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Original Research Article

An Ultrasound Guided Double Point Injection in Supraclavicular Block: A Novel Approach with Better Efficacy

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Abstract Background:
Regional anesthesia now a days are commonly used as a sole technique or combined with general anesthesia for patients undergoing surgery, as it decreases the postoperative morbidity and post operative pain in patients.
Portability and handy machine had markedly increased the use of ultrasound for regional anesthesia. Ultrasound guided blocks Provide excellent efficacy and durability of the block if placed correctly. Single point deposition of drug is traditional. Approach followed for supraclavicular Brachial plexus block in this study. We intended to compare the efficacy of single point approach with double point drug deposition approach

Aim and Objective
To evaluate the single point versus double point injection technique of ultrasonography guided supraclavicular Block.

Methodology:
A single center based prospective observational Study was conducted in Gandhi medical college Bhopal, after Ethical clearance,60 patient was included in the study who underwent electives or emergency upper limb surgery and were randomly divided into 2 group, 30 patient in each group as, Group S (single point) and Group D (double point). As Per routine institutional protocol supraclavicular block was administered to the patient under ultrasound guidance in group S drug was deposited in single point around plexus bunch that is 11O'clock with respect to subclavian artery and in group D Drug was deposited in 2 Point around brachial plexus bunch that are in the corner pocket formed between subclavian artery and 1st rib and 11O'clock with respect to subclavian artery.
Both the groups were observed for parameters like success of block, onset of sensory block, onset of motor block, duration of sensory block, duration of motor block and for any complication.

Result:
The mean onset of sensory blockade was 7.393±.735 minutes in **group D** and in **group S** it was 10.47±1.22 minutes. The mean onset of motor blockade was 9.800±1.646 minutes in **group D** and **group S** it was 13.870±1.350 minutes. The mean duration of sensory block in **group D** was 167.07±19.767 minutes and in group S, it was 141.40±14.041 minutes. The mean duration of motor block in group D was 143.07±19.287 minutes and in group S, it was 112.40±12.88 minutes. All the above difference between group S and group D found to be statistically significant ($p<0.001$). The mean duration of Sensory and motor block was significantly faster in group D compared to group S.

Conclusion:
We conclude that double point ultrasound guided supraclavicular block is more superior than single point injection, as it provides a significantly early onset of sensory and motor block

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with prolonged duration of sensory and motor block with no significant complication and hemodynamic changes

Key words: ultrasound, supraclavicular, single point, double point

1. INTRODUCTION:

Regional anesthesia nowadays is commonly used as a sole technique or combined with general anesthesia for patients undergoing surgery, as it decreases the postoperative morbidity and post operative pain in patients. Brachial plexus block is a commonly practiced technique performed to provide anesthesia and analgesia for upper limbs.
Portability and handy machine had markedly increased the use of ultrasound for regional anesthesia. Blocks under ultrasonography give exact position of needle and proper delivery of drugs Which ultimately provide a complete and reliable block with less complication {1}.
Single point injection in a corner is the most common approach practiced. In corner approach as the full volume of drug is unloaded in a single point it may cause improper spread and sparing of the nerve block with complication
{3}. In this study we intended to compare the efficacy of single point injection with double point injection supraclavicular

2. METHODOLOGY

A prospective observational study, was conducted in Gandhi medical college Bhopal in department of Anesthesiology after approval of ethical committee. Total of 60 patients between the ages of 18-65 years of either gender belonging to ASA grade I-II, who underwent electives or emergency upper limb surgery were included in the study and randomly divided into 2 group, 30 patient in each group each, S (single point) and D (double point)
Patients were excluded, If Patient refused to give consent for the procedure.
A patient information sheet was given to all the subjects of study and the procedure was explained to them thoroughly, written and informed consent for the conduct of study was obtained. All the selected patients underwent routine investigation required for the pre anesthetic checkup and there was no research specific investigation done. The anesthesia plan was as per the choice of the in-charge anesthesiologist and institutional protocol. No attempt to change the anesthesia technique was made.
The patients in the theater were attached with standard monitors and all the patients of each group were premeditated with injection ondansetron 0.08- 0.1mg/kg, midazolam 0.02mg/kg and fentanyl 1 μg/kg intravenously prior to procedure. With an aseptic precaution painting and draping done
The position of the patient was kept supine with head turned to opposite side and arm adducted. A small pillow or folded sheet was placed below the shoulder at the interscapular area. Under all aseptic precautions ultrasonography was done at the level of supraclavicular region and structures traced from cephalic to caudal direction. The subclavian artery brought to the center of the screen and the plexus

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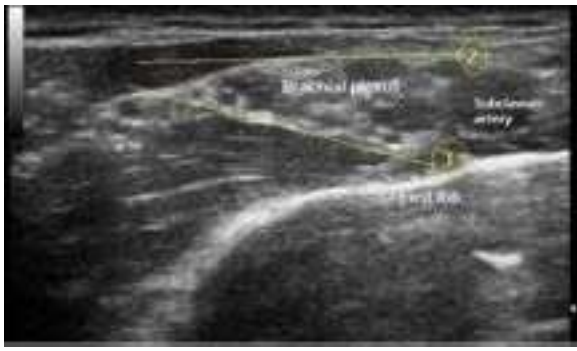

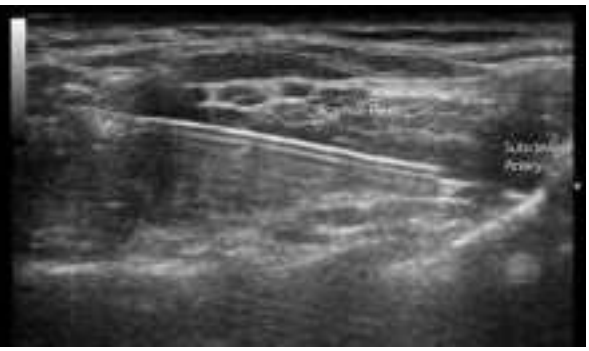

Figure 1 Single point injection (group S) **Figure 2 double point injection (Group D)**

Patient of group S received single point injection at 11 O'clock position with respect to subclavian artery, after repeated negative aspiration confirmation 20ml of drug was injected Were as group D patients receiving double point injection technique, initially the needle is passed between the artery and plexus.

To avoid injury to these structures, hydro-location/hydro-dissection with 0.5 - 1 ml of normal saline was done. Once the needle reached the corner pocket formed by the subclavian artery and first rib, 10 ml of 0.5% bupivacaine was injected with repeated aspiration. The needle then slowly withdrew, and the remaining 10 ml of 0.5% bupivacaine was deposited as in single point injection technique {4}. And each group of patients was observed for Number of attempts.

success of block (Analgesia of area supplied by median, ulnar, musculocutaneous and radial nerve. onset of sensory block b assessing pin prick by 23 gauge needle ,Onset of motor block-time noted after attainment of Bromage scale 1.Duration of motor block- defined as duration between Bromage scale 2 and return to Bromage scale 0.Duration of sensory blockade-defined as duration between the onset of sensory block to pain in the anesthetized limb (VAS>3). And for Complications like arterial puncture, local

anesthetic toxicity, nerve injury and pneumothorax.

3. OBSERVATION & RESULT:

In our study 60 patients were included of age 18-65 years. The mean age of the study was 30.00+/- 11.6.1 years. In group D 83% of study patients were male and 16. % were female and in group S 76% were male and 23.3% were female. Our study included a wide range of weight and height. The mean weight of the study patients in group D was 57.00+/- 6.45 kg and in group S mean weight was 54.30+/-6.81. In group D 43% of patients were of ASA grade I and 56.7% were of ASA grade II were as in group S 43.3% was of grade I and 56.7% was of grade II.

In this study the mean onset of sensory blockade was 7.393±.735 minutes in **group D** and in **group S** it was 10.47±1.22 minutes. The association was found to be statistically significant ($p<0.01$) (Table 1) Shows that sensory block was significantly lesser in **group D** compared to **group S**.

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Table 1: Comparison of mean onset of sensory block between the two groups

Group	Mean	SD	p value
Group D	7.3933	.73564	.0001
Group S	10.4700	1.22218	

The mean onset of motor blockade was 9.800±1.646 minutes in **group D** and **group S** it was 13.870±1.350 minutes. The above association found to be statistically significant (p<0.001) (Table 2) and the mean onset of motor block was significantly faster in **group D** compared to **group S.**

Table 2: Comparison of mean onset of motor block between the two groups

Group	Mean	SD	p value
Group D	9.800	1.646	.0001
Group S	13.870	1.350	

The mean duration of sensory block in **group D** was 167.07±19.767 minutes and in group S, it was 141.40±14.041 minutes. The above association found to be statistically significant (p<0.001) (Table 3). The mean duration of sensory block was significantly higher in group D compared to group S

Table 3: Comparison of mean duration of sensory block between the two group

Group	Mean	SD	p value
Group D	167.07	19.767	.0001
Group S	141.40	14.041	

Unpaired 't' test applied. P value <0.05 was taken as statistically significant*

Unpaired 't' test applied. P value <0.05 was taken as statistically significant*
The mean duration of motor block in group D was 143.07±19.287 minutes and in group S, it was 112.40±12.88 minutes. The above association was found to be statistically significant (p<0.001). The mean duration of the motor block was significantly faster in group D compared to group S.

Table 4: Comparison of mean duration of motor block between the two groups

Group	Mean	SD	p value
Group D	143.07	19.287	.0001
Group S	112.40	12.888	

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No other significant association was found with comparison of single point group and double point group

4. DISCUSSION:

Regional anesthesia nowadays is a preferred technique for upper limb surgery as it gives excellent hemodynamic stability during intraoperative course with good postoperative analgesia, also allowing patients for early mobilization. Regional anesthesia is proven for cost effectiveness with lower rate of procedure drug related complication. Portability with ease of use gives great accessibility to ultrasound in the world of regional anesthesia. Real time ultrasonography enables us to accurately visualize the structure and accurate placement of the drug which further increases the efficacy of the block.

Onset of block effect is one of the important factors which significantly decreases the theater stay of the patient and early start of surgery in our study, we found that in double point technique the onset duration was significantly less then single point injection. The mean time of onset of sensory block and motor block in double point injection was 7.393+/- 0.73 minutes and 9.800+/-1.64 respectively. **Choi JJ** et al {2} found that the rate of onset of blockade in both sensory and motor was significantly less in D group. **Choudhary N et al {**4} found rate of sensory block and motor block was significantly less in double point injection group, they also proposed the encircling of the brachial plexus in double point injection which may lead to faster onset. **Pallath NM et al {**7**}** found that time of onset for sensory and motor for individual nerve blocks is faster in double point injection. In another study conducted by **Sayed AM et al {**5**}** found that early initial sensory and motor block was achieved early and post injection after 5 min grade 1 sensory and motor block were significantly higher in double point injection.

Duration of the sensory and motor block is the most important aspect of the brachial plexus block which gives an adequate time and relaxation for the surgical procedure and also provides adequate anesthesia and postoperative analgesia to the patient. In our study we found that the mean duration of sensory and motor block in double point injection group (Group D) was significantly higher than the single point injection (Group S). The mean duration of sensory and motor block in group D was 167.07+/-19 minutes and 143.07+/-19.28 minutes respectively. **Choudhary N et al {4}** found that the mean duration sensory block and motor block was significantly, they suggested the reason for prolonged block was even Distribution and systemic absorption of the local anesthetic. **Pallath NM et al {7}** and **Hemlata et al {6}** also noted a significantly prolonged sensory and motor block in the double point injection group.

Use of ultrasound significantly reduces complication, and, in our study, we encountered only 2 arterial punctures, which could be due to close proximity of the nerve plexus and variable quality of ultrasound image.

5. CONCLUSION:

We conclude that double point ultrasound guided supraclavicular block is more superior than single point injection, as it provides a significantly early onset of sensory and motor block with prolonged duration of sensory and motor block with no significant complication and hemodynamic changes.

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Study Limitation

The study was performed only in patients with ASA grade I and II.

In study we had used the fixed concentration of drug irrespective to patient weight and lastly the degree of sedation was not considered

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