Postoperative analgesic efficacy of ultrasound-guided, low-volume C5–6 root block in combination with erector spinae plane block in complex shoulder surgeries

Dear Editor,

Interscalene block, though widely used for shoulder surgeries, is associated with adverse effects.[1,2] The adverse effect may be mitigated by low volume and low concentration of local anaesthetic, but it limits the block duration.[3] Recently, erector spinae plane block (ESPB) has been favourable in shoulder surgery and partially qualifies as a phrenic-sparing block with effective analgesia for shoulder surgery.[4,5] Also, the shoulder is innervated by the C5–C6 nerve roots; hence, blocking it would provide postoperative analgesia after shoulder surgeries. We hypothesised that this combination of blocks would provide equivocal analgesia to a conventional interscalene block and have fewer adverse events (e.g., hoarseness of voice, Horner's syndrome, difficulty in breathing, and phrenic nerve involvement).

After approval of the ethical committee (Poona Medical Research Foundation, vide approval number RHC/BIOPMRF/EC/2020/256 dated 14 December 2020), 13 American Society of Anesthesiologists physical status I and II patients aged 18–65 years, undergoing major shoulder surgery under general anaesthesia were included. C5–C6 block was given using 7 ml of 0.375% ropivacaine at the start of surgery. All patients were then administered general anaesthesia with intravenous propofol 2 mg/kg, fentanyl 2 μg/kg, rocuronium 0.8 mg/kg and maintained on sevoflurane (minimum alveolar concentration 0.8–1). Multimodal analgesia was provided with intravenous paracetamol 1 g and diclofenac 75 mg. At the end of the surgery, an ultrasound-guided thoracic ESPB was performed at level T2, depositing 15 ml of 0.375% ropivacaine [Figure 1]. The spread of local anaesthetic was appreciated at the level of costotransverse junction in the axial plane, and the cephalon–caudad diffusion was noted. Diaphragm excursion was assessed before by a curvilinear probe – M mode) (Venue Go R2; GE, WI, USA) and 20 min after the blocks were instituted. Hemidiaphragmatic paralysis was considered if there was more than a 50% reduction in an excursion on deep breathing. A positive sniff test (a paradoxical diaphragm movement on asking the patient to sniff) was considered complete hemidiaphragmatic palsy.

Five patients were female, while eight were male. Rescue analgesia with intravenous tramadol 50 mg was administered if the Visual Analogue Scale (VAS) score was more than or equal to 3; it was required by five patients once in 24 hours h (at 12, 13, 14, 16 and 18 hours) and one patient needed two rescue analgesics. The median duration of surgery was 140 min [range 130–150, interquartile range (IQR) 142.5–132.5 min]. VAS scores observed till 12 hours h was 0, whereas at 12, 18 and 24 hours, the median (IQR) was 0 (1–0), 2 (2.5–0.5) and 1.5 (2.5–1), respectively. The phrenic nerve was visualised in eight patients, near the C5–6 ventral rami in two of these patients. One of these patients reported hoarseness of voice. Diaphragm involvement was noted [Table 1].

Fredrickson *et al*.[3] elicited a direct correlation between the volume and concentration of the local anaesthetic with the duration of the interscalene block and is crucial in advocating a specific regional technique.[6] Few case reports have documented the use of cervical ESPB for shoulder surgery, and various case reports have observed that the local anaesthetic deposited at the T2–T3 level provided effective analgesia for shoulder surgery.[4] Ciftci *et al*.[7] studied ESPB for shoulder surgery in 60 patients and noted a reduction in VAS score and fewer rescue analgesics. A cephalad-directed, cervical

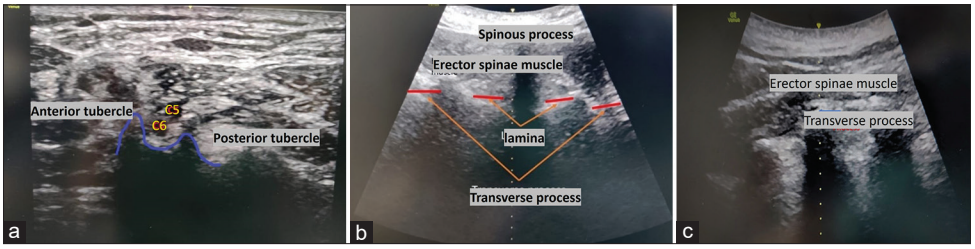

Figure 1: Sonoanatomy of cervical ventral rami and second thoracic vertebra. (a) Anterior and posterior tubercle of the sixth cervical vertebra seen with the cervical ventral rami five and six (C5–C6); (b) transverse view at the second thoracic vertebra; (c) paramedian sagittal image at the second thoracic vertebra

Table 1: Ultrasonography assessment of the diaphragm

Number of patients	Diaphragm assessment 20 min after cervical 5 and 6 ventral rami block			Diaphragm assessment half an hour after extubation		
	Quiet breathing	Deep breathing	Sniff test	Quiet breathing	Deep breathing	Sniff test
6	No	No	Negative	No	No	Negative
1	No	No	Negative	No	<50%	Negative
4	No	<50%	Negative	No	<50%	Negative
1	No	< 50%	Negative	Yes	>50%	Positive
1	No	<50%	Negative	No	>50%	Positive

ESPB injection at the first costotransverse junction showed a consistent effect on the dorsal spinal nerves of the thoracic and cervical areas, with spread noted in the paravertebral space dorsal to ventral roots.[4] In our series, the administration of two blocks (compounding) did not allow segregation of analgesia for either block. The cephalocaudal spread of the drug in the erector spinae plane could not be appreciated accurately without imaging or dye studies to advocate a particular pain relief modality. The low-volume C5–6 root block showed a lower incidence of phrenic nerve palsy than interscalene block and longer duration analgesia. Combining various site-specific blocks aids in lowering doses, limiting adverse events and giving an equivocal or longer duration of analgesia, and it may warrant further comparative studies.

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Conflicts of interest

There are no conflicts of interest.

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