

# Efficacy and Safety of Ultrasound Guided Interscalene Block Versus Combined Suprascapular and Axillary Nerve Blocks as Pre-Emptive Analgesia for Arthroscopic Shoulder Surgery

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## ABSTRACT

Combined suprascapular nerve and Axillary nerve blocks (Shoulder Block) can provide a safe effective alternative to the interscalene block, with adequate intra-operative and postoperative pain relief after arthroscopic shoulder surgeries and with viable diaphragmatic sparing and less other complications.

**Keywords:** Shoulder arthroscopy, Interscalene block, Shoulder Block, Stress hormones, Cortisole level

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## DESCRIPTION

Arthroscopic shoulder surgeries result in significant intraoperative and postoperative pain. This pain can be severe enough to interfere with postoperative mobility, may lead to prolonged hospital stay and delayed hospital discharge (Fredrickson MJ, *et al.*, 2010).

Pre-emptive analgesia is an optimum analgesic treatment that prevents establishment of central sensitization and altered central processing of afferent input that occur after incisional and inflammatory injuries (Woolf CJ and Chong MS, 1993).

For shoulder arthroscopy, regional anesthesia is better than General Anesthesia (GA) because of the extended postoperative analgesia and rapid recovery towards discharge (Wilson AT, *et al.*, 2004).

GA with a regional nerve block reduces intraoperative anesthetic requirements resulting in rapid recovery and reduction of postoperative pain (Borgeat A and Ekatodramis G, 2002).

On the basis of the fact that ISB provides anesthesia for the shoulder joint by blocking C5 and C6 nerve roots and most of the nerve supply to the shoulder from these two nerve roots are carried by two nerves-namely, the suprascapular and the axillary nerves-the Shoulder Block (ShB) that involves the combined block of these two specific nerves was proposed to provide intra-operative and postoperative analgesia for the shoulder surgery as a safe alternative to ISB (Checcucci G, *et al.*, 2008).

Interscalene Brachial Plexus Block (ISB) is considered the current standard approach as it provides effective intra-operative and postoperative analgesia. It has the potential for many complications. The most common of these complications is phrenic nerve palsy which is reversible but may produce respiratory distress less common complications include Horner's syndrome, recurrent laryngeal nerve block that cause hoarseness of voice, vascular puncture, brachial plexus neuropathy, unintended injection of local anaesthetic in subarachnoid space (Urmey WF and McDonald M, 1992; Wurm WH, *et al.*, 2003), also produces intense motor block of the shoulder, which may extend to the hand, predisposing the patient to injuries, and thus more distal block may be more appropriate and safe (Borgeat A, *et al.*, 2001; Price DJ, 2007).

The suprascapular nerve supplies sensation for most of the posterior, medial, and superior part of the shoulder joint capsule. It also supplies the supraspinatus and infraspinatus muscles of the rotator cuff and some branches to the teres minor, the glenoid, acromion, and the posterior surface of the scapula (Price DJ, 2007).

The anterior, lateral, and inferior structures of the shoulder joint are supplied by the axillary nerve, which also supplies the deltoid muscle and gives some fibers to the teres minor. The axillary nerve also supplies the skin overlying the deltoid muscle (Singelyn FJ, *et al.*, 2004).

Combined suprascapular nerve and Axillary nerve blocks (Shoulder Block) can provide a safe effective alternative to the interscalene block, with adequate postoperative pain relief after arthroscopic shoulder surgeries and with viable diaphragmatic sparing (Singelyn FJ, *et al.*, 2004).

Using ultrasound-guided brachial plexus block has many advantages than other techniques as it allows direct visualization of the nerve roots, decreases the number of the attempts, decreases the total dose of the used local anaesthetic, improves the quality of the block and allows for faster onset with longer duration of the block (Aysel I, *et al.*, 2013).

Normally, there is a circadian rhythm for stress hormones, the common of which is cortisol, with a gradual increase after night sleep to reach a peak at early morning wake up time, followed by a gradual decrease as the day goes by.

As a result of blocking the afferent impulses from the surgical site, decrease of the endocrinal stress response to the surgical procedure is observed. Furthermore, this decrease of such stress response is considered as an important indicator of a successful regional block (Katz FH, *et al.*, 1975).

However, this rhythm may be interrupted by any stressful condition such as acute pain associated with surgery, which was proved to be accompanied by a progressive rise in cortisol level intraoperatively as well as in the early postoperative period (Katz FH, *et al.*, 1975).

So, the effect of pre-emptive nerve block appears in suppression of serum cortisole level, normal haemodynamic parameters, normal reading in visual analogue scale scores and less first analgesic requirement postoperative (Elshamaa HA, 2015).

## CONCLUSION

The specific blockades of the suprascapular and axillary nerves (ShB) using ultrasound guidance for the block may be as effective as ISB for intra-operative and postoperative pain relief and in decreasing of stress hormones during and after shoulder arthroscopy, but with fewer side effects, so Shoulder Block is better than interscalene block.

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