



## COMPARISON OF EFFICACY OF EXTRAFASCIAL VS SUBFASCIAL DEPOSITION OF LOCAL ANAESTHETIC IN ULTRASOUND GUIDED SUPRACLAVICULAR BRACHIAL PLEXUS BLOCK

**Dr. C.Karpagavalli** M.D DA\* Senior Assistant Professor of Anesthesia - Corresponding Author

**Dr.Kavitha** Post Graduate, Institute of Anaesthesiology, Govt. Rajaji Hospital, Madurai Medical College, Madurai – 625020.

**ABSTRACT** **BACKGROUND:** Brachial plexus blockade is a time-tested technique for upper limb surgeries. The classical approach using paresthesia technique is a blind technique and may be associated with a higher failure rate and injury to the nerves and surrounding structures. Ultrasound for supraclavicular brachial plexus block has improved the success rate of the block with excellent localization as well as improved safety margin. Hence, this study was planned for comparing efficacy of extrafascial Vs subfascial deposition of local anaesthetic in ultrasound guided supraclavicular brachial plexus block in terms of block time, readiness for surgery, duration of analgesia, duration of motor block.

**METHODS:** 60 patients were selected and divided into two groups Subfascial group: drug: 15 ml [7.5ml of 2% lignocaine with adrenaline and 7.5ml of bupivacaine] under ultrasound guidance and Extra fascial group : 15 ml [7.5ml of 2% lignocaine with adrenaline and 7.5 ml of bupivacaine] under ultra sound guidance block time, readiness for surgery, duration of analgesia, duration of motor block were observed.

**RESULTS:** The subfascial approach provides faster onset of surgical anaesthesia with lesser amount of local anaesthetics and prolonged postoperative pain relief compared to extrafascial approach in ultrasound guided supraclavicular nerve block

**KEYWORDS :** Brachial plexus blockade, Subfascial, extrafascial, ultrasound

### 1. INTRODUCTION :

Pain is “an unpleasant sensory or emotional experience associated with actual or potential tissue damage, or described in terms of such damage.” It is an unpleasant effect associated with significant psychological and physiological changes during surgery and postoperative period. This can be overcome by the use of suitable drugs and techniques. Regional anesthetic techniques have specific advantages both for stand-alone anesthesia or as analgesic supplements for intraoperative and postoperative care. Brachial plexus blockade is a time-tested technique for the upper limb surgeries.[1] The first supraclavicular brachial plexus block was performed by Kulenkampff in 1912.[2] The classical approach using paresthesia technique is a blind technique and may be associated with a higher failure rate and injury to the nerves and surrounding structures.[3] To avoid some of these problems, use of peripheral nerve stimulator was started which allowed better localization of the nerve/plexus.[4,5] However, this technique may not be foolproof with persistent risk of injury to surrounding structures, especially vascular structures, nerves,[6] and pleura leading to pneumothorax.[7] The application of ultrasound technique for exact localization of nerves/plexus[7] has revolutionized the regional anesthesia field where in ultrasound probes with suitable frequencies have been successfully tried. Ultrasound for supraclavicular brachial plexus block has improved the success rate of block with excellent localization as well as improved safety margin. Hence we planned a study to compare efficacy of extrafascial Vs subfascial deposition of local anaesthetic in ultrasound guided supraclavicular brachial plexus block in terms of block time, readiness for surgery, duration of analgesia, duration of motor block

### 2. AIM

Comparison of Efficacy of extrafascial Vs subfascial deposition of local anaesthetic in ultrasound guided supraclavicular brachial plexus block in terms of: Block time, Readiness for surgery, duration of analgesia, duration of motor block

### 3. MATERIALS & METHODS

**TYPE OF STUDY-** Prospective case control study, Randomized double blind study [patient and observer.] **SAMPLE SIZE-** 60 **PATIENTS.** Patients posted for elbow, below elbow surgeries were selected based on inclusion criteria Randomisation – simple randomisation. Institutional ethical clearance was obtained

### INCLUSION CRITERIA

- Age 18 TO 60 years.
- ASA I, II, III

### EXCLUSION CRITERIA

- Patient refusal
- Coagulation disorder
- Allergy to local anaesthetics
- Neurological deficit
- Skin infection at supraclavicular fossa.

### Groups:

- **Subfascial group :** drug : 15 ml [7.5ml of 2% lignocaine with adrenaline and 7.5ml of bupivacaine] under ultrasound guidance
- **Extra fascial group :** 15 ml [7.5ml of 2% lignocaine with adrenaline and 7.5 ml of bupivacaine] under ultra sound guidance

### Parameters monitored:

- Block time
- Readiness for surgery
- Duration of analgesia
- Duration of motor block

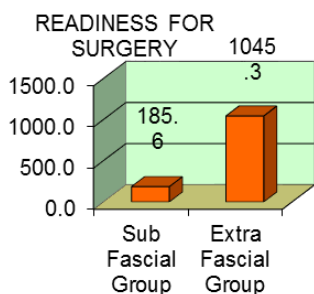
All observed data were entered in proforma sheets and analysed with statistical tool spss 16 software Under U/S guidance supraclavicular brachial plexus block was performed using 18 gauge needle, attached to a 10 ml syringe via a three way by a 100 cm pressure monitoring line. The pressure developed during the conventional Extra Fascial or Sub Fascial injection of drug was monitored by a 100 cm pressure monitoring line with the help of three way adapter. With the help of Ultrasound the Needle tip was seen and then 2ml of normal saline was infiltrated to confirm the position. A mixture of LAs (7.5 ml each of 2% lignocaine with adrenaline and 0.5% bupivacaine) was uniformly used for both approaches. After satisfactory drug deposition under Ultrasound guidance, the final needle removal time was noted. Assessment of surgical site pain while attempting motor manoeuvre, scale 1 -sensory block (assessed on a 3-point qualitative scale for perseverance of cold), scale-1 motor loss (assessed on 3-point qualitative scale) in the four nerve territory were used

### 4. RESULTS:

**TABLE:1 BLOCK TIME BETWEEN TWO GROUPS**

Block Time in sec	Sub Fascial Group	Extra Fascial Group
Total	16	16
Mean	167.5 sec	476.1sec
Std	21.525	36.969
P'value	<0.001 Significant	

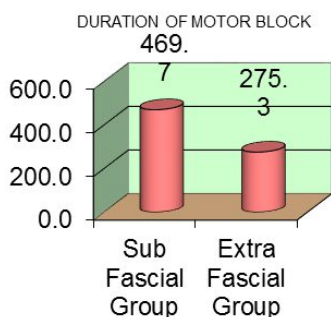
**FIGURE: 1 READINESS FOR SURGERY**



**TABLE:2 DURATION OF MOTOR BLOCK BETWEEN TWO GROUPS**

Duration of motor block in min	Sub Fascial Group	Extra Fascial Group
Total	16	16
Mean	469.7	275.3
Mean in hrs	7 hrs 50 min	4 hrs 35 min
Std	15.107	11.614
P'value	<0.001 Significant	

**FIGURE:2 DURATION OF MOTOR BLOCK BETWEEN TWO GROUPS**



**TABLE:3 TIME TO FIRST ANALGESIA REQUEST**

Time to first analgesic request in min	Sub Fascial Group	Extra Fascial Group
Total	16	16
Mean	460.3	255.6
Mean in hrs	7 hrs 40 min	4 hrs 15 min
Std	16.329	10.308
P'value	<0.001 Significant	

**TABLE:4 COMPARISON OF ALL THE PARAMETERS OBSERVED**

PARAMETERS	GROUP EF	GROUP SF	P VALUE
Block time (min)	476.1+ <sub>36</sub> sec (7.23 min)	167.5+ <sub>21</sub> sec (2.79min)	<0.001 MORE SIGNIFICANT
Readiness for surgery (min)	185.63+ <sub>18</sub> sec (17.43 min)	1045.63+ <sub>18</sub> sec (3.09min)	<0.001 MORE SIGNIFICANT
Duration of motor blockade (min)	275.3 + <sub>11</sub> min (4 hrs 35 min)	469.7+ <sub>15</sub> min (7 hrs 50min)	<0.001 MORE SIGNIFICANT
Time to first analgesic request	255.6+ <sub>10</sub> min (4 hrs 15 min)	460.3+ <sub>16</sub> min (7hrs 40min)	<0.001 MORE SIGNIFICANT

**5. DISCUSSION & CONCLUSION**

Peripheral nerve blocks are cost-effective anesthetic techniques used to provide good quality anesthesia and analgesia while avoiding airway instrumentation and hemodynamic consequences of general anesthesia. Patient satisfaction, a growing demand for cost-effective

anesthesia and a favorable postoperative recovery profile have resulted in increased popularity for regional techniques. Brachial plexus block is an easy and relatively safe procedure for the upper limb surgeries. Williams et al. compared ultrasound and nerve stimulator for the supraclavicular brachial plexus block. They have reported that in Group US, 85% of blocks could be successfully achieved without supplementation, compared with 78% in nerve stimulator group.[8]. Kapral et al. studied ultrasound-guided supraclavicular block. They found that there was no significant difference in the extent of the motor or sensory block of the ulnar, median, and radial nerve between the two groups 1 h after application of block. The onset of plexus block was similar in both groups between 10 and 20 min, with complete analgesia occurring in 40 min.[9] The subfascial approach provides faster onset of surgical anaesthesia with lesser amount of local anaesthetics and prolonged postoperative pain relief compared to extrafascial approach -There is dissipation of drug to the surrounding tissues There are more chances for drug wastage and chances for phrenic nerve damage. There is variation and delay in the onset of sensory and motor block. The readiness for surgery is prolonged. The request for analgesia is sooner. The motor blockade recovery is fast. Subfascial approach -There is no wastage of drug and The onset of blockade is fast, Readiness for surgery is quick and The time taken for motor blockade recovery is delayed The first analgesic requisition time is also prolonged Subfascial deposition of LA provides faster onset of surgical anaesthesia and prolonged analgesia without any persistent neurological deficit with lesser amount of local anaesthetic agent

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