



Serratus anterior plane blocks provide opioid-sparing analgesia in patients with isolated posterior rib fractures: a case series

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To the Editor,

Serratus anterior plane (SAP) blocks provide effective analgesia in patients with antero-lateral rib fractures but are reportedly ineffective for posterior rib fractures.^{1,2} Serratus anterior plane injections consistently result in local anesthetic spread to lateral cutaneous branches of intercostal nerves that innervate the superficial antero-lateral chest wall, but were thought to spare the intercostal nerves that supply the posterior rib periosteum and intercostal muscles.^{3,4} Nevertheless, a recent cadaver study showed that, in the traumatized hemithorax, SAP injectate consistently reaches multiple intercostal nerves and spreads more posteriorly, reaching the medial border of the scapula.⁵ This study helps elucidate the mechanism of SAP block analgesia in rib fractures and provides an anatomical explanation for analgesia of posterior rib fractures.

At our institution, we have developed a protocol for early thoracic epidural or paravertebral analgesia to prevent pain-related pulmonary complications in rib fracture patients. We have recently begun offering SAP blocks as a safe alternative for patients with contraindications to epidural or paravertebral techniques regardless of rib fracture location. Herein, we present five consecutive patients with isolated posterior rib fractures managed with a SAP catheter that reflect clinical outcomes consistent

with the cadaveric findings. Written consent for this report was obtained from all patients.

All five patients were admitted to our institutional trauma service with isolated posterior rib fractures. Each was assessed by the acute pain service, found to have contraindications to thoracic epidural and paravertebral block, and offered a SAP catheter. After informed consent, patients were positioned supine for SAP block insertion. The mid-axillary point of the middle-fractured rib was approached anterior-to-posterior using ultrasound guidance, and a 17G 80-mm Tuohy needle was advanced deep to the serratus anterior muscle. After hydrodissection of the plane between the serratus anterior and the rib periosteum with 5 mL of normal saline, 20 mL ropivacaine 0.5% with epinephrine 1:400,000 was injected. A 19G catheter was then inserted and an additional 10–20 mL solution was injected through the catheter, based on patient mass. Ropivacaine 0.2% was then infused at 5 mL·hr⁻¹ with an 8-mL patient-controlled bolus set to a 30-min lockout.

In each case, patients achieved reduced pain with inspiration and rib palpation within 30 min of local anesthetic administration. All patients reported reduced pain scores and had reduced daily opioid consumption in the 72 hr after SAP block insertion. In case 2, the SAP catheter was dislodged and discontinued 48 hr after insertion; otherwise there were no catheter-related complications. Clinical outcomes are summarized in the Figure.

Our cases suggest SAP blocks, as described above, provide a simple, safe, effective, opioid-sparing analgesic option for patients with rib fracture pain regardless of anterior or posterior fracture location. The current opioid crisis calls for opioid-sparing analgesic strategies. SAP

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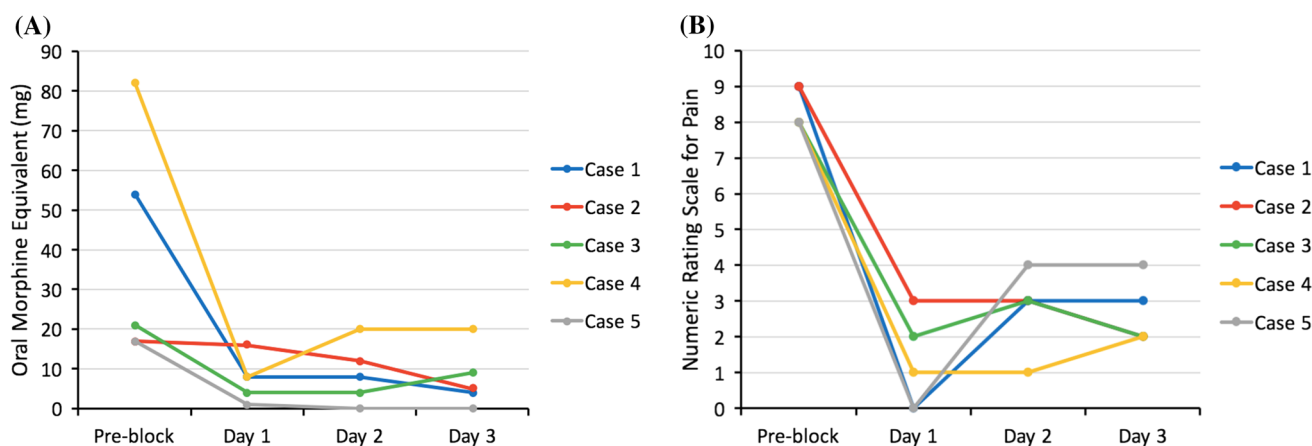


Figure A) Opioid consumption in oral morphine equivalents (mg) in the 24 hr prior to serratus anterior plane (SAP) block insertion (labelled Pre-block) and daily in the following 72 hr (labelled day 1, day 2, and day 3). B) Average numeric rating scale for pain in the 24 hr prior to SAP block insertion (labelled Pre-block) and daily in the following 72 hr (labelled day 1, day 2, and day 3). *Case 1*: Posterior fractures of ribs 1–3 in a 69-yr-old male with coronary artery disease and obstructive sleep apnea on therapeutic ticagrelor. *Case 2*: Posterior fractures of ribs 3–11 in an 86-yr-old female with

dementia who was unable to be safely positioned for epidural insertion. *Case 3*: Posterior fractures of ribs 4–7 in a 64-yr-old male who refused epidural analgesia despite unmanageable pain on optimized multimodal systemic analgesia. *Case 4*: Posterior fractures of ribs 4–8 and 11 in an 84-yr-old male with dementia on therapeutic apixaban. *Case 5*: Posterior fractures of ribs 4–8 in a 93-yr-old male with dementia and congestive heart failure on therapeutic warfarin

blocks are easy to adopt with few contraindications limiting their applications.

Conflict of interest None declared.

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