

## COMBINED SUPERFICIAL CERVICAL PLEXUS-CLAVIPECTORAL FASCIA BLOCK FOR MID SHAFT CLAVICLE FRACTURE SURGERY: CASE SERIES

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### Abstract

Clavicle fracture is common injury in sportsmen. Interscalene nerve block with or without cervical plexus block is commonly used nerve block for clavicle surgery. Main drawback of interscalene block is involvement of phrenic nerve, so contraindicated in patients with compromised lung function. Clavipectoral fascia block is a new technique in which Local Anesthetic (LA) is injected between periosteum of clavicle and clavipectoral fascia. Many case reports have been published till date demonstrating that combined superficial cervical plexus and clavipectoral fascia block can be used for clavicle fracture surgery as sole mode of anesthesia and post operative analgesia in the patient with compromised pulmonary function. We have successfully used combined superficial cervical plexus and clavipectoral fascia block with dexmedetomidine infusion as sole mode of anesthesia in 10 cases of mid shaft clavicle fracture without any significant adverse effect.

## INTRODUCTION

Fracture of clavicle is commonest injury of shoulder girdle. It is very common in sportsmen. Among the clavicle fracture, the fracture of mid shaft clavicle is most common.<sup>[1]</sup> Surgical intervention is required in 44% cases of mid shaft clavicle fractures.<sup>[2]</sup>

Pain management is major concern in orthopedic surgery. Nerve block is preferred over parental analgesia as it provides superior analgesia with fewer side effects.<sup>[3]</sup> Sensory nerve supply of clavicle is complex. Supraclavicular, subclavian, long thoracic nerve/suprascapular nerve alone or together are responsible for pain transmission during clavicle surgery [Figure 1]. Superficial cervical plexus block, Inter scalene block and superficial cervical plexus block combined with inter scalene block are common nerve block used clavicle surgery.<sup>[4]</sup>

A new technique clavipectoral fascia block (CPB) was first described by Valdes in 2017(5). Clavipectoral fascia completely surround the clavicle and nerve ending of the clavicle penetrate the fascia [Figure 2]. In CPB, under USG guidance, Local Anaesthetic agent is injected between periosteum of clavicle and clavipectoral fascia [Figure 3] to anesthetize the clavicle. If CPB combined with cervical plexus which supplies skin over clavicle can be used as sole mode of anesthesia for clavicle surgery [Figure 2]. At 44<sup>th</sup> annual regional anesthesiology and acute pain medicine meeting in 2019, Roques et al demonstrated

combined superficial cervical plexus –clavipectoral fascia plane block for clavicle surgery.<sup>[6]</sup>

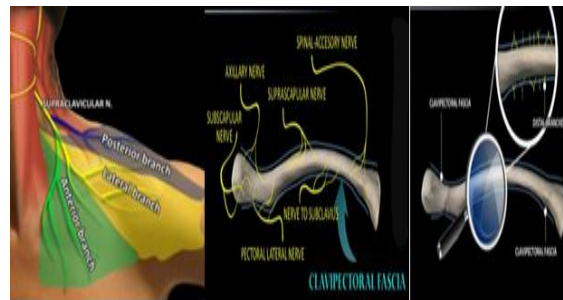
In this case series we aimed to demonstrate anesthetic and analgesic effect of combined superficial cervical plexus-clavipectoral fascial plane block in 10 cases of fractures mid shaft clavicle.

## MATERIALS AND METHODS

Total ten patients with mid shaft clavicle fracture scheduled for open reduction and plating in our institute during period from 15 June 19 to 15 Jan 20 were given combined superficial cervical plexus-clavipectoral fascia block. Before procedure, permission was obtained from Institutional Ethics Committee (IEC) and Scientific Advisory Committee of the institution and each patients signed an informed written consent form after Pre-Anesthetic assessment and counseling. All patients were advised to fast for 8 hours as per institutional protocol. In the operating room after attaching all essential monitors baseline parameters were recorded as per ASA guidelines. All patients were premedicated with Inj.Ondansetron 4 mg and Inj Midazolam 1mg intravenously. Injection dexmedetomidine infusion started at the rate of 0.5 mcg/kg/hour and continued till fixation of plate. Superficial cervical plexus block was given using 27 G needle by landmark technique in supine position using 0.375% ropivacaine 5 ml. Sono Site Ultra Sound System- EDGE with a 12 MHz linear

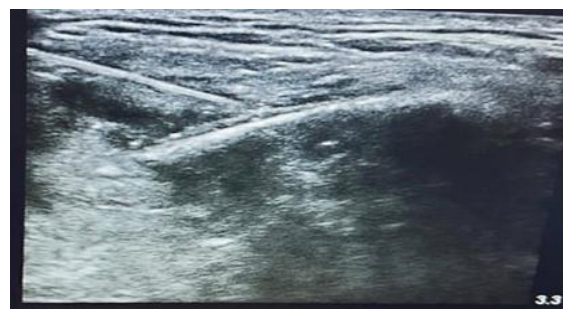
transducer was used for CPB. The ultrasound probe was placed on the anterior superior border of the medial third of the clavicle. After visualizing the clavicle and clavipectoral fascia using 22 G quincke needle 15 ml of 0.375% ropivacaine containing 25 mcg dexmedetomidine was deposited between the periosteum and the clavipectoral fascia [Figure 3]. Same procedure repeated on lateral side of clavicle. All equipments and drugs for GA kept standby. Any patient complaining of mild pain or comfort during surgery were initially managed with injection fentanyl 50 mcg. Any Patient requiring inj fentanyl more than 100 mcg was converted to GA. After surgery patient was kept in PACU for 30 min all requisite parameter were recorded before sending to ward. In ward MAP, Heart Rate and pain score was recorded 2 hourly for next 24 hours by trained nursing staff and anesthesia resident. In ward all patients were given injection PCM 1gm 08 hourly and at any VAS score more than 4 was managed with Inj tramadol 50 mg. A decrease in MAP more than 30% of basal reading was considered as hypotension and managed injectable Mephenteramine 03 mg intravenously. A decrease Pulse rate by 30% was considered as bradycardia and managed with injection atropine 0.6 mg intravenously. SpO2 less than 90% on room air was considered as an episode of desaturation and managed by oxygen @ 5L / min by face mask.

## RESULTS



**Figure 1, 2 & 3: Clavipectoral fascia plane block for clavicle surgery.**

\*Courtesy: Clavipectoral fascia plane block for clavicle surgery. You tube video; ASRA Society: 13 Apr 2019. // [www.youtube.com/watch=gNM\\_CD7Oqso](http://www.youtube.com/watch=gNM_CD7Oqso)



**Figure 4: USG guided Clavipectoral fascia plane block.**

**Table 1: Demographic characteristics of cases**

Sex	Male-10 (100%) Female-0 (0 %)
Age	Mean- 33.1 yrs SD 5.7 yrs
ASA	I-6 (60%) II- 4 (40%)

Total 10 cases were done under clavipectoral block. All ten cases were male. Out of ten 60% patient were in ASA status I and 40% were in ASA II. Mean Age of the patients were 33yrs.

**Table 2: Duration of surgery**

Case-1	Case-2	Case-3	Case-4	Case-5	Case-6	Case-7	Case-8	Case-9	Case-10	Mean + SD
130	110	90	120	60	68	105	140	70	126	101.9 + 28.45

Mean duration of surgery was 101.19 minutes.

**Table 3: Incidence of significant events during surgery**

Supplementary analgesia	01
Conversion to GA	Nil
Hypotension	Nil
Bradycardia	Nil

Only one patient complained pain during use of electric cautery. Pain well managed with single dose of inj fentanyl 50 mcg. No patient was converted in GA. No incidence of clinically significant bradycardia and hypotension noted.

**Table 4: Mean sedation score during surgery**

Case-1	Case-2	Case-3	Case-4	Case-5	Case-6	Case-7	Case-8	Case-9	Case-10
3.5	3.3	3.3	3.5	3	3	3.3	3.5	3	3.5

All patients were sedated with dexmedetomidine infusion during surgery but responding to verbal command.

**Table 5: Average pain score and rescue analgesia in post operative period**

Post operative analgesia assessment parameters	Case-1	Case-2	Case-3	Case-4	Case-5	Case-6	Case-7	Case-8	Case-9	Case-10
Average pain score	1.8	1.6	1.3	2	1.5	1.7	1.7	1.8	1.5	1.7
Time of first rescue analgesia	8hrs	0	0	6 hrs	0	0	8 hrs	0	0	12 hrs
Tramadol requirement in first 24 hrs	50	-	-	50	-	-	50	-	-	50

Average NRS score in 24 hrs of postoperative periods of patients were less than 2. Only four patients required tramadol as rescue analgesia. No patient required rescue analgesia in first six hours.

## DISCUSSION

Clavicle surgeries mostly performed under general anesthesia.<sup>[7]</sup> Regional anesthesia is preferred over general anesthesia in orthopedic surgery as it provides superior post operative analgesia with less adverse effects. There are various studies and case reports which suggest that combined superficial cervical plexus-interscalene block can be used as sole anesthetic method for clavicle fracture surgery.<sup>[8-10]</sup> Major drawback of ISB is involvement of phrenic nerve so it is contraindicated in patient with compromised respiratory function.<sup>[11]</sup>

Yashimura et al in their case reports demonstrated that clavipectoral fascia block can be used in patient with compromised respiratory function.<sup>[12]</sup> They observed that clavipectoral block has post operative analgesic effect similar to ISB for clavicle fracture. In our case series also, all patients had NRS less than 2 with injectable PCM only for first 06 hrs of post operative period. Only 4 patients required injection tramadol 50 mg as rescue analgesia in first 24 hours. We conclude that clavipectoral fascia block provides adequate post operative analgesia up to 6-8 hours.

Roque et al in their presentation described that combined cervical plexus- clavipectoral fascia block can be used as sole mode of anesthesia for medial end clavicle fracture surgery. In our case series also, we observed that combined cervical plexus-clavipectoral fascia block with infusion of dexmedetomidine provide adequate surgical anaesthesia for mid shaft clavicle surgery.

Dexmedetomidine infusion known to cause hypotension and bradycardia.<sup>[13]</sup> We have not observed any incidence of clinically significant bradycardia and hypotension in our case series at infusion rate of 0.5mcg/kg/hr. But all patients were well sedated during the surgery.

We observed that ultra sound guided combined superficial cervical plexus -clavipectoral fascia block with mild sedation can be used as sole mode anesthesia for clavicle surgery.

### Limitation

Low number of cases is main limitation of study. Multiple parameters not evaluated like number of needle pricks, patient satisfaction score.

## CONCLUSION

Our limited experience suggests that combined cervical plexus-clavipectoral block can be used as sole method of anesthesia for clavicle fracture. This method can be used in place of ISB in patient with compromised respiratory function and shoulder muscle weakness. Randomized control trials are required determine best option for surgery.

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