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A Clavipectoral Fascia Block Along With Superficial Cervical Plexus Block For Open Reduction And Internal Fixation Of Clavicle Using Landmark Technique-A Case Series

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Abstract:
Background*: Clavicle fractures represent 2–5% of adult fractures, most commonly involving the midshaft. Surgical fixation is often required in displaced fractures. General anesthesia though common ,involves risks such as airway manipulation and opioid-related side effects. Regional anesthesia provides superior analgesia and reduces opioid consumption. The clavipectoral fascial plane block (CPFB), combined with the superficial cervical plexus block (SCPB), offers targeted anesthesia while sparing the phrenic nerve.*
Materials and Methods*: This case series included 10 adult patients (ASA I–III) undergoing ORIF of the clavicle under RA. A landmark-guided CPFB was performed by injecting 22 mL of local anesthetic solution (20 mL 0.5% bupivacaine + 2 mL dexamethasone) around the fracture site, supplemented with SCPB using 8 mL of 0.5% bupivacaine. Adequacy of block was assessed with pinprick, patient comfort, and surgical conditions. Postoperative pain was measured using the Visual Analog Scale (VAS) and time to first rescue analgesia.*
Results*: Nine of ten patients achieved satisfactory surgical anesthesia without conversion to GA. Analgesia lasted 18–20 hours in most cases, with VAS ≤4 in the first 24 hours. One patient required intraoperative conversion, and another required rescue analgesia within 10 hours. The surgical field was relatively bloodless, and no major complications were reported.*
Conclusion: *Landmark-guided CPFB combined with SCPB is a safe and effective technique for clavicular fracture surgery. This phrenic-sparing, opioid-sparing technique is valuable in patients with respiratory compromise and in settings without ultrasound availability*
Key Word: *Clavipectoral fascial plane block, superficial cervical plexus block, clavicle fracture, regional anesthesia, landmark technique*

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I. Introduction

Clavicle fractures account for approximately 2–5% of all adult fractures, with midshaft injuries representing the majority (5,8). Surgical fixation is increasingly indicated in displaced and comminuted fractures, creating a demand for reliable anesthetic strategies. General anesthesia (GA) remains the most widely used approach; however, it carries potential drawbacks such as airway manipulation, opioid use, and hemodynamic fluctuations (3). Regional anesthesia (RA) has gained prominence in this setting due to its ability to provide effective intraoperative conditions, superior postoperative analgesia, and opioid-sparing benefits (7). Traditional RA options for clavicular surgery include superficial cervical plexus block (SCPB) and interscalene brachial plexus block (ISBPB). While effective, these techniques are associated with complications such as phrenic nerve palsy and motor block of the upper limb (6,3). The clavipectoral fascial plane block (CPFB), first described by Valdés in 2017, was designed as a procedure-specific block to address these shortcomings (5).

The rationale for CPFB is rooted in the complex innervation of the clavicle. The skin overlying the clavicle is supplied predominantly by the supraclavicular nerves, branches of the cervical plexus (C3–C4) (6). In contrast, the periosteum and deeper osseous structures receive contributions from several brachial plexus branches including the subclavian nerve (C5–C6), lateral pectoral nerve (C5–C7), and occasionally the long thoracic and suprascapular nerves (5,9). This dual innervation explains why SCPB alone often provides incomplete analgesia for clavicular fixation procedures.

The clavipectoral fascia is a dense connective tissue layer extending from the clavicle superiorly to the axillary fascia inferiorly. It envelops the subclavius and pectoralis minor muscles and is pierced by important neurovascular structures including the lateral pectoral nerve, thoracoacromial artery branches, and cephalic vein (10). Injection of local anesthetic beneath this fascia allows spread along the fascial plane, blocking the neural elements traversing the region while sparing the phrenic nerve, which lies outside this compartment (3).

By selectively targeting this anatomical plane, CPFB provides effective analgesia for clavicular surgery without the respiratory complications commonly seen with interscalene block (3,5). While ultrasound has facilitated the adoption of CPFB, access to imaging remains limited in many clinical settings. A surface anatomy-based landmark approach may extend the utility of CPFB in resource-constrained environments. Purnomo and Witjaksana reported successful use of a landmark-guided CPFB in clavicular surgery, highlighting its feasibility (1).

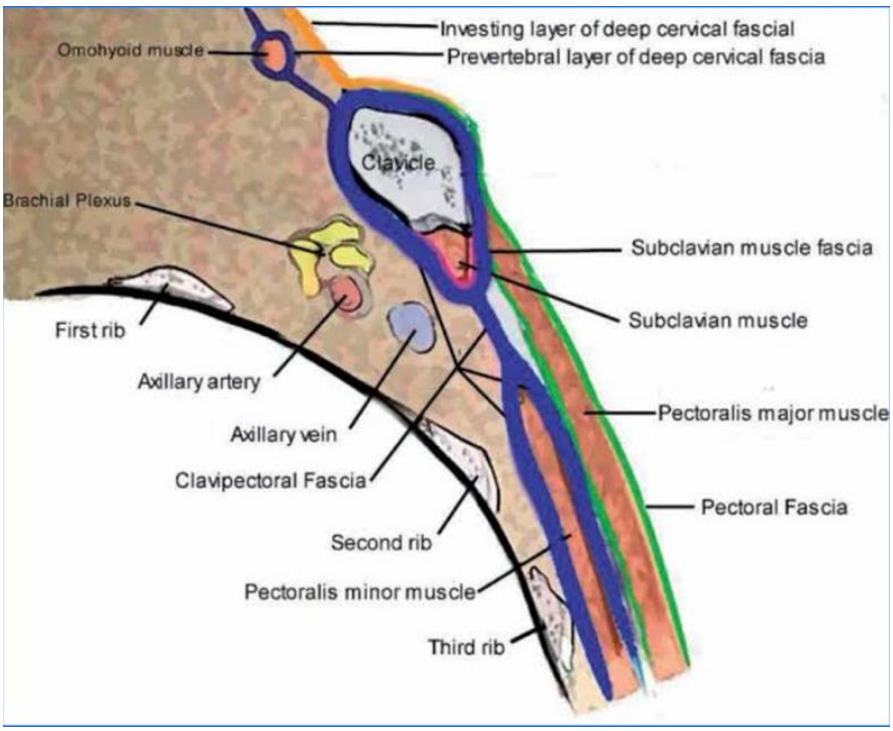

Figure 1: Anatomical depiction of the clavicle and surrounding fascial layers, muscles, and vascular structures. Illustrates the clavipecroral fascial plane targeted in regional blocks.

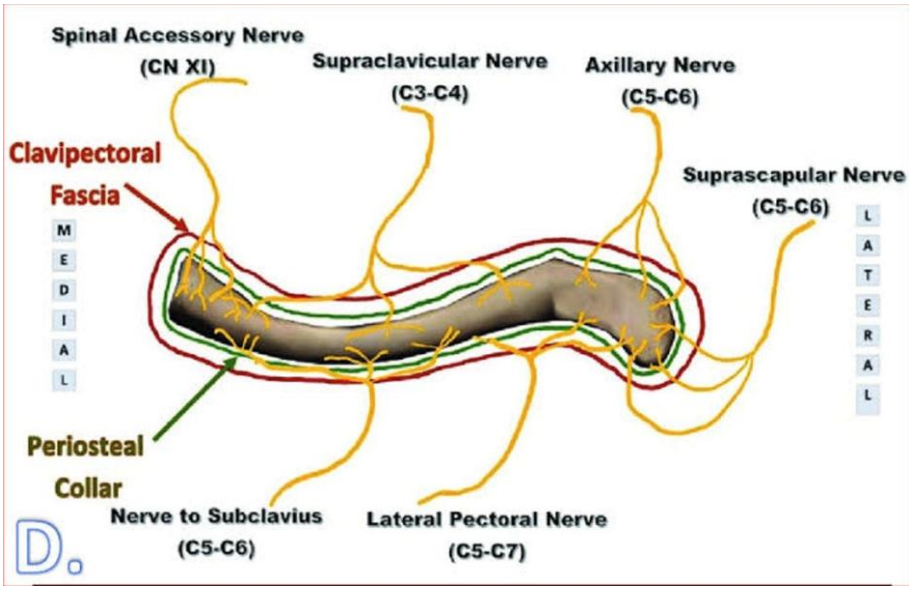

Figure 2: Schematic showing sensory innervation of the clavicle from cervical and brachial plexus branches. Highlights the clavipectoral fascia and periosteal pathways relevant for regional anesthesia.

II. Materials And Methods

This prospective interventional study was carried out on patients of Department of Anesthesiology, SIMS&RC, Bangalore, Karnataka, India from December 2023 to June. 2024. A total 10 adult subjects (male) of aged ≥ 18, years were for in this study.

Study Design: Prospective interventional study

Study Location: This was a tertiary care teaching hospital based study done in Department of Anesthesiology, SIMS&RC, Bangalore, Karnataka

Study Duration: December 2023 to June 2024.

Sample size: 10 patients

Patient selection: Ten adult patients scheduled for open reduction and internal fixation (ORIF) of the clavicle

Inclusion criteria:
Patient consent
Age >18 years
Fracture <7 days old
No neurological abnormality
Ability to cooperate during awake regional Anesthesia

Exclusion criteria:
Patient unwilling for procedure.
Patient on anti coagulants
Morbid obesity.

Methodology:

After institutional ethical committee clearance (SIMS&RC/EC-15/PG-07/2024-25) written informed consent was obtained from the patients who were recruited in the study. Ten adult patients scheduled for open reduction and internal fixation (ORIF) of the clavicle were enrolled Aged >18 years, Fracture <7 days old, no neurological abnormality, Ability to cooperate during awake regional anesthesia.

Following standard NPO guidelines, after shifting the patient to OR, Baseline vitals (heart rate, mean arterial pressure, SpO_2, ECG, temperature) were recorded. Intravenous access was secured with 18G cannula, and crystalloid fluids (Ringer lactate) were administered at 10 mL/kg.

The patient was placed in supine position with the head turned contralaterally and the clavicle was palpated to locate the fracture site. Under asterile precautions ,2% lignocaine was infiltrated into the skin and subcutaneous tissues at the fracture site.A 21G needle was inserted at an oblique angle over the medial third of the clavicle at 11 o clock position until bone contact was made .The needle was withdrawn slightly,and a 11mL of solution (10 mL of 0.5% bupivacaine + 1mL dexamethasone) was injected between the periosteum and the clavipectoral fascia in a fan shaped manner .The procedure was repeated on the lateral side of the fracture also .A total of 22 mL of the drug was deposited on either side .Using a 27G spinal needle, 8 mL of 0.5% bupivacaine was injected along the posterior border of the sternocleidomastoid, targeting the superficial cervical plexus. The distribution of the local anesthetic was assessed by manual palpation under the fascia, feeling for tissue turbulence. In selected cases, ultrasound confirmation was performed to ensure spread beneath the clavipectoral fascia Sensory blockade was confirmed using a pinprick test. Motor function of the upper limb was preserved. Adequate anesthesia was assessed by patient comfort and surgeon evaluation of the operative field was relatively bloodless.

Figure 3: Clinical image demonstrating ultrasound-guided clavipecroral fascia block technique.Shows in-plane needle insertion under aseptic conditions adjacent to the clavicle

Continuous monitoring of heart rate, blood pressure, and oxygen saturation was performed. Any patient reporting pain received incremental doses of intravenous fentanyl (25–50 mcg). If pain and discomfort persisted, the case was converted to general anesthesia.

Patients were observed in the post-anesthesia care unit (PACU) for 24 hours. Pain was assessed using the Visual Analog Scale (VAS) every 2 hours for the first 24 hours. Rescue analgesia with intravenous diclofenac 75 mg in 100 mL normal saline was administered if VAS $\geq$ 4/10.

Table 1: Patient Demographics and Anesthesia Details

Case	age (yrs)	gender	ASA grade	type of Anesthesia	conversion to GA
1	35yrs	M	ASA 2	CPB + SCPB	NO
2	36yrs	M	ASA 2	CPB + SCPB	NO
3	29yrs	M	ASA 1	CPB + SCPB	NO
4	38yrs	M	ASA 1	CPB + SCPB	NO
5	54yrs	M	ASA 3	CPB + SCPB	NO
6	25yrs	M	ASA 2	CPB + SCPB	NO
7	35yrs	M	ASA 3	CPB + SCPB	YES
8	52yrs	M	ASA 3	CPB + SCPB	NO

9	56yrs	M	ASA 3	CPB + SCPB	NO
10	39yrs	M	ASA 1	CPB + SCPB	NO

Table 2: Postoperative Analgesia and Rescue Analgesic Use

CASE	VAS SCORE (0-10)	TIME FOR FIRST RESCUE ANALGESIA (hrs)
1	3/10	20hrs
2	2/10	19hrs
3	3/10	20hrs
4	2/10	18hrs
5	3/10	19hrs
6	2/10	20hrs
7	8/10	09hrs
8	3/10	18hrs
9	3/10	19hrs
10	7/10	08hrs

III. Results:

Ten adult male patients undergoing open reduction and internal fixation of clavicle fractures were included in this case series. All patients received landmark-guided clavipectoral fascial plane block combined with superficial cervical plexus block. Adequate surgical anesthesia was achieved in 9 out of 10 patients, with one patient requiring conversion to general anesthesia due to inadequate block.

Postoperative analgesia was satisfactory in most patients, with VAS scores ≤3 for the first 18–20 hours in eight cases. Two patients required early rescue analgesia within 8–10 hours. Hemodynamic parameters remained stable intraoperatively, and motor function of the upper limb was preserved. No major complications such as respiratory distress, local anesthetic toxicity, or vascular injury were seen. Overall, the technique provided effective anesthesia and prolonged postoperative analgesia in the majority of patients.

IV. Discussion:

Clavicular and anterior superior shoulder regions derive their nerve supply from both the cervical and brachial plexuses, making any single regional block often insufficient for complete surgical and perioperative analgesia. Traditionally, a combination of superficial cervical plexus block and interscalene block has been used for ORIF of clavicular fractures; however, this approach carries a major drawback—the involvement of the phrenic nerve, making it relatively contraindicated in patients with compromised respiratory function (3,6).

Roque and Barros and Sampaio described the use of a combined cervical plexus–clavipectoral fascia block as a sole anesthetic technique for medial clavicle fracture surgeries (4). Similarly, Kukreja and MacBeth and Feinstein conducted a prospective observational study demonstrating the utility of CPFB as an adjunct analgesic technique (5). Yoshimura and Morimoto and Kusunoki further highlighted that CPFB can be safely used in patients with compromised respiratory function while preserving diaphragmatic function (2).

In our case series, a landmark-guided CPFB along with SCPB was employed in 10 patients undergoing ORIF of clavicular fractures. A total of 30 mL of local anesthetic (20 mL of 0.5% bupivacaine + 2 mL dexamethasone) was administered, achieving adequate spread along the clavipectoral fascia and 8 mL of 0.5% bupivaccaine was used for superficial cervical plexus block. The clavicle, being a superficial and easily palpable bone, allows the landmark technique to be feasible, particularly in settings where ultrasound guidance is unavailable.

Eight out of ten patients reported a visual analogue scale (VAS) score of less than 3 in the first 20 hours postoperatively, with analgesia lasting 20 hours. One patient required conversion to general anesthesia and rescue analgesia in the first 8 hours, and one patient required rescue analgesia with 75 mg of injectable diclofenac within the first 10 hours, indicating occasional variability in block efficacy. The surgical field was relatively bloodless, and no major complications were noted.

CPFB represents a focused, procedure-specific regional anesthesia technique. The landmark-guided approach, although less precise than ultrasound-guided techniques, can be valuable in resource-limited or rural settings, where general anesthesia may carry higher risk. Its advantages include targeted analgesia, phrenic nerve sparing, reduced opioid requirement, and facilitation of outpatient procedures. Limitations include variable anatomy, incomplete skin coverage without SCPB, and the potential for vascular puncture or local anesthetic systemic toxicity [1–5].

This case series demonstrates that CPFB, combined with SCPB using a landmark technique, provides effective surgical anesthesia and prolonged postoperative analgesia for clavicular fracture surgeries. Its feasibility in patients with respiratory compromise and in resource-limited settings highlights the technique's practical utility.

Limitations:
Small sample size limits generalizability.
Single centre study
Patient cooperation is essential
Lateral clavicular anesthesia may occasionally be inadequate due to local anesthetic spread into the axilla

V. Conclusion:

The landmark-guided clavipectoral fascia block, when combined with a superficial cervical plexus block, provides effective surgical anesthesia and prolonged postoperative analgesia for clavicular fracture surgeries. This technique offers a focused, procedure-specific approach while sparing the phrenic nerve, reducing opioid requirements, and minimizing airway manipulation—advantages that are particularly valuable in patients with compromised respiratory function or in resource-limited settings where ultrasound guidance or general anesthesia may be challenging.

Our case series demonstrates that the landmark-based CPFB is feasible, safe, and effective, with most patients achieving satisfactory analgesia lasting up to 18–20 hours. Although occasional variability in block efficacy may necessitate rescue analgesia or conversion to general anesthesia, the overall clinical outcomes are favorable. Further prospective studies comparing landmark-guided and ultrasound-guided approaches are warranted to optimize technique efficacy, safety, and reproducibility.

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