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Original Research Article

TO EVALUATE TIME OF ONSET OF ANALGESIA & EXTENT OF SENSORY BLOCK APPROACHES MACINTOSH AND LATERAL OF SUPRACLAVICULAR BRACHIAL PLEXUS BLOCK IN UPPER EXTREMITY SURGERIES.

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Abstract

Background & Methods: The aim of the study is to evaluate Time of onset of analgesia & Extent of sensory block approaches macintosh and lateral of supraclavicular brachial plexus block in upper extremity surgeries. The patients with associated medical conditions like hypotension, ischemic heart disease, diabetes, severe anaemia, renal disease where general anaesthesia was supposed to be associated with increased risk, were of particular interest. Patients with the respiratory disease were given the special consideration.

Results: Group I: 88% patients had successful sensory block. Group II: 96% patients had successful sensory block.

Conclusion: Patients were divided randomly in each group. Cases were selected where surgery was supposed to be up to lower 1/3rd of humerous, forearm & hand. The patients selected underwent thorough preanaesthetic checkup and routinely investigated in group I conventional supraclavicular approach was applied while in group II lateral approach was undertaken. In group the drug was deposited either on first rib or after eliciting paraesthesia while in group II after it was deposited only after eliciting paraesthesia. In this group elicitation of the paraesthesia was taken as a mandatory for deposition of drug.

Keywords: onset, analgesia, supraclavicular, brachial & plexus.

Study Design: Observational Study.

1. Introduction

Local anaesthetics produce reversible conduction blockade of impulses along the central and peripheral nerves over a limited part of the human body[1]. With the progressive increase in the concentration of local anaesthetics the transmission of autonomic; somatic sensory and somatic motor impulses are interrupted producing autonomatic nervous system blockade, sensory anaesthesia and skeletal muscle paralysis[2]. This temporary abolition of sensation and reaction to pain over the particular limited part of the body offer surgeon to operate on

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the patients without the loss of consciousness Removal of local anaesthetic is followed by spontaneous and complete return of nerve conduction with no evidence of structural damage to nerve as a result of drug's effect[3].

Brachial plexus block is an ideal regional anaesthetic technique for many surgical procedures on upper extremity. Since the introduction of ether anaesthesia in 1946 and appearance of local analgesia in 1884, it has gone revolutionary changes like from natural alkaloid cocaine to numerous synthetic chemical derivatives of present day use[4].

Leaving their intervertebral foramina in the cervical region the nerves forming the brachial plexus run downwards and outwards remaining sandwiched between the scalenus anterior and medius muscles until they cross the first rib[5].

Brachial plexus lies in the posterior triangle in the neck between the clavicle and the lower part of the posterior border of the sternocleidomastoid being covered by the skin, platysma and deep fascia. It emerges between the scalenus anterior and scalenus medius. Its upper part lies above the third part of subclavian artery while the lower trunk is placed behind the artery. The plexus next passes behind the anterior convexity of medial two thirds of the clavicle, the subclavius and the supraclavicular vessels and lies upon the first digitation of the serratus anterior and the subscapularis[6].

2. Material and Methods

Present study was conducted at Osmania M. C. & MNJ Cancer Hospital, Hyderabad for 01 Year. 50 patients of ASA grade I and II between the age group of 15-60 years undergoing routine or emergency surgery for upper limb, surgery up to lower third of humerous under brachial plexus block were taken for the study. Patients were randomly allocated to one of the two groups of 25 each.

Group I : 25 patients receiving conventional approach (Macintosh) of Brachial plexus block.

Group II : 25 patients, receiving lateral approach of Bracheal plexus B block.

All patients underwent a preanesthetic checkup and particular emphasis was put on history of present & post illness, sensitivity to the drugs particularly local anaesthetics.

The patients with associated medical conditions like hypotension, ischemic heart disease, diabetes, severe anaemia, renal disease where general anaesthesia was supposed to be associated with increased risk, were of particular interest. Patients with the respiratory disease were given the special consideration.

3. Result

TABLE NO. 1: Weight Wise Distribution

S. No.	Weight (in kg.)	No. of Patients	%age
1	31-40	Nil	Nil
2	41-50	03	06
3	51-60	41	82
4	61-70	04	08
5	71-80	02	04

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6	81-90	Nil	Nil
7	91-100	Nil	Nil

Majority of patient (41) had weight between 51-60 kg. The dose of the drug used was 2% lignocaine with Adrenaline (1:200000) 7 mg/kg body weight and 0.5% Bupivacaine 2 mg/kg body weight. The total volume of the drug injected was 30 ml. where according to the weight the volume was not 30 ml, it was made by adding normal saline.

TABLE NO. 2: Onset of Analgesia

S. No.	Time (min)	Group I	Group II
1	0-3	01	05
2	3.1-6	03	06
3	6.1-9	03	07
4	9.1-12	07	04
5	12.1-15	06	01
6	15.1-18	04	01
7	18.1-20	01	01

Group I: Majority of patient (68%) had onset between 9-18 min.
Group II: Majority of patient (72%) had onset between 1.5-9 min. ($P<0.01$ which is statistically highly significant).

TABLE NO. 3: Quality of Motor Block

Grade	Group I		Group II	
	No.	Percentage	No.	Percentage
Grade I	-	-	-	-
Grade II	-	-	-	-
Grade III	14	56	06	24
Grade IV	11	44	19	76

Group I: 56% Patients had grade III and 44% patients had Grade IV motor block.
Group II: 24% Patients had grade III and 76% patients had grade IV motor block.

TABLE NO. 4: Extent of Sensory Block

Time in min	Group I		Group II	
	No.	%	No.	%
Successful	22	88	24	96
Failure	03	12	01	04

Group I: 88% patients had successful sensory block.
Group II: 96% patients had successful sensory block.

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4. Discussion

With the interscalene technique anesthetist have the choice to block cauded nerve of cervical flexus & cephalad nerve of brachial plexus. V 1ile with axillary approach blockage of caudad nerves of brachial plexus does occurs[7]. Conventional supraclavicular block can be performed without the abduction of arm and without eliciting the paraesthesia, and less volume of drug is required when compared to other above mentioned technique. Catheter technique with axillary route may interfere with physiotherapy and there are more chances of infection also. Interscalene block is always associated with diaphragmatic paralysis and respiratory compromise while with supraclavicular technique diaphragmatic paralysis occurs less frequent and is not associated with respiratory difficulties in healthy subjects.

The completion of injection the usual length of time to develop analgesia was 15 min. A study showed that complete block developed within 10 mm in 98% patients. In present series maximum cases showed development of analgesia 64% of patients in group I between 9.1-18 min & 70% of patients in group II 1.5 - 9 min.

The choice of the local anaesthetic depends on the duration of the block and the availability in the Anaesthesia service. Reducing the local anaesthetic concentration and increasing the volume prolongs the duration of the block. Levobupivacaine and ropivacaine have been used in concentrations of 0.375–0.75% and 0.25–0.5%, respectively. Compared to levobupivacaine, ropivacaine has a faster onset of action (9min vs. 12min) but blockade duration is shorter (9.2h vs. 11.3h). The total volume used ranges between 30 and 40ml when delivered in a single injection, and between 5 and 8ml when each nerve is anaesthetized individually[8]. The MAC-90 of 1.5% lidocaine with epinephrine 5mcg/ml is 5.5ml and 23.5ml in the dual injection technique. The minimum effective volume (MEV90) of 0.5% bupivacaine is 1.56ml per nerve. The use of other additives to prolong the block, like using dexamethasone with the local anaesthetic, has shown to be an effective way to increase motor and sensory blockade. The use of clonidine as adjunct to the local anaesthetic has not been shown to increase block duration, different from dexmedetomidine which does appear to prolong axillary block duration. Magnesium sulphate has also been used as additive in axillary blocks, but has not been shown to improve block duration or efficacy. Other adjuncts such as ketamine and tramadol have also been used, and some studies have shown evidence that they prolong the action of the axillary block. There is recent evidence about the effect of hyaluronidase in shortening the time to onset of the axillary block in upper limb surgery[9].

5. Conclusion

Patients were divided randomly in each group. Cases were selected where surgery was supposed to be up to lower 1/3rd of humerous, forearm & hand. The patients selected underwent thorough preanaesthetic checkup and routinely investigated in group I conventional supraclavicular approach was applied while in group II lateral approach was undertaken. In group the drug was deposited either on first rib or after eliciting paraesthesia while in group II after it was deposited only after eliciting paraesthesia. In this group elicitation of the paraesthesia was taken as a mandatory for deposition of drug.

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