

ULTRASOUND GUIDED PERINEURAL DEXMETETOMIDINE VERSUS DEXAMETHASONE AS ADJUVANT TO LVOBUPIVACAINE IN SUPRACLAVICULAR BRACHIAL PLEXUS NERVE BLOCK FOR UPPER LIMB SURGERY - A PROSPECTIVE COMPARATIVE STUDY

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Abstract

Background: Surgery on the upper extremities frequently uses the highly efficient supraclavicular block. the least amount of problems, whether combined with general anaesthesia or used as the only anaesthetic for upper limb surgery. **Materials and Methods:** The study was carried out at Bhaskar Medical College and General Hospital from January 2022 to April of 2022 with permission from the hospital's ethical review board. Using a type 1 error of 0.05 and a type 2 error of 0.2, the pilot study's sample size of 60 participants was chosen. The two groups each received a 0.25 percent levobupivacaine supraclavicular perineural injection along with dexamethasone in one group and dexmedetomidine in the other. **Result:** Each group had 30 patients, and there were no statistically significant differences in the demographics of the groups. Levobupivacaine is a long-acting local anaesthetic drug, whereas perineural dexmedetomidine and dexamethasone enhance block quality, effectiveness, and duration. Ultrasound guidance allows for secure needle placement and visual tracking of the local anaesthetic's distribution during supraclavicular brachial plexus nerve blocks. **Conclusion:** Levobupivacaine is a long-acting local anaesthetic, and perineural dexmedetomidine and dexamethasone increase block quality, effectiveness, and duration, Dexamethasone was seen with better block quality in comparison. Real-time ultrasound pictures permit direct observation of the distribution of local anaesthetic, making brachial plexus nerve blocks easier to conduct safely and effectively.

INTRODUCTION

Substantially and successfully, the supraclavicular block is employed for procedures involving the distal upper extremities.^[1,2] It is a safe alternative to or complement to general anaesthesia for distal limb surgery. In upper extremity surgery, however, there have been conflicting findings on the efficacy of these techniques. Although targeted medication combinations for the supraclavicular block have not been studied,^[1] 2 agonist, corticosteroid, bicarbonate, or opioid has been shown to prolong the local anaesthetic's effects following a supraclavicular block. In patients with hyperthyroidism or cardiovascular illness, its use is restricted for this reason.^[3-6] Pneumothorax, phrenic

nerve block, Horner syndrome, neuropathy, and nerve injury are uncommon side effects of supraclavicular nerve block.^[7,8] Adjuvant medicines used in conjunction with a local anaesthetic can lessen the amount of the anaesthetic needed for a nerve block, lessen the likelihood of any adverse reactions to the anaesthetic, and boost the drug's effectiveness. Buprenorphine,^[9] dexamethasone,^[10] magnesium,^[11] and midazolam,^[12] are just some of the new drugs that have been used in this field. Dexamethasone is an extremely potent, long-acting glucocorticoid with sustained analgesia lasting up to 48 hours. Peripheral nerve block analgesia is enhanced when dexamethasone is added to perineural local anaesthetics. Their use has been proposed and studied with the hopes of decreasing

the onset block time, increasing the duration time of analgesia without incidence of unwanted systemic complication, elongating the motor block, and ultimately decreasing the total dose of local anaesthetics drug. Hemodynamic stability, calming effect, and analgesia are all benefits of alpha-2 receptor-stimulating medications that have been addressed recently.^[13]

Dexmedetomidine, like clonidine, is the active d-isomer of medetomidine. Dexmedetomidine is degraded in two ways, through liver glucuronidation and cytochrome P450.^[14,15] It is a selective 2 agonist with a 2: 1 ratio of 1620:1. Dexmedetomidine has just been added to the list of medications used in the nerve block, which also includes bupivacaine. During their 2016 study, Singh et al,^[16] looked at what happened when Dexmedetomidine was mixed with levobupivacaine. In 2016, Tripathi et al,^[17] examined the results of using bupivacaine in a brachial plexus block against adding Dexmedetomidine or clonidine. Using their calculations, they found that dexmedetomidine sped up the beginning of the motor and sensory block. This not only improves the block's anaesthetic and pain-relieving effects, but also makes them last longer. Additive local anaesthetics have been the subject of some research.^[18] Contrarily, administering local anaesthetic as a unit medication to enhance block quality is not advised.^[19] Twenty-five trials evaluating the effectiveness and safety of dexmedetomidine were examined in two meta-analyses of randomised controlled trials. The study suggests that more investigation into the benefits and risks of preneural injection of dexmedetomidine is warranted. This study compared the effects of a supraclavicular block in upper limb orthopaedic surgery with and without dexmedetomidine on sensory and motor block duration time, pain score, and hemodynamic changes. The pinprick test and the Bromage scale are being used as major measures of sensory and motor block quality in our study.

Thereafter, patients used a VAS to rate their level of discomfort.^[20]

MATERIALS AND METHODS

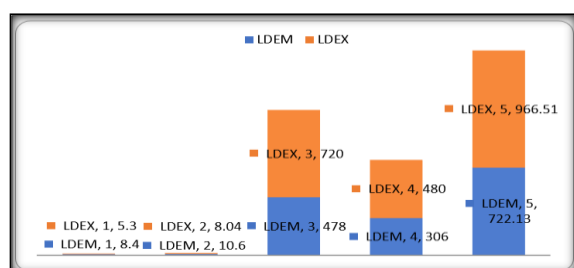
The study lasted for four months, from January to April of 2022, and was done at Bhaskar Medical College and General Hospital with clearance from the hospital's ethical review board. The pilot research used a 30% difference in sensory block length as the cutoff for statistical significance (type 1 error = 0.05, type 2 error = 0.2). 60 patients with asa1 status undergoing elective upper-limb surgery under usgscbp block were split evenly between two groups for this research. Patients in the l dem (n=30) group were given 50 mcg of dexmedetomidine along with 30 cc of 0.25% levobupivacaine. Dexamethasone (8mg) in 0.25 percent levobupivacaine (30ml) was administered to group 2 dex (n=30). Patients with no consents, bleeding problems, neuropathic illness, or intolerance to local anaesthetic medications were excluded from the randomized prospective comparison trial of asa1 for elective upper limb surgery.

RESULTS

Our study compared 30 patients in each group, the demographic profile was comparative and no significant difference. Onset of sensory block in l dem group 8.40+/-2.01 mins, and l dex group 5.30+/-1.34 mins Onset of motor block l dem 10.64+/-2.13 and dex 1 group is 8.04+/-0.96 mins Sensory block duration in l dem group 478.02+/-60.15 and dex 1 group 720.48+/-60.45 mins Motor block in dem 1 group 306+/-32.52 and dex 1 group 480.93 +/-60.90. Time of rescue analgesia in l dem group is 722.13+/-114.42 and l dex group is 966.51+/-121.48 mins. All block characteristics are significant and p value <0.001.

Table 1: Variables

Variables	1DEM	1DEX	P value
Sensory block onset(mins)	8.40+/-2.01	5.30+/-1.34	<0.001
Motor block onset(mins)	10.64+/-2.13	8.04+/-0.96	<0.001
Sensory block duration (mins)	478.02+/-60.15	720.48+/-60.45	<0.001
Motor block duration (mins)	306+/-32.52	480.93+/-60.90	<0.001
Time for first rescue analgesia (mins)	722.13+/-114.42	966.51+/-121.48	<0.001



DISCUSSION

Operations on the furthest joints of the upper limbs are common places for the safe and effective use of the supraclavicular block. For distal limb surgery, the approach is utilised either in conjunction with general anaesthesia or as the only anaesthetic option, and it has a very low complication rate. Nonetheless, conflicting data has been published on the efficacy of these techniques in upper extremity surgery. However, specific medication combinations for the supraclavicular block have not been

explored. Levobupivacaine is long acting local anesthetic drug, perineural dexmedetomidine and dexamethasone both enhance block quality, efficacy and duration. ultrasound guided supraclavicular brachial plexus nerve block provides real time images, with safe needle placement and visual local anesthetic spread.

Dexmedetomidine combined with bupivacaine for supraclavicular brachial plexus nerve block had comparable results for Shahrayar sane et al. The combined effects of dexmedetomidine and bupivacaine sped up the duration of numbness and immobility and sped up the rate at which sensory and motor function were blocked. Also, the combination of bupivacaine for supraclavicular block and dexmedetomidine greatly decreased postoperative discomfort.^[21]

Dexmedetomidine and ropivacaine for supraclavicular brachial plexus nerve block: a systematic review and meta-analysis by Anjan das et al.^[22]

Dexamethasone was examined as an adjuvant in usgscbp with a modest dosage of 20ml 0.5% bupivacaine, and the results showed a block duration of no more than 7 hours. The duration of analgesia after low-volume supraclavicular brachial plexus block is greatly extended by the addition of dexamethasone. Adjunctive dexamethasone was well tolerated by patients, with no serious adverse events reported.^[23]

Consistent with other research, we found that dexmedetomidine sped up the onset of sensory and motor block and lengthened its duration. Previous research studies had conflicting results due to the use of numerous medications at once and the variation in the definition of the onset time of sensory and motor block, which both contributed to the reduction in the onset time of block in the present study.

Researchers Nidhi Singh et al. evaluated the effects of dexmedetomidine in ropivacaine sscbp to those of dexamethasone and a placebo group.^[24]

The onset of sensory block was quicker in the bupivacaine group compared to the bupivacaine plus dexmedetomidine group in a 2012 trial involving 70 patients done by Gandhi et al.^[25]

Research by Bharti et al.,^[26] divided 60 patients into two groups: a control group given ropivacaine and lidocaine with adrenaline, and an intervention group given dexmedetomidine 1 g/kg plus additional medicines.

Dexmedetomidine, when combined with other drugs, has been shown to increase the duration of motor block of the brachial plexus and the duration of postoperative analgesia.^[27]

CONCLUSION

Adjuvants such perineural dexmedetomidine and dexamethasone are helpful and efficient, and they have great block properties. Due to its rapid start of

action, increased duration of action, and decreased sensitivity to pain, dexamethasone is a superior adjuvant to dexmedetomidine when used in conjunction with levobupivacaine for postoperative pain management.

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