

Superficial Cervical Plexus Block with Interscalene Block vs. General Anaesthesia for Clavicle Surgeries: A Randomized Comparative Study

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Conflict of interest: Nil

Abstract

Background: Clavicle fractures are a common injury to the shoulder girdle, with operative management recommended for displaced fractures with greater than 2cm of shortening. Clavicle surgery is typically performed under general anesthesia, with regional anesthesia methods rarely used. However, recent literature suggests that combined interscalene-cervical plexus blocks may be an effective alternative to general anesthesia for clavicle surgeries.

Material and Methods: This prospective randomized study aimed to compare the efficacy of anesthesia and postoperative analgesia between combined interscalene-superficial cervical plexus blocks and general anesthesia for clavicle surgeries. Sixty patients between the ages of 18-60 undergoing clavicle surgery were randomly allocated to either Group A (general anesthesia) or Group B (combined interscalene-superficial cervical plexus blocks).

Results: The results showed that surgery was completed exclusively under block in 90% of patients in Group B, with a mean duration of surgery of 2 hours. The study found that superficial cervical plexus block with interscalene block can be used as an alternative to general anesthesia for patients undergoing clavicle surgery. Regional anaesthesia provided better analgesia in terms of VRS score and also provided stable intraoperative hemodynamics.

Conclusion: The study suggests that combined interscalene-superficial cervical plexus blocks can improve outcomes and maintain the stability of vital functions and providing better analgesia for clavicle surgeries. The results of this study can be useful for clinicians in selecting an optimal nerve block for anesthetizing the clavicle and can inform the development of future research on regional anesthesia for clavicle surgeries.

Keywords: Interscalene Block, Superficial Cervical Plexus Block, Clavicle Surgery, PNS.

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Introduction

Clavicle fractures account for 35% of injuries to the shoulder girdle and generally occur after blunt traumas. For displaced clavicle fractures with greater than 2 cm of shortening, current recommendation is operative management with open reduction and internal fixation. [1, 2]

Clavicle surgery is usually performed under general anesthesia. Any regional anesthesia method for repair of a clavicular fracture has not been described and not commonly performed in current anesthesia practice. Although peripheral nerve blocks are commonly used for a wide variety of surgical procedures on the upper extremity, there are very few reports regarding

regional anesthesia for surgery of the clavicle. In the literature, proposed interventional strategies for clavicular fractures include superficial cervical plexus blocks, combined cervical plexus-deep cervical plexus blocks, and interscalene brachial plexus blocks. These techniques are usually used for analgesia of the clavicle. [1] Choosing the optimal nerve block to anesthetize the clavicle requires a thorough understanding of innervation, which remains controversial. The sensory innervation of the clavicle has been attributed to either the cervical or brachial plexus. [3, 4]

PNS -guided techniques have enabled the anesthetists to reduce doses of local anesthetic drugs and perform more successful blocks. As local anesthetic doses were reduced with the use of PNS and lower doses were administered, combined or multiple blocks have become possible.

In regard to the neuronal anatomy and clinical experience, the combined interscalene-cervical plexus block seems to be an effective block and may be a promising method for sufficient surgical anesthesia in clavicle surgery. We understand from very few case reports that interscalene brachial plexus blocks and combined interscalene-cervical plexus blocks are being used as a single anesthetic modality for surgery of the clavicle in some hospitals. [5] Up to date, there is neither a prospective study nor a well-established regional anesthesia method for clavicle surgery.

combined interscalene-cervical plexus blocks Improves the outcome, Maintain the vital functions of the patient stable, Shorten the duration of stay in hospital.

Objective

The objective of our study was to compare the efficacy of anaesthesia and post operative analgesia of combined interscalene- superficial cervical plexus block and general anaesthesia for clavicle surgeries.

Material and Methods

The present study is a prospective randomized study conducted at Maharaja Krushna Chandra Gajapati Medical College And Hospital, Odisha with 60 patients from June 2021 to December 2022. Written and informed consent was taken from all the patients.

Inclusion Criteria

- ASA I & II.
- 18-60 yrs.
- Undergoing clavicle surgery.

Exclusion Criteria:

- ASA III & IV.
- History of any CVS, CNS disorder.

Sample Size-60.

- Patients were randomly allocated into 2 groups:
- 1. Group A (n=30)- General Anaesthesia was administered
- 2. Group B (n=30)- Superficial Cervical Block + Interscalene Block was administered.
- Superficial Cervical Plexus (SCP) Block was given with 3ml of 2% Lignocaine + Adrenaline and 2ml of 0.5% Bupivacaine by Landmark Guided technique
- Interscalene Block (IS) Block was given with 18ml of 2% Lignocaine + Adrenaline and 12ml of 0.5% Bupivacaine by Landmark Guided + PNS technique.
- Sensory and motor conduction blockade was assessed in both the plexus territories, following which surgery ensued.
- Intraoperatively Heart Rate, SpO₂ (by Pulse Oximetry), NIBP were monitored in both the groups of patients.
- Post operatively patients were monitored for- duration of post operative analgesia provided by anaesthesia technique, need and amount of analgesic needed by the patients, duration of hospital stay, quality of life (observed by time taken to consume

water and food after surgery, throat soreness etc.)

Statistical Analysis

Frequency and proportion were used for analysis of categorical variables. Categorical outcomes were compared between study groups using Chi- Square

Test. Ordinal data and nonnormally distributed continuous data (presented as the median and interquartile range) were compared between the groups using the Mann–Whitney U test. P value<0.05 was considered statistically significant.

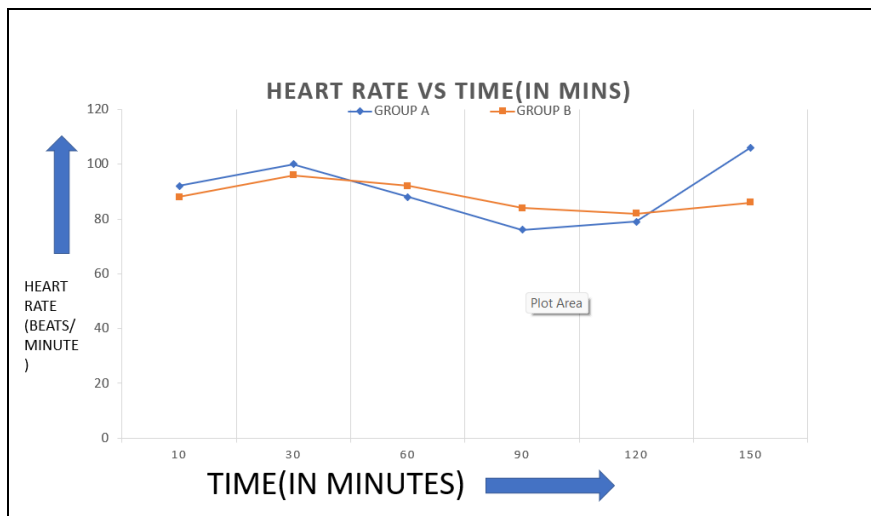
Study groups were comparable with respect to age, gender and weight. Surgery was completed exclusively under block in 27(Strategy success rate 90%) out of 30 patients. 2 patients were given supplementation of block with a local infiltration. 1 patient was turned from regional block to General Anaesthesia. Mean duration of the surgery was 2 hrs. (SD= 0.5 hrs.). No other complications were noted.

Results

Table 1: Comparison of Anthropometric Variables and Age between Two Groups

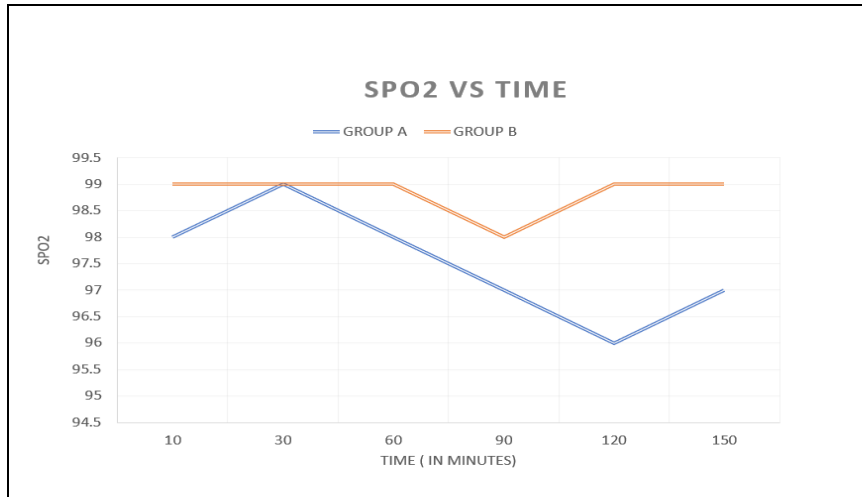
Parameters	Group A	Group B	P Value
Age(in years)	42±11.74	39.87±10.52	0.28
Weight	59.83±9.59	59.90±9.56	0.85
Female	13	13	
Male	17	14	

There were no statistically significant variation in the demographic profiles among the two groups (Table 1).



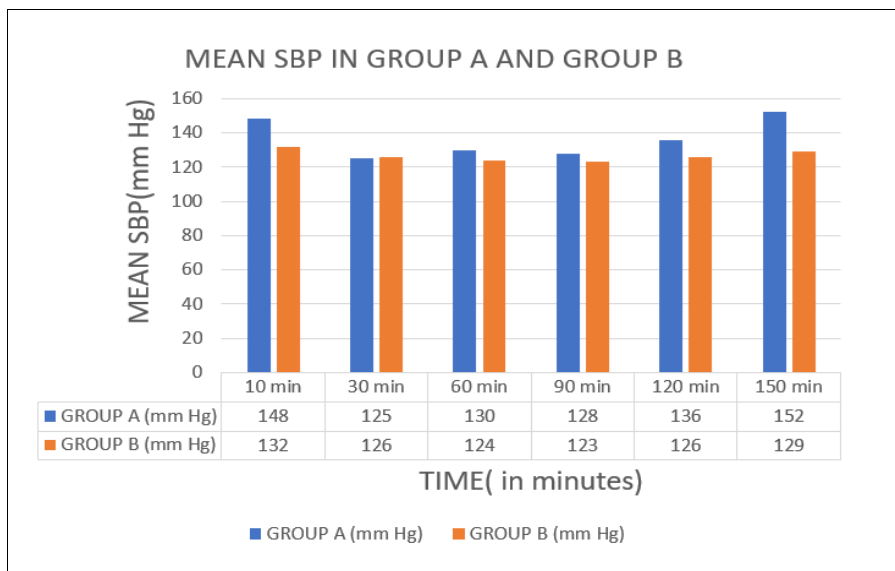
Graph 1: Heart rate Vs time (in mins)

Heart rate were comparable in the two study groups during the period of study.

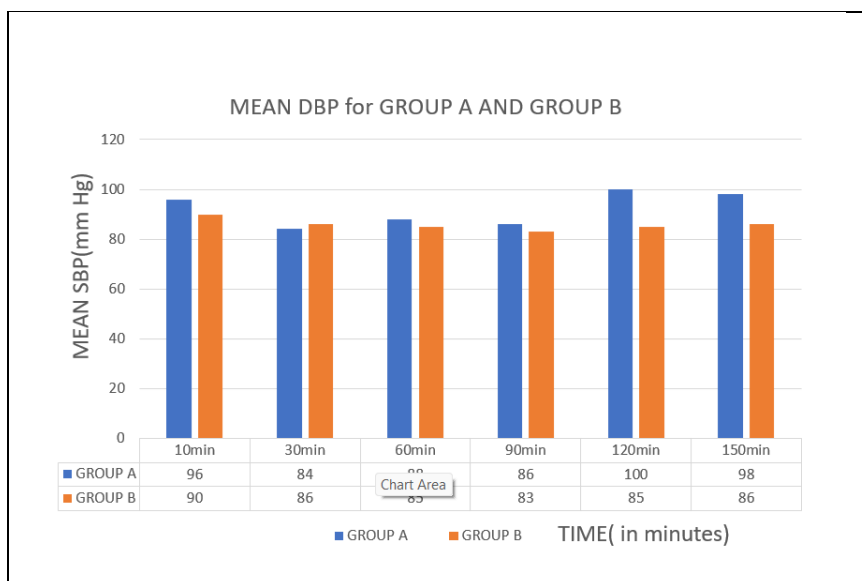


Graph 2: SpO₂

There was no statistical difference between SpO₂ among the two groups.



Graph 3: Mean SBP in Group A and Group B



Graph 4: Mean DBP for Group A and Group B

There was no significant difference between SBP and DBP among the two groups.

Table 2: VRS Scores

Time after Surgery	Group A	Group B
1 HR	1	0
2 HR	2	0
4 HR	3	1
6 HR	3	1
10 HR	3	2

Rescue analgesia was given as inj paracetamol infusion iv 1gm was initiated for VRS scores more than 1 and given tds if the scores continued to be high.

Mean time for post op consumption of clear liquids.

Group A- 7.8hrs

Group B- 2.5hrs

Discussion

Interscalene and superficial cervical plexus blocks have proven to be reliable and effective in clavicle fracture surgeries, with regional anesthesia shortening hospital stays and improving early postoperative functional outcomes when compared to general anesthesia. [6] A literature review by Tran et al. [1] aimed to understand the sensory innervation of the clavicle, and suggested that the supraclavicular, subclavian, and long thoracic/suprascapular nerves, alone or in combination, may be responsible for pain transmission after clavicular fracture and surgery. However, the exact role of individual nerves remains controversial.

These nerves enter the skin at the middle of the posterior border of the sternocleidomastoid muscle at the level of C3, which is located superior to Erb's point and includes the fifth cervical nerve to the plexus, contributing to the formation of one of the motor branches of the cervical plexus, the phrenic nerve. Therefore, the cervical plexus is defined as a network of nerves formed by the ventral rami of C1-C5 nerves, giving off both motor and sensory branches. [7] The exact sensory innervation of the clavicle and overlying skin is not well

defined and varies in the literature from C3 to C6. The supraclavicular, subclavian, and long thoracic/suprascapular nerves, alone or in combination, may be responsible for pain transmission after clavicular fracture and surgery. [1, 8]

There is a confusing nomenclature in the literature regarding cervical plexus blocks, with various techniques described for proper injection. The classical technique involves subcutaneous injection of local anesthetics, which has been clinically effective for carotid endarterectomy. [9] In some reports, superficial cervical plexus injections are suggested to be "intra-dermal" or administered into the body of the sternocleidomastoid muscle. The subinvesting fascia injection might be termed the "intermediate cervical plexus block". [10] In this study, the authors preferred the term "intermediate cervical plexus block," as the local anesthetic distribution was within the prevertebral fascia.

Regmi et al. conducted a prospective study with 60 patients and concluded that the combination of interscalene block and superficial cervical plexus block (ISB + SCPB) is more effective than interscalene block (ISB) alone for clavicular plating, with both techniques successfully avoiding general anesthesia. [11] The authors found that the visual rating scale (VRS) score was significantly lower in group B than in group A, which is consistent with the findings of Manuel Shaji Shara Azikakath et al.

Conclusion

From our study, we conclude that superficial cervical plexus block with

interscalene block can be used as an alternative to general anaesthesia for patients undergoing fracture clavicle surgery.

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