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Letter to Editor

Modified Clavipectoral Fascial Plane Block to The Rescue: Polytrauma Patient with Brachial Plexus Injury Undergoing Awake Clavicle Surgery

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Dear Editor,

Clavipectoral fascial plane block (CFPB) is an attractive alternative to traditional regional anaesthesia (RA) techniques for clavicle surgery. It was reported to provide motor-sparing, diaphragm-sparing stand-alone surgical anaesthesia, or perioperative analgesia [1]. We want to highlight the application of CFPB as the sole RA technique in a polytrauma patient with brachial plexus injury for surgical management of clavicle fracture. Consent was obtained for the publication of this letter.

A 30-year-old American Society of Anesthesiologist physical grade I male (weight 75 kg, height 170 cm) patient was admitted with an alleged history of a fall from a two-wheeler. He had displaced comminuted right clavicle fracture (Allman type I) (Figure 1a), displaced fracture of right transverse processes of C6-T1, and right brachial plexus injury. He had undergone emergency left fronto-temporo-parietal craniotomy and evacuation of an acute subdural hematoma under general anaesthesia. The patient was transferred to the intensive care unit following surgery and weaned off from ventilatory support after three days. A Follow-up computed tomography (CT) scan revealed a significant reduction of cerebral edema and a thin rim of residual left frontal, bilateral tentorial, and interhemispheric subdural hematoma. Magnetic resonance imaging of the right brachial plexus revealed C5-C8 complete nerve root avulsion with hematoma and soft tissue edema in the adjacent area. After ten days of craniotomy, the patient was scheduled for right clavicle open reduction and internal fixation with plating (Figure 1b). The plan was to provide motor-sparing, phrenic nerve-sparing surgical anaesthesia without brachial plexus block (BPB). The anaesthesia plan was explained to the patient and relatives, and informed written high-risk consent was obtained.

Standard monitors were attached inside the operating room, and an infusion of ringer lactate was started. Oxygen supplementation using a Hudson mask at 5 L/min flow was provided. The patient was placed supine with the head turned towards the contralateral side. Ultrasound-guided modified right CFPB was performed as described by Sonawane et al. [2]. A high-frequency linear probe (Sonosite HFL 38xp/13–6 MHz; Fujifilm SonoSite Inc., Bothell, WA, USA) was placed on the skin over the anterior surface of the clavicle. The local anaesthetic (LA) was deposited on the medial (10 ml) and lateral (10 ml) third of the clavicle between the clavipectoral fascia and periosteal collar using an in-plane technique (Figure 1c, d). In addition, the probe was kept over the fracture site, and LA (5 ml) was deposited around it under vision. Also, the skin over the incision site was covered by an additional subcutaneous infiltration (5 ml). The total volume of the LA was 30 ml (1:1 of 0.25% Bupivacaine and 1% Lignocaine-adrenaline, 8 mg Dexamethasone). The patient's vitals remained stable, and the procedure was completed without complications.

Clavicle innervation is complex and controversial. The pain-generating elements in clavicle surgeries include the skin and the richly innervated periosteum. The brachial plexus roots involved in complete innervation (dermatome, myotome, and osteotome) of the clavicle are C3-C7. Proximal BPB has been a standard practice for anaesthesia or analgesia for clavicle fracture surgeries. Hemidiaphragmatic paresis due to blockade

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of the phrenic nerve can be detrimental in polytrauma patients with lung injury or pneumothorax. Recently, the C5 ventral ramus block and selective supraclavicular nerve and upper trunk (SCUT block) with low volume of LA have been described as site-specific and phrenic-sparing RA techniques for clavicle surgeries [3, 4]. However, BPB is contraindicated in patients with ipsilateral brachial plexus injury. Bhat et al. reported an incident of apnoea and cardiac arrest following paraesthesia-guided subclavian perivascular BPB in a polytrauma patient with undiagnosed brachial plexus injury [5]. The spread of injected LA to the subarachnoid space through the dural tear around the ruptured nerve roots resulted in total spinal anaesthesia and cardio-respiratory arrest. A CT myelogram after the resuscitation revealed a traumatic meningocele of the C8 nerve root. We avoided BPB in our patient, considering such dreaded consequences.

In 2017, Dr. Luis Valdes described CFPB as an RA technique for clavicle surgeries targeting the sensory nerves that traverse the clavipectoral fascia [1]. CFPB creates a field block by depositing the LA at the medial and lateral third of the clavicle between the clavipectoral fascia and the periosteum of the clavicle involving all the nerves piercing the fascia to enter the clavicle. Rosale et al. managed a case where CFPB with intravenous Dexmedetomidine sedation provided intraoperative surgical anaesthesia and postoperative analgesia up to 16 hours after the block [6]. However, the skin incision may not be covered with the CFPB alone. So, an additional supraclavicular nerve block, cervical plexus block, or skin infiltration is required. The spread of LA in CFPB depends on the integrity of the clavipectoral fascia, which is lost in displaced or comminuted fractures due to a breach in the continuity of the fascia around the fractured site. Hence, an additional injection or hematoma block at the fracture site may improve the quality of the RA. We opted for the modified CFPB, which covered all the innervations and provided optimal surgical anaesthesia or analgesia.

To conclude, the modified CFPB can be a better alternative to general anaesthesia or other available RA techniques in providing incision congruent surgical anaesthesia or postoperative analgesia for awake clavicle fracture surgery, especially in polytrauma patients with brachial plexus injury. However, randomized controlled trials are warranted for further validation.

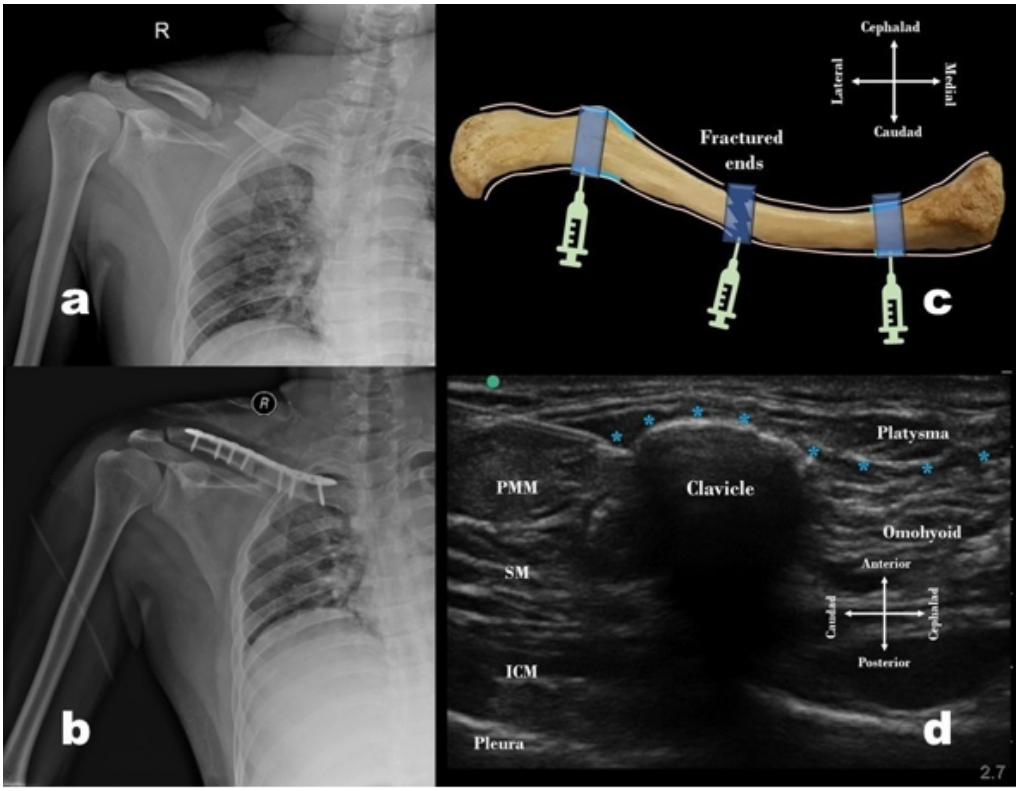

Figure 1: a. pre-operative X-ray showing right clavicle midshaft fracture (Allman type I); b. post-operative x-ray showing right clavicle internal fixation with plating and screws; c: modified clavipectoral fascial plane block (CFPB), d. Ultrasound image of CFPB, PMM-pectoralis major muscle, SM-subclavius muscle, ICM – intercostal muscles, blue asterisk (*) – local anaesthetic spread

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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