



Letter to the Editor

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Corresponding author:

Lígia S. Vieira, M.D.

Department of Anesthesiology, Tondela-Viseu Hospital Center, King Dom Duarte Avenue, 3504-509, Viseu, Portugal

Tel: +351-925472061

Email: 8503@hstviseu.min-saude.pt

ORCID: <https://orcid.org/0000-0003-2264-2795>



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The novel continuous bilateral parascapular sub-iliocostalis plane block for thoracic spinal surgery

Carlos Rodrigues Almeida, Lígia S. Vieira, Emília M. Francisco, Pedro F. Antunes

Department of Anesthesiology, Tondela-Viseu Hospital Center, Viseu, Portugal

During major thoracic spinal surgery, available regional anesthetic techniques may impinge on the surgical site [1,2] and interfere with postoperative neurological evaluation [1,2]. With this letter, we aim to propose the use of the continuous bilateral parascapular sub-iliocostalis plane (PSIP) block, which has been recently evaluated for posterior rib fractures [3], for thoracic spinal surgery given its safer profile [4]. The patient authorized the publication of this letter with anonymized details. The study was conducted in accordance with the 2013 Helsinki Declaration.

A 25-year-old male with no past medical history presented with thoracic vertebral fractures (spinous processes and laminae of T5 and T6) caused by a motorcycle crash. He was 179 cm tall and weighed 73 kg. He underwent percutaneous transpedicular fixation of the thoracic spine (from T4 to T7) (Fig. 1A) in the prone position under general anesthesia. The intraoperative period was uneventful. Since postoperative pain was anticipated, multimodal intravenous (IV) analgesia (paracetamol 1,000 mg, metamizole 1,000 mg, parecoxib 40 mg, tramadol 150 mg, and morphine 6 mg) was administered 30–45 min before emergence from anesthesia. Nevertheless, in the post-anesthesia care unit, his pain was 9/10 on the numeric pain rating scale [NPRS] despite the administration of rescue analgesia (total of 10 mg of IV morphine boluses). In this context, contralateral decubitus PSIP blocks were performed. A high-frequency linear ultrasound probe (Acuson P300[®]; Siemens[®], Germany) was placed in a parasagittal plane orientation 2 cm from the medial scapular border at the level of the edge of the scapular spine (fourth rib level) under sterile conditions. From the superficial to deep muscular layers, the trapezius, rhomboid major, iliocostalis, and intercostal muscles were visualized (Figs. 1B and 1C). A sonovisible 100 mm 18 G needle (SonoLong Echo NanoLine[®]; Pajunk[®], Germany) was inserted in a caudal-to-cranial orientation using the in-plane technique and advanced in the iliocostal-intercostal plane to the vicinity of the fourth rib. The needle location was confirmed using a 2 ml saline solution, after which 25 ml of 0.375% ropivacaine (Kabi-Fresenius[®], Portugal) was administered. A catheter was then inserted 6 cm beyond the needle tip and tunneled under the skin. Fifteen minutes after the local anesthetic (LA) was administered, the patient reported 2/10 pain on the NPRS. The techniques were performed laterally to the surgical dressing/drapes. The patient did not report any sensory or motor changes after receiving the blocks. The analgesic protocol consisted of 0.2% ropivacaine (20 ml boluses) administered through each PSIP catheter every 6 h, and IV paracetamol (1 g every 8 h), IV metamizole (1 g every 12 h), IV parecoxib (40 mg every 12 h), and IV tramadol (100 mg every 8 h), with IV morphine (3 mg every 6 h) prescribed for rescue analgesia. The patient was discharged to the intermediate care unit in the same day, where significant pain control was maintained (NPRS 1–2/10 at rest and 1–3/10 during movement) and no rescue analgesia was necessary. The patient did not report any ther-

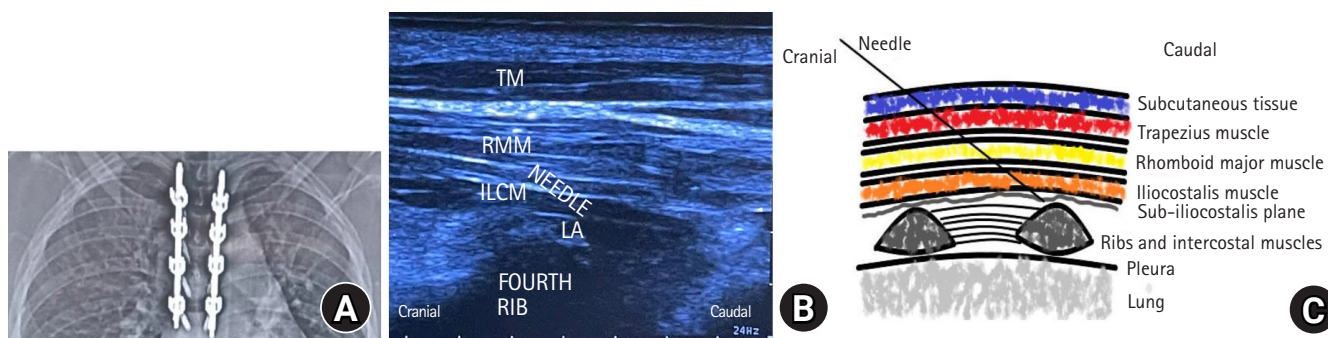


Fig. 1. Presentation of patient's post-operative X-ray and description of the parascapular sub-iliocostalis plane (PSIP) block (ultrasound image and schematic representation). (A) Postoperative X-ray showing a transpedicular T4 to T7 transpedicular spine fixation. (B) Description of the PSIP block. With the patient in the left lateral decubitus position, a high-frequency linear ultrasound probe is placed at a parasagittal orientation 2 cm from the medial scapular border at the level of the edge of the scapular spine (fourth rib level). The ultrasound depth is 3 cm. The PSIP block relies on the identification of the lateral border of the iliocostalis muscle (ILCM). To avoid confusion with the other muscles (such as the longissimus, rhomboid, or posterior-superior serratus muscle), the injection is performed medial to this border. The tendinous insertion of the ILCM at the rib is in the superolateral direction (it should not be confused with the insertion of the levatores costarum muscles, whose insertion is in the inferior-lateral direction). We chose to perform the PSIP block at the T4 level to take advantage of the gravity effect when the patient is in a sitting position or during ambulation. No significant lateral spread was seen to the lateral border of the ILCM. (C) A schematic representation of the relevant anatomy for a PSIP block. The injection is performed superficially to rib in the sub-iliocostalis plane. At the upper levels, the serratus posterior-superior muscle may be observed below the rhomboid major or rhomboid minor muscles. Of note, at the thoracic level, the iliocostalis dorsi muscle does not have any insertion site at any component of vertebrae in opposition to the longissimus dorsi or spinalis dorsi muscles. TM: trapezius muscle, RMM: rhomboid major muscle, LA: local anesthetic.

mal changes or any other sensitive alterations and did not require supplemental analgesia. On postoperative day 1, the patient was able to start ambulating. During this period, no complications related to the PSIP block were reported. After three days, the patient was transferred to the general ward, where systemic analgesia was maintained. On postoperative day 3, the PSIP catheters were removed, after which the pain rating increased to 4/10 with movement and 3/10 at rest (NPRS) for the next 3 days.

The posterior components of the vertebrae, namely the laminae and pedicles, to a large extent, are innervated by the branches of the posterior rami of the spinal nerves [1,2,5]. Safe regional analgesia depends on the ability to block these branches and minimize the impact on the ventral rami of the spinal nerves [5]. The most commonly implemented techniques for thoracic spinal surgery to date are epidural analgesia or intrathecal morphine, but these may be associated with significant adverse effects [1]. In the last decade, retrolaminar blocks, erector spinae plane (ESP) blocks, and different types of paraspinal intra-fascial blocks have been evaluated for lumbar spinal surgery [3]. While ESP blocks may theoretically provide good quality analgesia at the thoracic level, they may also cause several undesirable effects. These effects, which include weakness of the chest wall and risk of falls during ambulation, are particularly evident during bilateral techniques (such as a central sympathetic blockade) since thoracic ESP blocks may spread easily toward the paravertebral space through the costovertebral foramina [5]. Notably, a frequent concern with lami-

nectomies or trauma patients is the disruption of the epidural space. This means that the risk of spreading large volumes of anesthetics into the paravertebral space and epidural space may outweigh the benefits of ESP blocks during thoracic spinal surgery [2]. Thoracolumbar or paraspinal inter-fascial plane blocks have only been assessed for lumbar spinal surgery. Since their primary target is specific to the dorsal spinal ramus and its branches, they may be safer than ESP blocks; however, they are still performed in close proximity to the retrolaminar plane adjacent to the surgical site [2].

During a PSIP block, the LA will primarily spread medially, because the costal insertions of the iliocostalis muscle, which is often a barrier for the dispersion of rhomboid intercostal block, will limit the lateral dispersion of the LA [4]. We propose the use of bilateral PSIP blocks for patients with thoracic vertebral fractures or those undergoing thoracic spinal surgery for the following reasons: it does not compete with the surgical site; the risk of involving the anterior rami of the spinal nerves is dramatically reduced (leading to less of a motor and/or sensation block); the risk of masking epidural hematoma symptoms is lowered; and it allows for rapid ambulation post-operation, reducing the risk of falls compared to the thoracic ESP block. Additionally, compared to other regional analgesia techniques, it is associated with less of a sympathetic block, fewer epidural-like effects, and less thoracic wall weakness [3]. However, anatomical studies are needed to prove confirm its advantages and clinical applicability.

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Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

Author Contributions

Carlos Rodrigues Almeida (Conceptualization; Formal analysis; Investigation; Methodology; Writing – original draft; Writing – review & editing)

Lígia S. Vieira (Conceptualization; Formal analysis; Investigation; Writing – original draft; Writing – review & editing)

Emília M. Francisco (Conceptualization; Formal analysis; Investigation; Methodology; Writing – original draft; Writing – review & editing)

Pedro F. Antunes (Conceptualization; Formal analysis; Investigation; Methodology; Writing – original draft; Writing – review & editing)

ORCID

Carlos Rodrigues Almeida, <https://orcid.org/0000-0001-6980-841X>

Lígia S. Vieira, <https://orcid.org/0000-0003-2264-2795>

Emília M. Francisco, <https://orcid.org/0000-0003-1412-5624>

Pedro F. Antunes, <https://orcid.org/0000-0002-1541-6469>

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