



COMPARISON OF TWO DIFFERENT TECHNIQUES FOR BRACHIAL PLEXUS BLOCK – INFRA CLAVICULAR (CORACOID APPROACH) AND AXILLARY APPROACH

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ABSTRACT **Background:** Infraclavicular block of brachial plexus by coracoid approach provides an adequate sensory and motor blockade, with sufficient tourniquet tolerance, and better postoperative analgesia when compared to axillary approach. This study was therefore undertaken to evaluate the clinical efficacy of infraclavicular block in comparison with axillary block, and both approach guided by peripheral nerve stimulators. **Methods:** Sixty patients of ASA group I and A, undergoing upper limb surgeries were randomly assigned into two groups, Group I and Group A. 30 patients received an infra - clavicular block in Group I, and other 30 patients received an axillary block in group A. Block performance time, sensory and motor blockade, tourniquet tolerance and its quality, duration of postoperative analgesia, first rescue analgesia time and block related complications were observed **Results:** Study showed that the time to perform block was shorter, with good quality of tourniquet tolerance, with successful proximal as well as distal blockade was there in Group I. Infraclavicular brachial plexus block is clinically effective with least vessel puncture complications.

KEYWORDS : Infraclavicular block, Axillary block, Post-operative analgesia

INTRODUCTION:

Peripheral nerve blocks are gaining widespread popularity for perioperative pain management because of their distinct advantages over general and central neuraxial anaesthesia.[1] In the past few years infra clavicular brachial plexus block has become a method of increase interest. This block targets the musculocutaneous, axillary and intercostal brachial nerves at the level of the cords before these nerves leave the brachial plexus “sheath”.[2] This block carries no risk of accidental intrathecal, epidural, intravertebral injection, stellate ganglion block, paralysis of hemi diaphragm or pneumothorax. This block can be considered an alternative to the axillary approach in instances where abduction of the arm is uncomfortable or difficult, or when infection is located at the axilla.[3] This study was therefore undertaken to evaluate the clinical efficacy of infraclavicular block in comparison with axillary block, and both approach guided by peripheral nerve stimulators.

METHODS:

After approval from the Institute's ethical committee and written informed consent from the patients, this prospective randomized study conducted. Intravenous access was obtained. Anesthesia machine checked and resuscitative equipments and drugs were kept ready. This study consisted of 60 patients of age >14years, ASA I_III undergoing surgery for both elective/emergency of below elbow of either sex. In Group I, the infra clavicular block was performed with the patient lying in supine position with his head turned in the direction opposite the limb to be anaesthetized. The arm to be blocked laid in neutral position, along the body. Point of entry of the needle-2cm caudad and medial to the corocoid process, as per Wilson approach. Using sterile technique, a 100mm 22gauge insulated short bevel needle was inserted perpendicular to the skin and connected to the nerve stimulator that was programmed with the following variables: current 2.0mA and frequency 2Hz. In the absence of upper extremity motor response, the needle was redirected either caudad or cephalad but never medially to avoid the pleura. In presence of motor response, the intensity of the current was reduced to 0.5mA and after negative aspiration 30ml of local anaesthetic (15ml of 2% lignocaine&15ml of 0.5% bupivacaine were injected .Goal is to achieve a hand twitch preferably “medianus” using a current of 0.4mA. In group A the patient was placed in supine position with 90 degree abduction of the arm, flexion of forearm 90 degree with external rotation so that the forearm lies parallel to the long axis of the body. The arterial pulse should be identified and followed as proximal as possible to the point beneath the pectoralis major. A 22G 100mm stimulating needle is introduced until appropriate motor response in the hand at 0.4-0.5 mA. Motor response at elbow causing flexion indicates musculocutaneous nerve which is outside the neurovascular bundle. Injection at this end point will result in blockade of only this nerve. Following identification of EMR, 30ml of LA is injected after negative aspiration. Parameters observed were mean time to perform block, tourniquet tolerance and duration, successful

block (defined as analgesia in the five nerves to the elbow namely musculocutaneous, median, ulnar, radial and medial cutaneous nerve of forearm), onset of analgesia, onset of motor blockade, duration of motor blockade, duration of analgesia, tourniquet tolerance, vital parameters and complications.

STATISTICAL TOOLS:

The information collected regarding all the selected cases were recorded in a Master chart. Data analysis was done with the help of computer using Epidemiological Information Package. (EPI 2002). Using this software range, frequencies, percentages, means, standard deviations, chi square, ‘p’ and coefficient of correlation values were calculated. Kruskal Wallis chi-square test was used to test the significance of difference between quantitative variables. A ‘p’ value of less than 0.05 is taken to denote significant. If the coefficient of correlation is more than 0.5 then the two variables are taken to be correlated.

RESULTS & DISCUSSION:

Brachial plexus block like other regional anaesthetics, offers specific advantage to the patient, surgeon, anesthesiologists and surgical facility, which may not be true for use of general anesthesia. This anesthesia is limited to a restricted portion of body on which the surgery will be performed. It is possible and desirable for the patient to remain ambulatory patient who present for surgery with an upper extremity at risk of vascular compromise may improve as soon as the pain has been relieved and vasodilatation has been produced by the block. Whenever the tourniquet is to be used, the intercostobrachial nerve has to be blocked by additional infiltration. The infraclavicular approach was developed to overcome these limitations. It has gained favor of use with the patients in whom continuous block technique is desired, because maintaining an aseptic dressing at this site is more practical than at one at axilla. By statistical analysis of two groups the age distribution in both groups was not significant with the ‘p’ value of 0.1291. Similarly the sex distribution, weight and duration of surgery was also comparable in both groups with ‘p’ value of >0.05.

TABLE 1: COMPARISON BETWEEN BOTH GROUPS

	Group I	Group A	P' value
Age	15-60(29.8)	15-60(34.9)	0.1291
Sex	21/9	24/6	0.551
Weight	30-70(55.5)	40-70(55)	0.7057
Tourniquet tolerance(good/fair/poor)	30/-/-	17/11/2	0.0002
Time to perform block	2-7min(3.67)	3-7min(4.53)	0.0034
Onset of motor blockade	3-10min(5.2)	5-10 min (7.23)	0.0001
Onset of sensory blockade	5-15min(7.5)	7-15min(10.53)	0.0001
Total duration of analgesia	10-20 hours(15.07)	6-12hours(9.33)	0.0001

Proximal block	3	0-3	0.0001
Distal block	4-5(4.97)	4-5(4.67)	0.0029
Vas	1.57	2.37	0.001
Complications	-	11	0.0001

P value <0.05 is significant

TIME TO PERFORM BLOCK: Time to perform block in Group-I, ranges from minimum of 2 minutes to maximum of 7 minutes, with the mean of 3.67, and the standard deviation of 1.42, and in Group-A, the time to perform the block ranges from 3 minutes to maximum of 7 minutes, with the mean of 4.53 min, and the standard deviation of 1.14, with the 'p' value of 0.0034, which is significant. Study by Wellers R S showed the same result [4] **ONSET OF SENSORY BLOCKADE:** Mean onset of sensory block in group I was 7.5 min mean and in group A it was 10.53 min. The difference between the two groups was statistically significant with a 'p' value of 0.0001. [4] **ONSET OF MOTOR BLOCKADE:** Mean onset of motor blockade in group I was 5.2 min, and in group A it was 7.23 min which was statistically significant with the 'p' value of 0.0001. **TOURNIQUET TOLERANCE:** Tourniquet tolerance in Group-I, good in all 30 patients with 100% success, whereas in Group-A, it was good in 17 patients, and fair in 11 patients, and poor in 2 patients. The difference between two groups was statistically significant with the 'p' value of 0.0002. Injection of local anesthetic drug in the sheath above the level where the musculocutaneous and axillary nerves are formed would block these nerves frequently missed on an axillary approach. Study by Rodriguez J showed the similar results [5] **SUCCESSFUL PROXIMAL BLOCK:** Successful proximal block in Group-I, 100% with mean of 2, and in Group-A, it was 50%, with mean of 1.43, and the standard deviation of 0.63. Proximal block defined as analgesia in the two nerves- axillary nerve & medial cutaneous nerve of arm. **DISTAL BLOCK:** Successful distal block, that is involvement of distal five terminal nerves, in Group-I, ranges from 4-5, with the mean of 4.97, and the standard deviation of 0.18, and in Group-A, it was similar, with the mean of 4.67, and standard deviation of 0.48. successful distal block defined as analgesia in the five nerves distal to the elbow- musculocutaneous, median, ulnar, radial and medial cutaneous nerve of forearm. Study by Kalastad.O showed similar results [6] **DURATION OF MOTOR BLOCK:** Mean duration of motor block in group-I, was 130.8 minutes and in Group-A 56.7 minutes. The difference between the two groups was statistically not significant with the 'p' value of 0.0001. Study by Kilka H G showed similar results [7] **DURATION OF POST OP ANALGESIA:** The mean duration of post op analgesia till the VAS score >5 in group-I was 15.07 hours, and in group-A it was 9.33 hours. The difference between the two groups was statistically significant with the 'p' value of 0.0001. Study by Kilka H G showed similar results [7] **COMPLICATIONS:** No vessel puncture complication occurs in group-I, whereas 63.3% of vessel puncture occurred in group-A. No incidence of pneumothorax in both the groups.

CONCLUSION:

Infraclavicular block of brachial plexus by coracoid approach provides an adequate sensory blockade and motor blockade, with sufficient tourniquet tolerance, and better postoperative analgesia when compared to axillary approach. Positioning is not necessary in infraclavicular block by coracoids approach. Identification of bony landmark – coracoid process- is easy even in obese patients. Obviates the possibility of complications associated with those blocks performed above the clavicle, namely epidural, subarachnoid, pneumothorax, block of phrenic nerve, recurrent laryngeal nerve or stellate ganglion. Disadvantages of axillary approach like sparing of musculocutaneous nerve and 'unclean axilla' with hair and moisture can be avoided.

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