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Intertransverse Process Block in Coronary Bypass Surgery: A Two-Case Report

Mustafa Aydemir¹

¹ Konya City Hospital, Anesthesiology and Reanimation Clinic, Konya, Türkiye

Case Report

Abstract

Severe postoperative pain following coronary artery bypass grafting (CABG) performed via median sternotomy can adversely affect early mobilization, respiratory function, and overall recovery. Therefore, achieving effective analgesia is of paramount importance to prevent postoperative complications and enhance patient comfort. In recent years, regional anesthesia techniques have become an integral component of multimodal analgesia protocols due to their potential to reduce opioid consumption and improve analgesic efficacy. In this case series, bilateral intertransverse process block (ITPB) was performed under ultrasound guidance prior to surgery in two patients scheduled for elective CABG. Following the block, both patients were observed to have low pain scores, minimal opioid consumption, and no requirement for rescue analgesia throughout the postoperative period. No complications were encountered, and both patients were mobilized early with high-quality recovery scores. These cases demonstrate that ITPB may be a safe, feasible, and effective method for managing acute postoperative pain following median sternotomy. Particularly in patients where more invasive techniques such as thoracic epidural block are contraindicated or technically challenging, ITPB may serve as a strong alternative. In this context, ITPB should be considered more routinely in postoperative analgesia protocols for cardiac surgery.

Keywords:

Intertransverse process block,
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Introduction

Following CABG surgeries performed via median sternotomy, significant postoperative pain is frequently observed due to factors such as soft tissue dissection, bony trauma, sternal retraction, and thoracic drains [1]. Inadequate analgesia may lead to serious consequences, including pulmonary complications, delayed mobilization, development of chronic pain, and prolonged intensive care unit (ICU) or hospital stays [2]. Although systemic analgesics remain the mainstay of treatment, regional anesthesia techniques are increasingly integrated into multimodal analgesia protocols to minimize opioid-related side effects and enhance recovery [3].

ITPB has recently emerged as a novel regional anesthesia technique. Injection of local anesthetic into the fascial plane posterior to the superior costotransverse ligament (SCTL) allows spread to the paravertebral and retrolaminar spaces,

*Corresponding:

E-mail address: drmustafaaydemir02@gmail.com

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providing both somatic and visceral analgesia [4]. This case series presents the application of bilateral ITPB in two patients undergoing elective CABG surgery.

Case Report

Two male patients, aged 58 and 63 years, diagnosed with ischemic heart disease, were scheduled for elective CABG. Both patients had no comorbidities other than ischemic heart disease. They did not suffer from any chronic pain.

After standard monitoring, including electrocardiography (ECG), noninvasive blood pressure, and peripheral oxygen saturation (SpO₂), was initiated, the patients received sedoanalgesia with intravenous midazolam (1 mg) and fentanyl (50 µg). Subsequently, they were placed in the prone position for bilateral ITPB application.

The L13-3 high-frequency linear probe was used at a frequency of 10.0 MHz, which is within the optimal operating range for this transducer (Mindray DC-60 Exp). A scan was performed at the level of the T4 spinous process. The probe was then moved laterally until the SCTL, located approximately 2 cm lateral to the midline along with the transverse processes and pleura, was clearly visualized (Figure 1). Under in-plane ultrasound guidance, the block needle was advanced in a caudocephalad direction and stopped just short of the cranial border of the fourth rib. After confirming correct needle placement via hydrodissection, 20 mL of 0.25% bupivacaine was bilaterally injected without penetrating the SCTL. The spread of local anesthetic was visualized in real time using ultrasound.

General anesthesia was induced intravenously using midazolam (0.05 mg/kg), fentanyl (3 µg/kg), thiopental (5 mg/kg), and vecuronium (0.1 mg/kg). Anesthesia was maintained with sevoflurane. Both patients received a continuous remifentanyl infusion at a rate of 0.1 µg/kg/min throughout the procedure. No analgesics were administered at the end of surgery for postoperative pain management. Upon uneventful completion of surgery, the patients were transferred to the intensive care unit while still intubated.

In the postoperative period, a morphine-based patient-controlled analgesia (PCA) device was administered to both patients for pain control. Pain scores were recorded using the Numeric Rating Scale (NRS) at 0, 6, 12, and 24 hours after extubation, along with PCA usage data. Intravenous tramadol 100 mg was planned as rescue analgesia in cases where NRS exceeded 4.

In the first patient, pain scores assessed using NRS were consistently 1 at all time points. In the second patient, the initial pain score was 5, followed by scores of 2 at subsequent visits. Regarding PCA use, the first patient received 3 mg of morphine at 6 hours, 7 mg at 12 hours, and a total of 12 mg at 24 hours. The second patient received 5 mg at 6 hours, 10 mg at 12 hours, totaling 18 mg at 24 hours. No rescue analgesia was required for the first patient; however, the second patient received 100 mg of intravenous tramadol once during the initial visit. No respiratory depression, nausea, or vomiting was observed in either patient. Quality of recovery, as assessed by the Quality of Recovery-15 (QoR-15) score at 24 hours, was 125 and 123 for the first and second patients, respectively, both considered to represent moderate recovery. The patients were mobilized on postoperative day 1 with low pain scores.

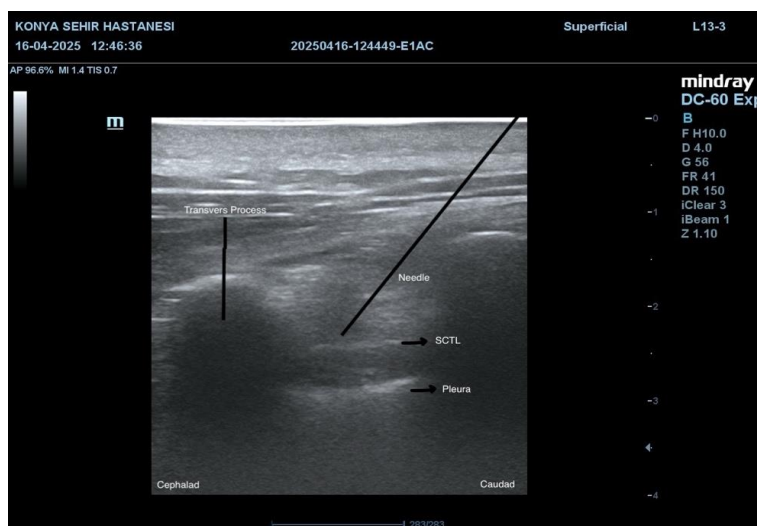


Figure 1. Ultrasonographic image of the transverse processes, SCTL, and pleura at the T4–T5 level.

Discussion

Recent advances in fascial plane blocks have heightened interest in comparing ITPB with more established techniques such as the erector spinae plane block (ESPB), thoracic paravertebral block (TPVB), and thoracic epidural analgesia (TEA), particularly in the context of postoperative analgesia following cardiac surgery.

In the present case, ultrasound-guided bilateral ITPB provided effective postoperative analgesia following median sternotomy. The outcomes—characterized by low opioid consumption, high patient satisfaction, and early mobilization—are consistent with existing reports suggesting that ITPB facilitates the spread of local anesthetic to the paravertebral and potentially the epidural spaces [3].

When compared with ESPB, ITPB is thought to offer more reliable spread to the dorsal rami and paravertebral space, primarily due to its proximity to the SCTL. This may result in more effective anterior thoracic analgesia [4]. A cadaveric study has demonstrated that local anesthetic spread with ITPB more consistently blocks both the dorsal and ventral rami [5].

Relative to TPVB, ITPB offers similar anterior rami coverage but is technically simpler and carries a more favorable safety profile. TPVB requires needle placement in close proximity to the pleura, which increases the risk of bleeding or pneumothorax, particularly in patients on anticoagulant therapy [6]. In contrast, ITPB is performed posterior to the SCTL, away from the pleura, allowing for paravertebral spread via an interligamentous route and minimizing the risk of pleural puncture [3].

Although TEA is considered the gold standard in thoracic surgery due to its ability to achieve dense bilateral blockade, ITPB offers a safer alternative. TEA is contraindicated in patients with coagulopathy and carries notable risks such as hypotension, urinary retention, and epidural hematoma formation [7].

Given the frequent presence of anticoagulation and sternal instability in cardiac surgery patients, ITPB may be viewed as a safer and equally effective alternative to both TPVB and TEA. While ESPB is widely used due to its technical ease, ITPB may provide superior analgesia for median sternotomy pain by achieving more direct spread to relevant nerves. Compared to thoracic epidural blocks, ITPB has a lower complication profile including reduced risks of hypotension, urinary retention, and technical failure and can be safely administered in awake patients. Furthermore, it confers the benefits of preemptive analgesia, making it a valuable option in patients with contraindications to epidural anesthesia, such as those with coagulopathy or spinal deformities.

Conclusion

ITPB appears to be a promising regional anesthesia technique for providing effective postoperative analgesia following median sternotomy. In this case, bilateral ultrasound-guided ITPB resulted in adequate pain control, reduced opioid requirements, and facilitated early mobilization. Compared to traditional techniques such as TEA, TPVB, and ESPB, ITPB offers several advantages, including a favorable safety profile, ease of application, and reliable spread to both dorsal and ventral rami. Particularly in cardiac surgery patients who often present with anticoagulation or spinal contraindications, ITPB may serve as a safer and efficacious alternative.

However, due to the limited number of cases, the findings presented here cannot be generalized to broader patient populations and should be interpreted with caution. Further randomized controlled trials are warranted to validate its comparative efficacy and long-term outcomes.

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Ethics

Informed Consent

Written informed consent was obtained from both patients for publication of this case report, including the use of anonymized clinical data and images.

Author Contributions

The author is solely responsible for the conception, design, data acquisition, analysis, interpretation, and drafting of the manuscript.

Declaration of Interests

The author declares no conflicts of interest.

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