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MANAGING PERIOPERATIVE PAIN FOR A NEWBORN UNDERGOING STERNAL CLEFT REPAIR

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Description:

Sternal cleft is a rare congenital defect characterized by mediastinal viscera protected only by skin and muscle. Associated birth defects, including cardiac disease, are common(1). Surgical repair is often achieved shortly after birth, when the sternum and ribs are cartilaginous. Optimal methods of postoperative pain management remain unknown. Adequate postoperative analgesia may be challenging to achieve in neonates given their unique anatomical and pharmacological considerations.

We present the use of a single shot transversus thoracis muscle plane (TTP) block to manage perioperative pain during a sternal cleft repair in a newborn.

A one-day old girl presented with an extensive superior partial sternal cleft and otherwise unremarkable perinatal history. Postnatal echocardiography suggested persistent increased pulmonary resistance with no cardiac anomalies.

Preoperatively, the patient was hemodynamically stable with normal saturation in room air. She was induced with propofol, rocuronium, ketamine and fentanyl intravenously. Anesthesia was maintained with sevoflurane in air. In addition to Canadian Anesthesiologist's Society standard monitors, blood pressure was measured invasively. The mean arterial blood pressure was targeted at 45-55 mmHg with epinephrine infusion.

Before surgical incision, a bilateral ultrasound guided TTP block was performed. 0.4 mL/kg of 0.2% ropivacaine was injected per side between the internal intercostal muscle and transversus thoracis muscle. The needle was introduced in-plane, with a lateral to medial direction, at the level of the 3rd or 4th intercostal space(2). Possible complications, including vascular injury of mammary vessels, pneumothorax and local anesthetic toxicity(2) were not observed. No additional analgesics were required intraoperatively.

Closure of the hemi-sternums occurred without hemodynamic disturbance. The patient was extubated in the operating room, requiring no postoperative oxygen or ventilatory support.

Four hours after surgery, the patient received one 30mcg/kg dose of intravenous morphine, in addition to regular acetaminophen for the first 48 postoperative hours. She was discharged on day five of life without further complication.

Discussion:

Sternal cleft repair is surgically similar to median sternotomy closure. Systemic opioids and thoracic epidural have been previously employed to manage postoperative pain(1). Systemic opioids carry

high risk of respiratory depression and prolonged mechanical ventilation in newborns. Meanwhile, thoracic epidural is technically challenging in neonates. Epidurals are associated with infection, misplaced catheter and failure in up to 13% of children(3).

Conversely, peripheral blocks have a six-fold lower complication rate than central blocks in children(4).

The TTP block has been utilized for postoperative analgesia in anterior chest wall procedures including thoracotomy, breast surgery and median sternotomy(2). Complication rates following TTP block remains unknown. Single shot analgesia of 0.25 mL/kg/side can last for 24 hours in pediatric populations(2). The TTP has been reported only in older children to date, but it appears a feasible and safe regional technique for newborns undergoing sternal cleft repair.

References

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