A Novel Combination for 7-Month-Old Infant Undergoing Cardiac Surgery: Pectointercostal Fascial Plane Block and Rectointercostal Fascial Plane Block

To the Editor

Our group recently published a case series detailing our experience with a novel regional anesthesia strategy for adults undergoing cardiac surgery,[1] and would like to comment on its application in children. Pediatric cardiac surgery is common, and effective pain management is one of the primary reasons for using regional anesthesia in pediatric patients. Children often experience pain differently from adults, and untreated pain can lead to both immediate and long-term negative effects. Regional anesthesia provides targeted pain relief, reducing the need for systemic opioids, which can have undesirable side effects like respiratory depression and nausea. When having open heart surgery on the midsternum, pediatric patients may have severe postoperative pain with inadequate analgesics. For pediatric patients, effective pain management is essential since excruciating pain can have disastrous side effects such as pulmonary hypertensive crisis, tachyarrhythmia, hypoxia, and morbidity.[2,3] The causes of pain are the median sternotomy and epigastric tubes.[4] Pectointercostal fascial plane block (PIFPB) is a parasternal block that provides sternal analgesia. Parasternal blocks are used for the analgesia of median sternotomy; however, the coverage of these blocks is down to T6. A novel block, the rectointercostal fascial plane block (RIPB), has recently been described for analgesia in this region.[4] Although there are case reports indicating that the combination of "PIFPB and RIFPB" provides effective analgesia in cardiac surgery,[1,5,6] there is no article yet on its use in the pediatric patient group. In this report, we would like to present our successful postoperative analgesia management with the "PIFPB and RIFPB" Medipol combination in our 7-month-old patient who underwent open heart surgery. Written informed consent was obtained from the patient's parents for this case report.

A 7-month-old, 7200-g female pediatric patient underwent tetralogy of Fallot repair, pulmonary valve valvotomy, and left pulmonary artery stenosis surgeries with median sternotomy. There were no complications during the surgery, and the surgery lasted 5 hours. One chest drain was placed in the right pleura, and one chest drain was placed in the epigastrium. The sternum was wired closed. Pace wires were placed in the subxiphoid (Figure A). We planned to perform a Medipol combination for postoperative analgesia management. The procedure was performed in the supine position before the patient was extubated. We used a high-frequency linear transducer and a 50-mm needle for the blocks. We performed the combination bilaterally under aseptic conditions, as described previously.[1] For PIFPB, the transducer was parasagittally placed just near the sternum at the level of the third to fourth ribs. The pectoralis major muscle (PMm), ribs, and pleura were visualized. The needle was inserted between the rib and PMm. After the needle touched the bone, 1 mL of isotonic saline was injected for confirmation. Then, 2.5 mL 0.25% bupivacaine was administered here (Figure B). For RIFPB; the rectus muscle (RM) was visualized at the level of the umbilicus and followed cranially. The point where RM attaches to the costal cartilage in the epigastrium was visualized. The needle was directed between RM and costal cartilage. One mL of isotonic saline was injected for confirmation. Then, 1 mL of 0.25% bupivacaine was administered here. The combination was performed bilaterally. We performed bupivacaine 1 mL/kg for the blocks (2.5 mL for each PIFPB, 1 mL for each RIFPB; total 7 mL). As a part of the multimodal analgesia protocol, we administered 15 mg/kg IV paracetamol at the end of the surgery. After the block procedure, the patient was transferred to the cardiovascular surgery intensive care unit and intubated. Paracetamol 15 mg/kg IV per 8 hours

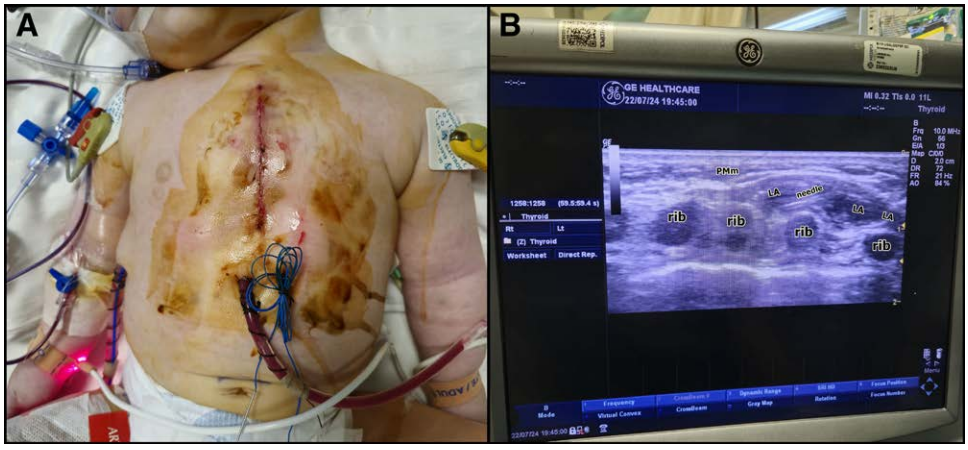

Figure. The image of the surgical incision and local anesthetic spread during the block. A, Showing the surgical area. Median sternotomy incision and thoracic drains are seen. B, The sonoanatomy of pectointercostal fascial plane block and spread of local anesthetic are seen. LA indicates local anesthetic, PMm; pectoralis major muscle.

was ordered for postoperative routine analgesia protocol. We evaluated the pain with the Face, Leg, Activity, Cry, and Consolability Revised (FLACC-R) score. We planned to perform tramadol 1 mg/kg IV as rescue analgesia if FLACC-R scores were greater than 2. The patient was extubated at the postoperative fourth hour, and there were no complications during the follow-up period. There was no need for additional rescue analgesics during the postoperative 48 hours due to the FLACC-R pain scores being <2.

The PIFB is an ultrasound-guided regional anesthesia technique targeting the fascial plane between the pectoralis major muscle and the intercostal muscles.[1] This block is used primarily for analgesia in thoracic procedures. The mechanism involves the injection of local anesthetic into this fascial plane, which diffuses and blocks the lateral and anterior cutaneous branches of the intercostal nerves. By doing so, it provides effective pain relief by numbing the sensory nerves that innervate the chest wall, leading to reduced postoperative pain and opioid requirements. The RIFB is a novel fascial plane block technique that targets the fascial plane between the rectus abdominis muscle and the costal cartilage. This block is particularly useful for providing analgesia in upper abdominal surgeries, including procedures involving the epigastric region. During the block, local anesthetic is injected into the fascial plane, where it spreads to block the anterior and lateral branches of the thoracoabdominal nerves. This results in effective pain control by numbing the nerves that supply sensation to the anterior and lateral abdominal wall. The RIFPB may be used both as a supplementary block for the thorax and as a stand-alone block for the upper abdomen.[1,4] There are also case reports in the literature reporting that the combination of these 2 blocks is used for anesthesia management during awake surgeries.[5,6] We use the Medipol combination for postoperative analgesia in patients who underwent cardiac surgery with median sternotomy and epigastric drain placement.[1] According to our experiences in this case, it may also be used effectively in pediatric patients.

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DOI: 10.1213/XAA.0000000000001853
A&A Practice. 2024;18:e01853.