

## Letters to the Editor

## Serratus Anterior Plane Block for Multiple Rib Fractures

**TO THE EDITOR:**

A 63-year-old man, admitted to a tertiary care hospital, with a history of motor vehicle accident 2 days prior, was referred to the pain clinic within the hospital with severe chest pain on the left side. He was morbidly obese (BMI = 44.2 Kg/M<sup>2</sup>) with a positive history of hypertension, uncontrolled diabetes mellitus, and obstructive sleep apnea. The patient had difficulty in breathing due to pain and was unable to lie supine/prone or take deep breaths. The patient reported his static and dynamic pain scores on Visual Analogue Scale (VAS) as 60 and 100 respectively. X-ray chest PA view revealed fractures of fourth through seventh ribs with no evidence of pneumothorax or haemothorax. The patient had already received intravenous (IV) diclofenac (75 mg 12 hourly), oral paracetamol (1 gm 6 hourly), and IV tramadol (100 mg 8 hourly). These analgesics did not provide any relief in dynamic pain. We therefore decided to perform a serratus anterior plane (SAP) block under ultrasound guidance, followed by catheter insertion for continuous infusion of local anaesthetic, which was done following informed consent.

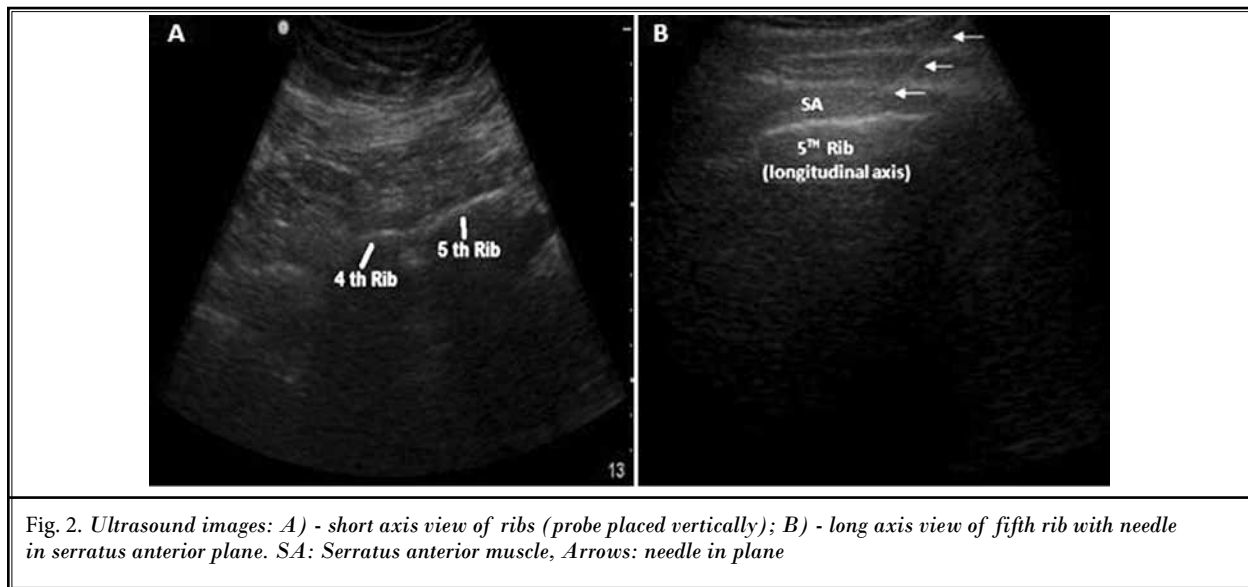
The patient was placed in a sitting position with his left arm resting on a side table (Fig. 1). An IV line was secured and all standard monitoring applied. The procedure was performed with 5-2 MHz curvilinear ultrasound probe (Sonosite M Turbo, Bothel, USA) under strict aseptic conditions. The serratus anterior muscle was localized over the fifth rib in posterior axillary line in vertical axis (Fig. 2A). Then the probe was aligned along the r long axis of the rib. Needle entry point was anesthetized with 1% lignocaine. An 18 G Touhy needle was introduced under real time ultrasound using an in-line needle technique from a posterior to an antero-caudal direction. The needle tip was placed on the surface of rib under the serratus anterior muscle between the posterior and mid-axillary line (Fig. 2B). Hydro dissection was done with 3 mL of saline to confirm the position of the needle tip. Thereafter 20 mL of 0.125% bupivacaine was injected under ultrasound guidance. A 20 G epidural catheter was advanced through the epidural needle to a depth of 4 cm beyond the needle tip; and tunneled subcutane-



Fig. 1. Position of the patient and placement of the needle by inline needling technique.

ously to prevent dislodgement. The patient reported significant decrease in pain 15 minutes after the procedure. Continuous infusion of 0.0625% bupivacaine with 1 microgram/mL of fentanyl using an elastomeric pump was started at 7mL/hour after 4 hours. Infusion was increased to 12 mL/hour on the next day since patient had pain in the left lower chest after the effect of bolus dosage decreased. Thereafter the patient's static and dynamic pain scores (VAS) were reduced to 00 and 10–20, respectively and the patient was able to ambulate and could undergo respiratory physiotherapy without pain. Other analgesics were stopped except paracetamol. The catheter was removed on the sixth day and the patient was discharged 24 hours later with no complications. He was advised to continue oral nonsteroidal anti-inflammatory drugs (NSAIDs) for one week.

Multiple rib fractures (MRF) continue to be a challenging problem as the associated pain leads to compromise in respiration especially in obese patients;



accompanying obstructive sleep apnea further complicates the management. Proper analgesia is required for early ambulation, physiotherapy, and to prevent development of respiratory failure (1,2). There are several regional analgesic methods used in treatment of MRF (3-6).

Ultrasound-guided SAP block has recently been described as a regional anesthetic technique to provide analgesia for breast and thoracic wall surgeries (7). SAP block provides analgesia to the hemi thorax by blocking lateral branches of inter-costal nerves (7). SAP block has also been reported to provide analgesia and to facilitate weaning from mechanical ventilation in critical care patients with MRF (8). SAP block is technically simple and can be performed as a bedside procedure safely.

Our patient, who was morbidly obese with obstructive sleep apnea, developed MRF (fourth to seventh ribs) following a traffic accident and presented to us with severe pain and difficulty in breathing. The patient had already received NSAIDs and tramadol with no relief in pain. Opioids were not tried because of fear of respiratory depression due to the associated obstructive sleep apnea (9). Single shot thoracic epidural steroid administration is recently described in the literature for management of pain in multiple rib fractures (10). Due to the associated morbid obesity, which makes the placement of thoracic epidural technically difficult, and uncontrolled blood sugar, we preferred go in for a SAP block. On account of short duration of action of single shot bupivacaine blocks (4 – 8 hours) and the fact that

the patient was hospitalized for control of his blood sugar, we opted for a continuous infusion of local anesthetic – opioid combination. We started with an infusion rate of 7mL/hour (8) and subsequently increased to 12 mL/hour the next day because of inadequate blockade (Baxter 2C9961 multi-rate infuser LV 5,7,12 with flow rate of 5, 7, 12 mL/hour). Low concentration of local anesthetic (0.0625% bupivacaine) for continuous infusion was used to minimize the chances of local anesthetic toxicity and motor blockade, if any. The patient reported significant pain relief after 15 minutes of the SAP block and started mobilizing. Breathing significantly improved and he could undergo chest physiotherapy without pain subsequently.

Ultrasound guided SAP block is a simple and effective technique for providing pain relief in unilateral MRF especially in obese patients with obstructive sleep apnea.

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