

Research Article**A Prospective Comparative Study of Clavipectoral Fascial Plane Block versus Interscalene Block for Postoperative Analgesia in Elective Clavicle Surgeries****Dr. P. G. Raghavendra¹, Dr. Sahana P R², Dr. Asif³**¹Associate Professor, Department of Anesthesiology, Raichur Institute of Medical Sciences (RIMS), Raichur, Karnataka, India.²Consultant Gynecologist, Raichur, Karnataka, India.³Assistant professor, Department of General surgery, RIMS Raichur.**Corresponding Author: Dr. P. G. Raghavendra****Received: 26-07-2025/ Revised: 12-08-2025/Accepted Date: 22-09-2025****Abstract**

Background: Clavicle fractures commonly require surgical fixation, and optimal perioperative analgesia is essential for patient satisfaction and recovery. Traditionally, the interscalene block (ISB) has been preferred for analgesia in clavicle surgeries; however, it carries risks such as phrenic nerve palsy and diaphragmatic dysfunction. The recently described clavipectoral fascial plane block (CPB) offers a potentially safer alternative while preserving diaphragmatic function.

Aim: To compare the analgesic efficacy, respiratory safety profile, and patient satisfaction between CPB and ISB in patients undergoing elective clavicle surgeries.

Methods: A prospective randomized study was conducted on 60 adult patients undergoing elective clavicle fixation. Patients were allocated into two groups of 30 each: Group CPB received clavipectoral block; Group ISB received interscalene block. Pain scores (VAS), time to first rescue analgesia, opioid consumption, diaphragmatic function, and complications were recorded.

Results: Both blocks provided effective postoperative analgesia. Mean VAS scores at rest at 6 hours were significantly lower in ISB group (2.1 ± 0.7) compared to CPB group (2.8 ± 0.9) ($p < 0.05$). However, hemidiaphragmatic paresis occurred in 46% of patients in the ISB group, while no diaphragmatic dysfunction was observed in CPB group. Time to first rescue analgesia was comparable (CPB 9.2 ± 2.3 hrs vs ISB 10.1 ± 2.6 hrs).

Conclusion: CPB provides effective analgesia comparable to ISB, with the added advantage of preserving diaphragmatic function. CPB may be preferred in patients where respiratory compromise is a concern.

Dr. P. G. Raghavendra et al / A Prospective Comparative Study of Clavipectoral Fascial Plane Block versus Interscalene Block for Postoperative Analgesia in Elective Clavicle Surgeries

Keywords: Clavipectoral block, Interscalene block, Clavicle surgery, Postoperative analgesia, Ultrasound-guided nerve block.

Introduction

Clavicle fractures represent approximately 2.6%–5% of all fractures, commonly affecting young active individuals[1]. Surgical fixation is preferred in displaced fractures to ensure anatomical restoration. Effective perioperative analgesia is crucial to reduce pain, facilitate early mobilization, reduce opioid consumption, and enhance overall patient outcomes[2].

The interscalene block (ISB) is widely used for shoulder and clavicle surgeries owing to its excellent analgesic efficacy. However, ISB is associated with high incidence (up to 100%) of transient phrenic nerve palsy, leading to diaphragmatic paresis and reduced pulmonary function, which may be problematic in patients with underlying respiratory disease[3,4].

The clavipectoral fascial plane block (CPB), introduced as a novel ultrasound-guided approach, targets the clavipectoral fascia surrounding the clavicle without affecting the brachial plexus or phrenic nerve[5]. It is proposed as a safer alternative with minimal impact on respiratory function.

This study aims to compare analgesic efficacy and respiratory safety between CPB and ISB in patients undergoing elective clavicle surgeries.

Materials and Methods

Study Design

A prospective, randomized, single-blinded comparative study.

Study Population

60 ASA I–II patients aged 18–60 years scheduled for elective open reduction and internal fixation of clavicle fractures.

Inclusion Criteria

- Elective clavicle surgery
- Age 18–60 years
- ASA physical status I–II

Exclusion Criteria

- Coagulopathy
- Local site infection
- Known allergy to local anesthetics
- Neuromuscular disorders
- Severe pulmonary disease

Grouping

CPB Group - Clavipectoral Fascial Plane Block 30

ISB Group - Ultrasound-guided Interscalene Block 30

Block Technique Summary

CPB: Injection between clavipectoral fascia and periosteum at medial and lateral fracture ends under ultrasound guidance; 20–25 ml 0.25% bupivacaine.

ISB: Injection around roots of C5–C6 under ultrasound; 20 ml 0.25% bupivacaine.

Outcome Measures

Primary Outcome: Pain score (VAS) at 2, 6, 12, 24 hours.

Secondary Outcomes: Time to first rescue analgesia, total 24-hr tramadol consumption, diaphragmatic function (ultrasound), complications, and patient satisfaction.

Statistical Analysis

Data analyzed using Student's t-test and Chi-square test. $p < 0.05$ was considered significant.

Results

Pain Scores (VAS at Rest)

Time	CPB Group	ISB Group	p-value
2 hr	2.4 ± 0.6	2.1 ± 0.5	0.09
6 hr	2.8 ± 0.9	2.1 ± 0.7	*0.02
12 hr	3.6 ± 0.8	3.1 ± 0.6	0.07
24 hr	4.1 ± 0.9	3.8 ± 0.7	0.18

Diaphragmatic Dysfunction

ISB Group: 14/30 (46%)

CPB Group: 0/30 (0%)

$p < 0.001$ (highly significant)

Rescue Analgesia

Time to first rescue analgesia:

CPB: 9.2 ± 2.3 hours

ISB: 10.1 ± 2.6 hours ($p = 0.14$)

Discussion

Dr. P. G. Raghavendra et al / A Prospective Comparative Study of Clavipectoral Fascial Plane Block versus Interscalene Block for Postoperative Analgesia in Elective Clavicle Surgeries

In the present study, both clavipectoral fascial plane block (CPB) and interscalene block (ISB) provided satisfactory postoperative analgesia in patients undergoing clavicle fixation. ISB demonstrated slightly superior analgesia in the early postoperative period, likely due to direct blockade of the upper roots of the brachial plexus which carry the majority of sensory fibers innervating the shoulder and clavicular region[3,7]. However, this advantage came at the expense of a significantly higher incidence of hemidiaphragmatic paresis caused by unintentional phrenic nerve blockade. Our study findings reinforce earlier research showing a 45–100% incidence of phrenic nerve involvement following ISB[4,8], making it less suitable for patients with respiratory compromise or reduced pulmonary reserve.

The CPB, on the other hand, acts by depositing local anesthetic between the clavipectoral fascia and periosteum, thereby blocking the terminal sensory branches that traverse the clavicle[6,9]. The preservation of diaphragmatic function in all patients in the CPB group confirms that the block avoids spread towards the brachial plexus and phrenic nerve. This supports recent anatomical and cadaveric studies which demonstrate that CPB is a fascial plane block with limited risk of motor blockade or pulmonary complications[10]. Although analgesia with CPB was marginally less intense in the first few hours compared to ISB, the overall duration of analgesia and total opioid consumption remained comparable between groups. This suggests that CPB is capable of providing clinically meaningful pain control, particularly when combined with multimodal analgesia.

From a clinical standpoint, the choice of block must balance analgesic efficacy with patient safety. While ISB remains the gold standard for shoulder procedures, its side-effect profile, especially in patients with asthma, COPD, rib fractures, or obesity, limits its use in clavicle surgeries where diaphragmatic function is critical. CPB offers a safer alternative, especially in ambulatory surgeries, elderly patients, or those requiring rapid recovery and early mobilization. Additionally, CPB is technically simpler under ultrasound guidance and may be associated with fewer complications such as Horner's syndrome, hoarseness, or upper limb weakness.

Overall, the results of our study align with emerging evidence that CPB can be adopted as a primary regional anesthesia technique for clavicle surgery, particularly when respiratory safety is a priority. Further large-scale randomized controlled trials are warranted to optimize volume, concentration, and combination strategies with other nerve blocks to enhance the block's analgesic consistency.

Conclusion

The clavipectoral fascial plane block provides comparable analgesia to the interscalene block while avoiding phrenic nerve dysfunction. Thus, CPB should be considered a preferable alternative, especially in patients where respiratory safety is a priority.

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Dr. P. G. Raghavendra et al / A Prospective Comparative Study of Clavipectoral Fascial Plane Block versus Interscalene Block for Postoperative Analgesia in Elective Clavicle Surgeries

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