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Sacral Multifidus Plane Block – A Way Forward to Provide Perioperative Analgesia for Spinopelvic Fixation Surgery

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To the Editor,

Perioperative pain management in spine surgeries poses a unique challenge to anesthesiologists. The severity of pain correlates with multiple factors, including the degree of trauma, the level of injury, and the complexity of the surgery. Various multimodal analgesia (MMA) strategies and regional analgesia options have been described to deal with such pain. However, the paucity of literature on pain management in traumatic sacral fractures and spinopelvic fixation surgeries warrants further exploration of various modalities. This report describes the application of the sacral multifidus plane block (SMPB) in spinopelvic fixation surgery as an adjunct to MMA. Consent was obtained for the publication of this letter.

An 18-year-old healthy male (weight 60 kg, height 160 cm) patient was brought to our hospital with an alleged history of fall from 15 feet height. Radiological investigations revealed comminuted type 1 sacrum fracture (bilateral zones 1, 2, and 3) extending to the left sacroiliac (SI) joint with kyphotic angulation at the fracture site with no anterior translation; comminution of S1, S2, and involvement of neural foramen, median sacral crest with diffuse marrow contusion (Figure 1a). His neuromuscular examination, other systemic examinations, and laboratory investigations were within normal limits. In the first stage, the patient had undergone emergency closed reduction and percutaneous SI joint screw fixation under general anesthesia (Figure 1b). After two days, the patient was scheduled for left L5-ilium spinopelvic fixation with decompression (Figure 1c). The anesthesia plan was discussed with the patient and his relatives and informed written consent was obtained.

In the operating room, standard monitors were attached, an 18G intravenous cannula was secured, and lactated ringer infusion was started. General anesthesia was administered using intravenous propofol 120 mg, fentanyl 120 µg, and rocuronium 40 mg. The patient was mechanically ventilated following tracheal intubation, and anesthesia was maintained with nitrous oxide: oxygen (1:1) mixture and titrated desflurane. After turning the patient prone, an ultrasound-guided SMPB was performed as per the technical description by Mistry et al. [1] A high-frequency linear transducer was kept longitudinally next to the midline in the parasagittal plane on left side (Figure 1d). After optimizing the image at the S2 level, a 23G Quincke's spinal needle was advanced in an in-plane approach from the cephalad to the caudad direction. After hitting the underlying bone, 20 mL of local anesthetic (LA) solution (0.2% ropivacaine + 4 mg dexamethasone) was administered. An anechoic LA spread in the plane between the multifidus muscle (MFM) and the hyperechoic bony area (between the median and intermediate sacral crests) was confirmed. The craniocaudal spread of the LA in the same plane was also noted (Figure 1e). A similar procedure was repeated on the right side of the midline.

Intraoperatively, intravenous paracetamol 1 gm, ketorolac 30 mg, and 2 gm magnesium sulfate were administered as a part of MMA. The patient remained hemodynamically stable and was extubated immediately after the surgery of two hours duration. Postoperatively, MMA was continued with intravenous paracetamol 1 gm 6th hourly and oral pregabalin 75 mg once daily. The patient remained comfortable with pain scores of 0–3 on the numeric rating scale for 24 hours

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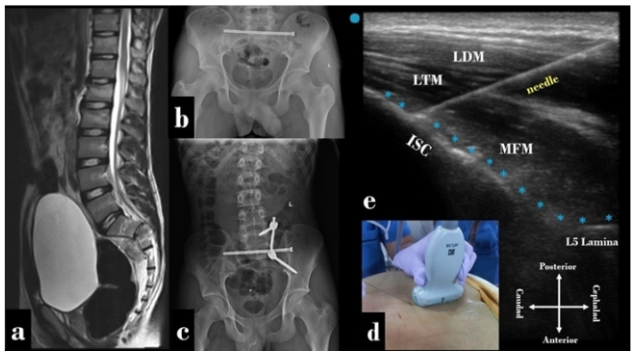

Figure 1: (a) magnetic resonance imaging (MRI) of the lumbosacral spine (sagittal view) showing sacral fracture; (b) Anteroposterior radiograph of the pelvis showing SI joint screw in-situ; (c) postoperative radiograph showing left L5-ilium spinopelvic fixation; (d) Linear transducer position and needle entry point for SMPB; (e) ultrasound image showing needle trajectory and local anesthetic spread. ISC – Intermediate Sacral Crest, MFM – Multifidus Muscle, LTM- Longissimus Thoracic Muscle, LDM - Latissimus Dorsi Muscle, blue asterisks - local anesthetic spread.

without requiring additional analgesics.

SMPB, a variant of paraspinal plane blocks, has been used for various surgeries in the perineal and buttock region [1]. The innervation of the SI joint is complex and varies among individuals. It may arise from the ventral rami of L4 and L5, superior gluteal nerve, and dorsal rami of L5-S2 or almost exclusively from the sacral dorsal rami [2]. The dorsal rami also innervate the skin and the muscles in the adjacent region [3]. The lateral branches of the S1-S3 dorsal rami unite to form the medial cluneal nerve that innervates the skin overlying the posteromedial area of the buttock near the midline. The possible mechanism of action of SMPB includes blocking the terminal nerves directly by LA deposition in the myo-osseous plane and involving ventral rami, pudendal nerve (S2–S4), lumbosacral plexus, and sciatic nerve by anterior and craniocaudal spread through dorsal and ventral sacral foramina [4,5]. Postoperatively, we observed selective sensory loss in the L4-S3 dermatome without motor weakness. Being a fascial plane block, the analgesic coverage of SMPB is volume-dependent. However, unlike other fascial plane blocks, the LA spread in SMPB can be consistent due to the presence of the bony dorsal surface of the sacrum. Consistent drug spread across the sacral dorsal surface could include all procedure-specific innervations required to provide analgesia for sacral spine surgery. SMPB provided adequate analgesia in our patient, possibly because of this anatomical advantage. It also helped to maintain intraoperative hemodynamic stability, reduce surgical blood loss, minimize opioid requirement, and facilitate enhanced recovery and mobilization postoperatively.

We conclude that the inclusion of SMPB as a component of MMA can provide effective perioperative analgesia in spinopelvic fixation surgeries or sacral spine injuries. However, adequately powered studies with robust methodology are required in the future to establish the safety, and efficacy of this block, and also to determine the appropriate volume and concentration of local anaesthetic necessary for providing the desired effect.

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Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

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