Bilateral Continuous Erector Spinae Plane Blocks for Median Sternotomy in a Pediatric Cardiac Patient

Jocelyn Y. Wong; RJ Ramamurthi MD; Katsuhide Maeda, MD; Gail Boltz, MD; Manchula Navaratnam, MD; Ban C.H. Tsui, MD
Department of Anesthesiology, Perioperative, and Pain Medicine, Lucile Packard Children's Hospital

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Introduction

Adequate pain control for cardiac patients after sternotomy can be challenging to achieve as the potential need for systemic anticoagulation on cardiopulmonary bypass (CPB) limits the use of regional anesthesia with neuraxial techniques [1-4]. We present a case of an adolescent boy who had excellent post-operative pain control after cardiac surgery via sternotomy, using erector spinae plane (ESP) blocks.

Material and Methods

Anatomic landmarks were identified using the Sonosite X-Porte ultrasound machine with a 13-6 MHz linear probe. The catheter-over-needle technique (E-Cath, Pajunk, Germany) was used for continuous nerve block catheter placement. Patient informed consent was obtained for submission of a case report.

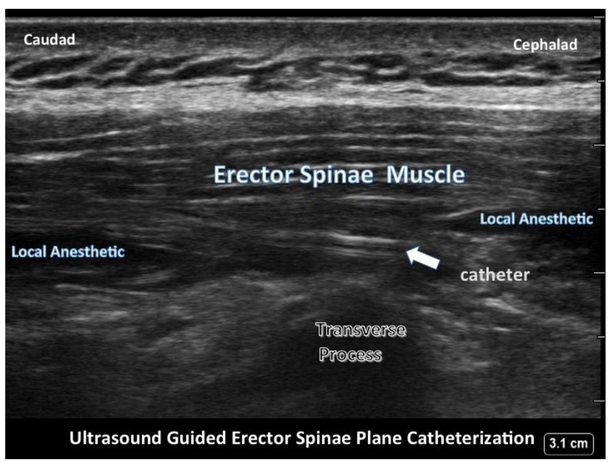

Figure 2: Ultrasound Image of Right Sided Erector Spinae Plane Block with Spread after Local Anesthetic Injection

Case Report

A 17-year-old, 76.5kg male with history of cardiac arrest from catecholaminergic polymorphic ventricular tachycardia, was found to have a complete myocardial bridge with significant dynamic stress induced ischemia of his left anterior descending coronary artery. He was scheduled for resection of the myocardial bridge and placement of an AICD with standby CPB. His history of sympathetically mediated malignant arrhythmias necessitated optimal post-operative pain control, prompting the consideration for bilateral ESP blocks.

The patient underwent IV placement and induction of general endotracheal anesthesia. After placement of invasive monitoring lines, the patient was positioned in right lateral decubitus. Under ultrasound visualization, the erector spinae muscle was identified lateral to the midline, at the tip of T7 transverse process. Using a catheter-over-needle assembly, the plane deep to the erector spinae muscle was hydro-dissected with saline prior to advancement of the catheters on both sides. The catheters were secured (Figure 1) and 10mL of 0.5% ropivacaine was delivered to each catheter with cephalad and caudad spread noted on ultrasound (Figure 2). The patient was repositioned supine for his procedure. Intraoperative analgesics included: 1050 mcg fentanyl, 1 – 2 mcg/kg/hr fentanyl infusion and 0.25 - 0.5 mcg/kg/hr dexmedetomidine infusion.

Post-operatively, he was transferred intubated to ICU. He was started on intermittent, alternating, catheter boluses of 10mL 0.1% ropivacaine every 60 minutes, PCA of hydromorphone, and standing acetaminophen. He was extubated within 3 hours of ICU admission and was started on a regular diet. He transferred to the floor on POD 0. His pain score was 0/10 for the first 24 hours. He did not utilize his PCA. On POD 1, his pain scores were 0-3 with ambulation, requiring a total of 5mg oxycodone. Throughout the next 48 hours, his pain scores were mostly 0. His catheters continued until his mediastinal chest tube was removed on POD 3 and he was successfully transitioned to oral analgesics.

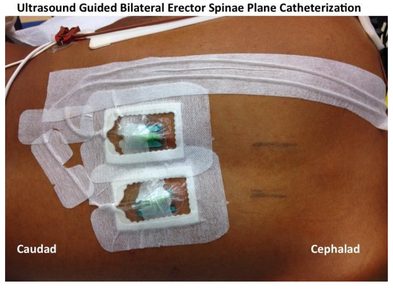

Figure 1: Stabilization of Ultrasound Guided Bilateral Erector Spinae Plane Block Catheters

Discussion

This is the first case to demonstrate excellent pain control for median sternotomy with placement of continuous bilateral ESP blocks for a pediatric patient undergoing cardiac surgery. While neuraxial anesthesia techniques are effective for sternotomy pain, many cardiac surgeries require CPB and systemic anticoagulation, thus increasing the neuraxial bleeding risk. The erector spinae plane block is a relatively superficial regional block with theoretically much lower bleeding risks than a neuraxial block [5]. While our case did not require CPB, this case demonstrated future potential applications for ESP blocks in cardiac surgeries requiring systemic anticoagulation and CPB.

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Conflicts of Interest

Conflict of Interest disclosure: BCH Tsui is a co-inventor of the peripheral nerve catheter used in this case.