	Left T9	4	0.35	0	0.00	0.05
						Mean	0.47 +/- 0.12	2.0 +/- 3.4	0.02 +/- 0.03	0.13 +/- 0.22

Figure 4



Discussion

ESP block in infants and children can be performed quickly, and most patients in our series had no hemodynamic response to incision, minimal opioid use, low initial postoperative pain scores, and no opioid requirement in the first postoperative hour. These data suggest that a single-shot ESP block can be effective for intraoperative analgesia in pediatric patients as small as 5 kg.

A single-shot block may not have sufficient duration of action for postoperative analgesia, as most patients had higher pain scores four hours postoperatively and eventually required morphine. A single patient undergoing Kasai procedure was the only patient to require intraoperative morphine, require more than 0.1 mg/kg of morphine postoperatively, and have hemodynamic response to incision. This suggests possible limitations of the ESP block with regard to dermatomal spread and visceral coverage, or could simply reflect block failure.

ESP block is a simple regional technique that can be used in pediatric patients for intraoperative analgesia in thoracic and abdominal surgery. Further research is needed to clarify the amount of dermatomal spread and duration of action of a single-shot block and to explore the use of continuous catheters