

Continuous Erector Spinae Plane Analgesia Covering Cervico-Thoracic and Lumbo-Sacral Dermatomes in a 19-month-old child following Excision of Severe Post Burn Contracture and Extensive Skin Grafting: Case Report

Short Title: ESP covering cervicothoraciclumbosacral dermatomes

Dr. G. Niraj, MD FRCA FFPMRCA^{1*} and Dr. Gurudatt Shenoy, MD²

¹Senior Consultant in Pain Medicine, Sri Madhusudan Sai Institute of Medical Sciences & Research, Muddenahalli, Chikkaballarpur, Karnataka, India

²Professor in Anaesthesia, Sri Madhusudan Sai Institute of Medical Sciences & Research, India

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***Corresponding author:** Dr G. Niraj, MD FRCA FFPMRCA, Senior Consultant in Pain Medicine, Sri Madhusudan Sai Institute of Medical Sciences & Research, Muddenahalli, Chikkaballarpur, Karnataka, India

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A B S T R A C T

Post-burn scar excision and split-skin grafting is known to produce severe postoperative pain and is the most distressing symptom reported by patients in the early postoperative period. Erector spinae plane block is a recently described analgesic technique. We present the effective use of continuous erector spinae plane analgesia in a nineteen-month-old child with severe post burns scarring who underwent extensive plastic surgery involving 16 dermatomes including cervico-thoracic and lumbo-sacral dermatomes. We conclude that erector spinae plane analgesia has the potential for widespread use in the pediatric population.

Keywords: Erector spinae plane analgesia; Burns; Skin grafting

Case Presentation

A nineteen-month-old male child weighing nine kilogram was admitted with severe post burn injury involving the face, chest wall, axilla and entire upper limb on the left side. There was severe post burn contracture at the axilla, elbow and fingers. The child was scheduled for excision of the contractures with split-skin grafting. The child appeared severely traumatized by the burn injury that occurred three months prior to the admission.

He was extremely anxious and distressed at the pre-anesthetic assessment.

Informed written parental consent was taken for insertion of the erector spinae plane catheters. Additional parental consent was obtained for deidentified data including photographs to be used for publication in a peer reviewed journal.

The child underwent general anesthesia and the trachea was intubated. Anesthesia was maintained with oxygen, nitrous

oxide and isoflurane. Muscle relaxation was maintained with atracurium. Intraoperative analgesia included intravenous fentanyl (3 microgram/kg), intravenous paracetamol (15 mg/kg) and per-rectal diclofenac (25 mg). The child underwent extensive excision of the contracture involving the left chest wall, axilla, arm and fingers. Skin graft was taken from the left thigh circumferentially and posterior aspect of the leg (**Figure 1**). A total of 16 dermatomes were involved that included cervical C4 to thoracic T4 (upper limb and chest wall) and lumbar L2 - sacral S3 (lower limb).



Figure 1: Image A shows the extent of post burn injury affecting the left chest wall, axilla and upper limb on day 18 following surgery. Image B shows the split skin graft donor sites in the left lower limb. Image C shows the two subcutaneously tunneled erector spinae catheters at thoracic T2 and lumbar L2 levels

On completion of the surgical procedure, the child was positioned prone and two erector spinae plane (ESP) catheters were sited under real-time ultrasound guidance¹. The first catheter was inserted at T2 level in the caudo-cranial direction using an 18-gauge Tuohy needle and 5 cm of a 20-gauge catheter (Perifix® Complete Set, B. Braun SE, Carl-Braun-Straße 1, 34212 Melsungen, Hessen, Germany) was inserted in the plane after saline hydrodissection¹. The second catheter was placed at lumbar L2 level in a cranio-caudad direction and 5 cm of the catheter was placed in the plane. Both catheters were subcutaneously tunneled and secured (**Figure 1**). A mixture of bupivacaine (25 mg), dexamethasone (1 mg) and dexmedetomidine (3 microgram/kg) diluted to 20 mL was equally divided and injected into each catheter. Postoperative analgesia was maintained with 8 hourly top-ups (10 mg bupivacaine diluted to 10 ml per catheter) and regular acetaminophen (20 mg/kg). Rescue analgesia included intravenous tramadol and per rectal diclofenac.

The ESP catheters were topped-up for four days postoperatively. The child remained comfortable during the postoperative period requiring just one dose each of intravenous tramadol (2 mg/kg) and per-rectal diclofenac (25 mg) on the first day. Breakthrough pain was caused by a delay in topping-up the ESP catheters. The catheters were left in-situ and were used to

provide analgesia on day 7 following further debridement and change of dressing. The catheters were removed on day 9. The child had an uneventful recovery and was discharged on day 18. There was no complication related to prolonged ESP catheter placement.

Discussion

The authors present the first case of continuous ESP analgesia covering concomitant cervico-thoracic and lumbosacral dermatomes in a paediatric patient following extensive plastic surgery. ESP analgesia has been reported for thoracic, abdominal and lower limb surgeries in children covering thoracic T1-lumbar L4 dermatomes^{1,2}. However, to the best of our knowledge, this is the first report where ESP analgesia was used to provide widespread analgesic cover for nociceptive pain arising from 16 dermatomes including cervical, thoracic, lumbar and sacral dermatomes. Local anaesthetic deposition in the ESP plane produces analgesia by blocking the paravertebral nerves³. The sympathetic block and vasodilatation observed following ESP block could be beneficial in enhancing healing post skin grafting⁴. In addition, the technique has an excellent safety profile^{4,2,3,5}.

Split-skin grafting is known to produce severe postoperative pain and donor site pain is one of the most distressing symptoms reported by patients in the early postoperative period⁶. Postoperative analgesic techniques recommended include continuous subcutaneous infusion of local anaesthesia (CSLA), subcutaneous local anaesthetic injections, topical application of local anaesthetic (LA) medication in wound dressing and pharmacological medications⁷. Subcutaneous LA injections, CSLA or topical LA applications were not feasible options for this child. As postoperative pain after split-skin grafting is primarily nociceptive in nature, pharmacological agents including opioids have poor efficacy. In a child with extensive surgical trauma, postoperative analgesia would have been a challenge especially considering the severe psychological impact from the burn injury.

The authors are aware of the major limitations of anecdotal reports. We did not perform formal paediatric pain assessments. The child was severely traumatized and extremely anxious. On the preoperative ward, the child was observed to be prone to uncontrollable crying during any examination that produced pain. During the first 72 hours, the child had only one episode of uncontrollable crying that coincided with delay in topping up the ESP catheters.

We conclude that continuous erector spinae plane analgesia has the potential for widespread use in the paediatric population.

Disclosures

No conflicts of interest declared

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