

CLAVIPECTORAL FASCIA BLOCK IN COMBINATION WITH SUPERFICIAL CERVICAL PLEXUS BLOCK AS AN ANAESTHETIC IN CLAVICLE SURGERIES – A CASE SERIES

Anaesthesiology

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KEYWORDS

INTRODUCTION:

Fracture of clavicle is commonest injury of shoulder girdle[6]. Clavicle fractures account for 2.6% of all fractures and are frequently encountered in both the emergency department and operating room settings[4].

Pain management is a significant concern in orthopedic surgery[6].

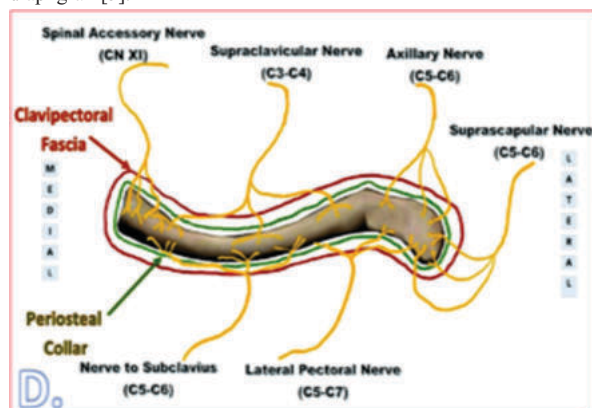
In clavicular fracture surgery 2 main modes of anaesthesia can be covered which is general anaesthesia or regional blocks.

Nerve blocks are favored over parenteral analgesia due to their superior pain relief and reduced side effects[6]. The sensory innervation of the clavicle is intricate, involving the supraclavicular, subclavian, long thoracic, and/or suprascapular nerves, which play a role in pain transmission during clavicle surgeries[6]. Commonly employed nerve blocks for clavicle surgery include the superficial cervical plexus block, interscalene block, and a combination of the two.

The clavipectoral fascia block (CPB), a novel technique, was first introduced by Valdes in 2017[6]. The clavipectoral fascia completely encases the clavicle, with the nerve endings of the clavicle penetrating this fascia[6]. The clavipectoral fascia is a tough fascial sheet that fills the space between the clavicle and the pectoralis minor muscle and is deep into the clavicular head of the pectoralis major muscle[1]. In CPB, local anesthetic is injected under ultrasound guidance between the periosteum of the clavicle and the clavipectoral fascia, effectively anesthetizing the clavicle[6]. When combined with a cervical plexus block, which anesthetizes the skin over the clavicle, CPB can serve as the sole method of anesthesia for clavicle surgery[6].

The clavipectoral fascial plane block (CPB) is a novel regional anesthesia technique that has been utilized for clavicular fracture surgery[1].

Providing regional anesthesia via peripheral nerve blocks can be a challenge to the anesthetist due to multiple innervations of the clavicle and the requirement of a combination of peripheral nerve blocks like cervical plexus block and brachial plexus block, which are associated with complications like phrenic nerve palsy, pneumothorax, puncture of vascular structure, horners syndrome, hemiparalysis of the diaphragm[5].



The skin above the clavicle is innervated by the supraclavicular nerve. Traditional superficial cervical plexus block (SCPB) combined with interscalene brachial plexus block (ISBP) can be used in the operation of clavicle fracture, but ISBP is prone to complications such as diaphragmatic paralysis caused by phrenic nerve block.[1]

The clavipectoral fascial plane block (CFPB) that has been utilized for clavicle fracture surgeries and pain management is an emerging anesthesia technique[1].

Hence, in this case series we aimed to demonstrate anaesthetic and analgesic effect of combined clavipectoral fascia block-superficial cervical plexus block in 6 cases of fracture of mid shaft clavicle

MATERIALS AND METHODS:

A total of 6 patients with mid shaft clavicle fracture posted for open reduction and internal fixation with plates and screws in our institute during August to October were enrolled for the study after meeting the required inclusion and exclusion criteria of the study

After obtaining approval and clearance from the institutional ethics committee, the patients were enrolled for the study after obtaining informed consent (Annexure 1)

Patients were shifted to operation theatre and monitors (Pulse oximeter, NIBP, ECG and Skin sensor temperature at axillary region) were connected.

Intravenous line was secured with 18G cannula. IV crystalloid fluid Ringer lactate will be given at rate of 10ml/kg/body weight.

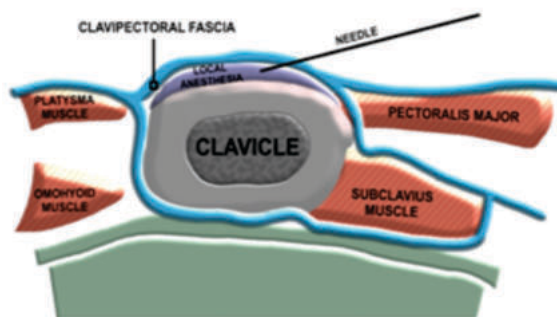
Clavipectoral fascia block was administered preoperatively, with midazolam (2–5 mg) and fentanyl (50–100 µg) intravenously.

In the supine position, the head was turned to the contralateral side.

The block was administered with appropriate antisepsis.

A high-frequency linear probe dressed with a sterile sonography cover was used to scan the length of the clavicle.

The probe was initially placed 2 to 3 cm proximal to the fracture line to mark the first injection, and a similar marking was performed 2 to 3 cm distal to the fracture line to mark the second injection.



The periosteum of the clavicle as well as the surrounding fascia were visualized for both the medial and lateral injection sites.

An in plane technique was used to view the ultrasound-visible stimulation needle advancing in a caudad to cephalad direction until it rested on the clavipectoral fascia.



Green arrow:needle inserted into clavipectoral fascia
Red arrow:clavicle

Aspiration was performed before the injection of local anesthesia.

The total amount of local anesthetic mixture used was 20 ml (0.5% bupivacaine and dexamethasone 8mg, Adrenaline 100 mcg {1:200000}), equally deposited on either side using USG guidance with the help of hypodermic needle.

Sensory and motor assessment of the arm and shoulder was performed 15 min after the nerve block.

The patient was monitored hourly for hemodynamic response and for pain control at the post-anesthesia care unit for 24 hours, using VAS score.

Post operatively at any VAS score of 5 or above rescue analgesia with Inj Tramadol 50 mg was given intravenously

DISCUSSION:

In 2017, Valdés initially introduced the CPB regional anesthesia technique at the 36th Symposium of the European Society of Regional Anesthesia & Pain Therapy (ESRA)[3].

Clavicle surgeries are predominantly performed under general anesthesia. However, regional anesthesia is often preferred in orthopedic procedures due to its superior postoperative analgesia and fewer adverse effects[6].

The innervation of the clavicle is complex, supplied by both the cervical and brachial plexuses. The clavicle is innervated by the spinal accessory nerve (cranial nerve XI), axillary nerve (C5-C6), nerve to subclavius (C5-C6), supraclavicular nerve (C3-C4), and lateral pectoral nerve (C5-C7) [6]. Multiple innervations of the clavicle make it difficult to choose one single anesthetic block technique for clavicle surgeries[5].

Studies and case reports suggest that a combined superficial cervical plexus-inter-scalene block can serve as a sole anesthetic technique for clavicle fracture surgeries. Nevertheless, the major limitation of the interscalene block (ISB) is its involvement with the phrenic nerve, making it contraindicated for patients with compromised respiratory function. Hence we consider CPB to be an effective regional anesthesia technique for clavicular surgeries, as the terminal branches of several sensory nerves traverse the plane between the clavipectoral fascia and the clavicle[1].

Due to the increased time consumption required to administer two separate blocks and the adverse effects associated with the brachial plexus blocks, usually general anesthesia becomes the preferred choice for clavicle fixation surgeries[5].

All the sensory nerves supplying the clavicle penetrate the

clavipectoral fascia to innervate clavicle except for the supraclavicular nerve, which innervates skin above the clavicle. Since the sensory block of skin incision could not be achieved with the CPB, a supraclavicular block (cervical plexus) should be performed[4].

In our case series 6 patients between the age of 20 to 50 years, of which 4 patients were male and 2 were female were included after obtaining their informed consent

ASA	Asa 3:4 Asa 4:2
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Time Of Need For Rescue Analgesia

Post operative analgesia assessment parameters	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Time of first rescue analgesia	18 hours	16 hours	19 hours	14 hours	24 hours	16 hours
Tramadol requirement in first 24 hours	-	-	-	50mg 1 dose of tramadol	-	-
VAS SCORE: 1 HOUR POST OP	0	0	0	2	0	0
3 HOURS POST OP	1	1	1	2	1	1
6 HOURS POST OP	2	1	2	4	2	1
12 HOURS POST OP	3	3	2	6	2	1

The primary objectives of this study was to evaluate the effectiveness of the clavipectoral fascia block in combination with the superficial cervical plexus block, for both surgical anesthesia and postoperative analgesia in clavicle surgeries and its duration of postoperative analgesia provided by this technique.

These six cases illustrate the efficacy of the CPB as a sole or adjunct peripheral nerve block in clavicle surgery. Five out of six patients had zero pain after surgery with only one patient having a maximum pain score of 6, requiring rescue analgesia which demonstrates the efficacy of this block in relieving postoperative pain. All five patients were able to be discharged from the PACU in less than an hour. Regional anesthesia results in opioid-sparing with effective analgesia, decreases postoperative nausea and vomiting, and enables early ambulation and discharge[4].

The CPB block can also be used for trauma patients with rib fractures and pneumothorax where general anesthesia may increase the risk of pneumothorax expansion and associated complications[4]. We observed that an ultrasound-guided combined superficial cervical plexus-clavipectoral fascia block, accompanied by mild sedation, can serve as the sole anesthetic technique for clavicle surgery.

LIMITATIONS:

The primary limitation of the study is the small sample size.

In this study, the effects of different fracture sites and fracture types were ignored.

This study revealed that the majority of patients prefer not to remain awake during surgery. Despite the absence of pain, many reported feelings of anxiety and fear during the procedure. To enhance patient comfort, we recommend incorporating sedative agents, such as midazolam and fentanyl, into clinical practice.

CONCLUSION:

Our initial experience indicates that the combined cervical plexus-clavipectoral block may serve as an effective standalone method of anesthesia for clavicle fractures. This approach could be a viable alternative to interscalene block (ISB) in patients with compromised respiratory function or shoulder muscle weakness. However, randomized controlled trials are needed to determine the optimal anesthetic technique for such surgeries.