Original Research Article

Regional Anaesthesia For Clavicular Surgeries- A Systematic Review

Dr. Isha Chopra[1], Dr. Sushil Chhabra[2] , Dr. Diksha[3]

[1]Assistant Professor, NIMS University, Jaipur

[2]Associate Professor, NIMS University, Jaipur)

[3]Junior Resident, Department of Anaesthesia and Intensive Care, Patiala

Corresponding Author : Dr. Diksha

Junior Resident, Department of Anaesthesia and Intensive Care, Patiala

Email : drdikshagarg96@gmail.com

Abstract:

The clavicle gets sensory enervation from both the cervical plexus as well as brachial plexus with variable contribution. This review was done to determine if regional anaesthesia with ultrasound can serve as the sole anaesthetic technique for clavicular surgeries.

Keywords: Clavicle fracture, Brachial Plexus block, Cervical Plexus block, Ultrasound

INTRODUCTION

Fractures of the clavicle are one of the common fractures encountered in young as well as pediatric population, encompassing almost 2-5% of all the fractures[1]. Commonly, these fractures are managed with conservative treatment, the most widely accepted among them being a supportive sling[2]. Operative treatment is indicated for completely displaced shaft fractures, open fractures, concomitant vascular injuries or nerve injuries[3].

In most of the hospital settings, these surgeries are performed under general anaesthesia as it provides very good surgical conditions but off late, there has been a surge in such cases being done under regional anaesthesia which may be a combination of different approaches of brachial plexus and cervical plexus blocks.

The clavicle has a variable sensory innervation, receiving branches from supra clavicular, subclavian and supra scapular nerves, which makes it difficult to do it solely under brachial plexus block[4]. Pertaining to its combined innervation by cervical plexus and brachial plexus, a combination of the two blocks is needed to get a successful anaesthetic outcome.

OBJECTIVE

The objective of this review is to systematically review and analyse the current research on the efficacy of combination of ultrasound guided Interscalene block and Cervical plexus block as a sole anaesthetic technique for clavicular surgeries.

SEARCH STRATEGY AND SELECTION CRITERIA

This systematic review was performed after thoroughly searching two databases (PubMed and EMBASE). The search terms used were "local anaesthetics", "interscalene block", "cervical plexus block", "regional anaesthesia" and "clavicular surgeries".

Only observational studies were included in this review and articles in language other than English were excluded.

RESULTS

We could find 20 studies from PubMed and 4 studies from EMBASE. After screening the titles, abstracts and then, full texts of these studies, we included four observational studies in our review.

One study observed the effect of ultrasound guided intermediate cervical plexus block and interscalene block as a sole anaesthetic technique in patients undergoing clavicular surgeries. 0.5ml/kg of Bupivacaine was used and total dose was divided equally between the two blocks[5].

Another study performed ultrasound guided interscalene block and superficial cervical plexus block with 7.5 ml of 2% Lignocaine and 7.5 ml of 0.5% Bupivacaine for interscalene and 5 ml of 0.5% Bupivacaine with 5 ml of 2% Lignocaine for superficial cervical plexus block[6].

Azikakath et al conducted an observational study to establish the effectiveness of ultrasound guided interscalene along with intermediate cervical plexus block, where they injected 20 ml of 0.5% Bupivacaine

with 2% Lignocaine in the interscalene and used 6 ml of the same combination for the intermediate cervical plexus block[7].

A nother study used 10 ml of 0.5% Bupivacaine for both interscalene and cervical plexus block each[8].

The block was considered successful when it did not need conversion to general anaesthesia. Balaban reported 100% success rate, all surgeries could be easily done under the regional anaesthesia only. Only one patient needed supplemental analgesic with deeper manipulation of the clavicle[5].

Another study reported the need for additional sedation and analgesia in 4 cases, where as one of their patients with medial fracture needed conversion to general anaesthesia[6].

Azikakath et al documented the need for supplementing two of the study patients with ketamine 50 mg during manipulation. These cases were not considered into block failure as no further supplementation was needed[7].

Arjun et al reported better successful outcome with intermediate cervical plexus block as compared to superficial cervical plexus block[8].

Table 1: The personal and study characteristics of the selected studies

Study	Anaesthesia	Member	Age (yrs)	Success Rate
Balaban et al	IS + ICPB	12	34.31 ± 20.11	100 %
Kacriod et al	IS + SCPB	16	44 ± 14	93.75 %
Azikakath et al	IS + SCPB	30	38.5 ± 13.88	100 %
Arhun et al	ICPB / SCPB	50	38 ± 14.9	100 % / 80 %

IS-Intersclene block, SCPB-superficial cervical plexus block, ICPB-Intermediate cervical plexus block

There were no complications related to the block in any of the studies, probably because all the studies were performed under ultrasonographic guidance. The surgeons were satisfied with the anaesthesia modality in all the studies.

DISCUSSION

Surgeries for the clavicular fractures are usually performed under general anaesthesia, as these surgeries need deep and efficient anaesthesia because of variable and diverse nerve supply of clavicle. Also, these surgeries are commonly performed in sitting position where the airway access becomes difficult. Regional anaesthesia for the clavicular surgeries offers several advantages over general anaesthesia as it provides more stable hemodynamics, lesser nausea and vomiting, significant post operative analgesia and thus, better patient satisfaction[9].

Regional anaesthesia for clavicular surgeries includes combination of brachial plexus and cervical plexus blocks. Literature reports the use of interscalene or supraclavicular block combined with superficial, intermediate or deep cervical plexus blocks[10].

Our review suggests that combined interscalene brachial plexus and cervical plexus block can provide effective anaesthesia for clavicular fracture surgeries. The cervical plexus can be targeted with different approaches. The superficial cervical plexus block consists of a subcutaneous injection just at the posterior border of sternocleidomastoid muscle, whereas in an intermediate cervical plexus block, the injection is made deep to the sternocleidomastoid muscle, under the investing fascia of the neck. In deep cervical plexus block, injection is made in proximity to the transverse processes of the cervical vertebrae[11].

Our review suggested that intermediate cervical plexus block provides superior analgesia than superficial cervical plexus block, when combined with brachial plexus block.

There were a few limitations of our study. We did not study the duration of post operative analgesia and post operative opiod consumption. Also, we included only observational studies in our review. Additionally, the drugs, volume and concentration used were heterogenous.

CONCLUSION

Regional anaesthesia for clavicle, when performed under ultrasound, proves to provide safe and effective anaesthesia, with decreased incidence of complications, thereby, leading to better patient outcome and satisfaction.

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