



## Regional Anaesthesia in Clavicle Surgery

Babu Raja Shrestha,<sup>1</sup> Puja Sharma<sup>1</sup>

<sup>1</sup>Department of Anaesthesiology and Intensive Care, Kathmandu Medical College, Nepal.

### ABSTRACT

In routine practice, regional anaesthesia is less commonly used for clavicular fracture compared to general anaesthesia. We report two cases of clavicle fracture for which operative treatment was done under combined superficial cervical plexus and interscalene brachial plexus block. In both the cases combination of ropivacaine and dexmedetomidine was used for block. Both the patients exhibited comfort and there was no additional analgesic demand in both the cases. Thus combination of interscalene and superficial cervical plexus block can prove to be useful in patients with clavicle fracture where administration of general anaesthesia and its adverse effects could be avoided.

**Keywords:** *clavicle fracture; interscalene brachial plexus block; superficial cervical plexus block.*

### INTRODUCTION

Despite extensive use of regional technique for upper limb surgeries, block for surgeries of clavicle has not been practised much as the sensory innervation of the clavicle remains controversial. The supraclavicular, subclavian, long thoracic and suprascapular nerves, alone or together, may be responsible for pain transmission after clavicular fracture and post clavicle surgery.<sup>1</sup> Peripheral nerve blocks used to anaesthetize the clavicle include superficial cervical plexus blocks, interscalene blocks, and combined superficial cervical plexus-interscalene blocks. For an effective blockade, one has to consider the variability in its nerve supply. Reports suggest that the predominant nerve supply for distal clavicle is possibly from superficial cervical plexus (SCP) and C5 nerve root, through suprascapular nerve and its branches.<sup>2,3</sup> The SCP arises from anterior rami of C1-C4 and gives off four terminal branches—greater auricular, lesser occipital, transverse cervical and suprascapular nerves which provides sensory innervations to the anterolateral neck and part of ear and shoulder.<sup>4</sup>

### CASE REPORT 1

A 23-year-old male who sustained a fall resulting in fracture of the left clavicle was planned for open reduction and internal fixation after 7 days post injury.

The patient weighed 50 kg and did not have any previous significant medical and surgical history and was graded as ASA PS grade I patient. With an informed consent ultrasound guided block was performed. A 4.2 cm linear probe of ultrasound (EXAGO) and peripheral nerve stimulator was used to locate brachial plexus in between anterior and medial scalene muscles. The frequency of 1MHz with current strength of 1.2 mA was set on nerve stimulator. At the start of procedure, 2 mg of midazolam was given for sedation. First Interscalene block (ISB) was performed with a 21 gauge insulated stimulator needle using the in-plane technique (Stimuplex A) with the patient lying in supine position and head turned to the contralateral side. Thirty millilitres of 0.25% ropivacaine and dexmedetomidine 30 mcg was deposited in the target region. Superficial cervical plexus (SCP) block was carried out in the same position for which sternocleidomastoid muscle was identified (Figure 1, 2). At the lateral border where the muscle tapers, i.e., midpoint of line joining the mastoid and clavicle, 15 ml of 0.25% Ropivacaine with 15 mcg Dexmedetomidine was deposited just beneath the skin under direct vision with ultrasound. The deposition was seen as a sausage shaped underneath the posterior

**Correspondence:** Professor Dr. Babu Raja Shrestha, Department of Anaesthesiology and Intensive Care, Kathmandu Medical College, Baburam Acharya Sadak, Sinamangal, Kathmandu, Nepal. Email: barashrestha@yahoo.co.in. Phone: +977-9851044526.

border of sternocleidomastoid. Sensory block was assessed and the area covered marked (Figure 3a). The patient was monitored using NIBP, ECG, RR and SpO<sub>2</sub> throughout the procedure. The procedure lasted 75 minutes in supine position with good patient comfort and no demand for additional sedation or analgesic. No any clinical signs of respiratory distress were encountered. The patient first experienced pain at 6 hours following surgery which was managed by Inj. Ketorolac 30 mg.

## CASE REPORT 2

A 38 year male weighing 85 kg with right clavicle fracture, ASA PS I, was planned for open reduction and internal fixation after 3 days of injury. Following detailed history taking and examination the patient was graded as ASA-PS I. Patient was taken to the OR on the day of surgery after obtaining an informed consent. He was placed supine with head turned to the contralateral side. Monitors were attached and intravenous access obtained on the non operative side. With the direct visualization of the superficial cervical plexus, 2 ml 2% lidocaine was infiltrated on the overlying skin. Then 20 ml 0.25% ropivacaine with 30 mcg dexmedetomidine was administered in the superficial cervical plexus in the same way as described for first case and using the same instruments. Thereafter interscalene brachial plexus was identified between the anterior and medial scalene muscles and 24 ml 0.25% Ropivacaine with 40 mcg dexmedetomidine was injected, as described in the first case. Sensory block was assessed and the area covered marked (Figure 3b). Hemodynamic was stable and no additional analgesic was required during the procedure which lasted 103 minutes. Patient remained pain free for 10 hours post operatively at which time he had moderate pain managed by oral analgesic (Figure 4).



**Figure 1.** SCP block. Yellow arrow, SCP; White arrows, needle; MS, medial scalene muscle; AS, anterior scalene muscle.



**Figure 2.** Interscalene brachial plexus block. White arrows, needle; BP, brachial plexus; AS, anterior scalene muscle; MS, medial scalene muscle.



**Figure 3.** 3a. Area covered by block in Case 1. Figure 3b. Area covered by block in Case 2.



**Figure 4.** Patients immediately after completion of surgery.

## DISCUSSION

Regional anaesthesia has been used previously for provision of postoperative analgesia following clavicle

surgery. However, these two cases demonstrated that interscalene brachial plexus and superficial cervical plexus when blocked in combination had good outlook for operative analgesia. At the same time, it attenuated the need of post-operative analgesia as opioids and NSAIDs. The use of low volume of anaesthesia must have avoided the risk to the phrenic nerve injury. It can thus be a good alternative to the routinely practised general anaesthesia for clavicle fracture surgeries.

Similar combined block has been reported in a patient with dilated cardiomyopathy scheduled for surgery of fracture mid shaft of clavicle where use of general anaesthesia was totally abandoned.<sup>5</sup> Use of this combination of blocks guided by ultrasound has been used solely in a patient undergoing ORIF for clavicle fracture as reported by Dillane et al.<sup>6</sup> Ultrasound guided superficial cervical plexus alone has been used in the management of pain following clavicle fracture using 8 ml 0.5% bupivacaine.<sup>7</sup>

Various approaches have been described in different reports for pain management following clavicle fracture surgery. Choi SD et al reported a successful post operative analgesia after open reduction and internal fixation for clavicle fracture using a cervical plexus block by classic approach using 0.5% bupivacaine which provided 14 hours pain free interval following surgery.<sup>8</sup> Valdés-Vilches et al, has reported a low-volume (1.5–2 ml) selective supraclavicular nerve blockade, together with a low-volume (8–15 ml) brachial plexus supraclavicular approach to achieve adequate depth of blockade for clavicle surgery.<sup>1</sup> Use of combined superficial cervical plexus and selective C5 nerve root catheters have been described for the pain management following surgical

repair of clavicle with intactness of distal arm motor function. Similarly, another report mentioned two cases done with the same combination of nerve block. So, selective C5 block instead of entire brachial plexus along with superficial cervical plexus block can be an alternative promising technique.<sup>2</sup>

Ultrasound guided combined interscalene brachial plexus and superficial cervical plexus block provides an effective intraoperative as well as post-operative analgesia with patient comfort and reduction in other parenteral analgesics in patients undergoing clavicle surgery. With Dexmedetomidine as an adjuvant to the local anaesthetic, adequate sedation is maintained throughout the procedure which is an additional advantage apart from prolonging the block duration.

Superficial cervical plexus block can also be used in the emergency care settings for pain management not only for clavicle fracture but in ear lobe and lateral neck injuries as well.<sup>7,9</sup>

Interscalene and Superficial cervical plexus block can be used as a potential technique for procedures on clavicle fracture especially in patients who will have better outcome with avoidance of general anaesthesia. Use of ultrasound helps in better localization and avoids injury to surrounding vascular structures along with reduction in the volume of local anaesthetic solution used for blockade.

**Conflict of Interest: None.**

**Consent:** [JNMA Case Report Consent Form](#) was signed by the patient and the original is attached with the patient chart.

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