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A Prospective Randomised Comparative Study of Bupivacaine V/S Bupivacaine with Clonidine For Bracheal Plexus Block

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Abstract
Introduction: *Peripheral nerve blocks are gaining wide popularity in anaesthesia clinical practice and can be used in variety of surgical procedures, for surgical anaesthesia and postoperative pain. Supraclavicular approach gives the most effective block for upper extremity and is carried out at the level of trunks of brachial plexus.1the plexus is blocked where it is most compact. i.e. at the middle of brachial plexus, resulting in homogeneous spread of anaesthetic throughout the plexus with a fast onset and complete block.*
Materials and Methods: *This was a prospective, randomised, double-blinded comparative study, which was conducted under the Department of Anaesthesiology and Critical Care, D.Y Patil Medical College and Hospital, Navi Mumbai after obtaining patient's attendant's informed consent. The study was carried out on 100 patients of ASA Grade I and II scheduled for upper limb surgery. Sample size was taken for convenience. After enrolment, group assignments were determined by a computer-generated number sequence and were contained in sequentially numbered opaque envelopes to ensure blinding-Group A (n=50):Received 40 mL of 0.25% Bupivacaine with 1 mL of0.9% normal saline for brachial plexus block. Group B (n=50):Received 40 mLof 0.25% Bupivacaine with 2µg/kg body weight of Clonidine with normal saline to make a total of 1 mLas brachial plexus block.*
Results: *A prospective, randomised, double-blinded comparative study consisting of 50 patients in Group A (Bupivacaine alone) and 50 patients in Group B (Bupivacaine plus Clonidine) is undertaken to study the change in pattern of haemodynamics, pain score by VAS, duration of analgesia, duration of sensory and motor blockade and side effects. There were no statistical differences according to demographic data (Age, sex, weight). P-value for age-0.8375, sex 0.6820, weight-0.6379 being non-significant (p>0.05).The difference in the meantime of onset between Group A and Group B was statistically significant,i.e. p < 0.0001.*
Conclusion: *From our study, we conclude that clonidine when administered with bupivacaine is a better option compared to bupivacaine alone, when administered into brachial plexus sheath for providing intra-operative and post-operative analgesia following upper limb surgeries. There is a limitation in our study. The use of ultrasonography guided nerve block helps reduce the total volume of local anaesthetic requirement, but due to the absence of this facility in our institution we could not use this technique.*
Key Words: *Clonidine, bupivacaine, Peripheral nerve blocks.*

I. Introduction

Peripheral nerve blocks are gaining wide popularity in anaesthesia clinical practice and can be used in variety of surgical procedures, for surgical anaesthesia and postoperative pain. Supraclavicular approach gives the most effective block for upper extremity and is carried out at the level of trunks of brachial plexus.1the plexus is blocked where it is most compact.2i.e. at the middle of brachial plexus, resulting in homogeneous spread of anaesthetic throughout the plexus with a fast onset and complete block.3

The supraclavicular brachial plexus block provides anaesthesia of the entire upper extremity in the most consistent and time-efficient manner. Supraclavicular brachial plexus blockade provides anaesthesia for surgery of the hand, forearm, elbow and distal humerus. There has always been a search for adjuvant to the regional nerve block with drugs that prolong the duration of post-operative analgesia, but with lesser adverse effects.Alpha-2 adrenergic receptor agonists have been the focus of interest for their sedative, analgesic, perioperative sympatholytic and cardiovascular stabilising effects with reduced anaesthetic requirements. Furthermore, various methods of administration such as epidural, intrathecal and peripheral injections have been tried either alone or in combination with another drug to prolong and intensify the anaesthesia. This study was undertaken to evaluate efficacy and potency of bupivacaine alone and bupivacaine plus clonidine in supraclavicular brachial plexus block for onset and duration of sensory and motor block, haemodynamic stability, duration of effective analgesia including post-operative analgesia and any adverse effects in patients undergoing upper limb surgeries

II. Materials And Methods

This was a prospective, randomised, double-blinded comparative study, which was conducted under the Department of Anaesthesiology and Critical Care, D.Y Patil Medical College and Hospital, Navi Mumbai after obtaining patient's attendant's informed consent. The study was carried out on 100 patients of ASA Grade I and II scheduled for upper limb surgery. Sample size was taken for convenience. After enrolment, group assignments were determined by a computer-generated number sequence and were contained in sequentially numbered opaque envelopes to ensure blinding-Group A (n=50):Received 40 mL of 0.25% Bupivacaine with 1 mL of0.9% normal saline for brachial plexus block. Group B (n=50):Received 40 mLof 0.25% Bupivacaine with 2µg/kg body weight of Clonidine with normal saline to make a total of 1 mLas brachial plexus block.

Inclusion Criteria:

- Patients belonging to ASA Grade I and II.
- Patients of both sexes between the age group 20 and50 years.
- Patients scheduled for elective upper limb surgeries.

Exclusion Criteria:

- Patient's refusal.
- Patients having history of hypersensitivity to local anaesthetics.
- Patients with skin sepsis in supraclavicular area, patients with pre-existing neurological disorders.

Preoperative Preparations: All the patients underwent thorough pre-anaesthetic evaluation on the day prior to surgery. All systems were examined including airway and the surface anatomy, where the block was to be given. Basic laboratory investigations were conducted including complete haemogram, urine analysis, blood sugar, kidney function test and whenever needed chest x-ray and electrocardiogram. The anaesthetic procedure to be carried out was explained. Patients were reassured to alleviate their anxieties. A written informed consent was taken. They were educated regarding the visual analogue scale. All the patients were fasted overnight. All of them received oral tablet alprazolam 0.5 mg and tablet ranitidine 150 mg the night before surgery.

Plan of Study: Supraclavicular brachial plexus block was carried out as an elective procedure on the patients undergoing upper limb surgery. It was a prospective, randomised, double-blind study with hundred consenting patients between 20 years and50 years of either sex divided into 2 groups of fifty each. All drug solutions were prepared by an anaesthesiologist not involved in administration of anaesthesia, patient care and data collection. Group A (n=50):Received 40 mLof 0.25% Bupivacaine with 1 mL of0.9% normal saline for brachial plexus block. Group B (n=50):Received 40 mLof 0.25% Bupivacaine with 2µg/kg body weight of Clonidine with normal saline to make a total of 1 mLas brachial plexus block.

Intravenous access was obtained in the limb opposite to that undergoing surgery with 18-G cannula. Injection bupivacaine of 0.5% was diluted with distilled water to make 0.25% bupivacaine of volume 40 mL,taking care not to exceed a total drug dose of 2mg/kg of bupivacaine. To this local anaesthetic, the study drug was added. Before the start of the procedure patient's pulse rate, blood pressure, respiratory rate and oxygen saturation were recorded. The patient was placed in supine position with the head turned away from the side to be blocked. The arm to be anaesthetised was adducted and the hand extended along the side towards the ipsilateral knee as far as possible. A small roll of towel was placed between the shoulder blades to make the plexus taut. Using classic technique approach, the midpoint of the clavicle was identified and marked. The posterior border of the sternocleidomastoid can be palpated easily when the patient raises the head slightly. Palpating the belly of the anterior scalene muscle and moving towards interscalene groove with the fingers, a mark was made at approximately 1.5 to 2.0 cm posterior to the midpoint of the clavicle. This was the point of entry. By palpating the subclavian artery at this site, landmark was confirmed. After appropriate preparation and injection of a skin wheal with local anaesthetic, the Stimuplex needle was connected with the nerve stimulator with the current output set at 1.0 mA and repeat twitch mode selected by the assistant under the guidance of an anaesthetist. The needle was inserted in a caudad slightly medial and posterior direction. On needle insertion, a twitch of the upper trunk (shoulder) was considered as the evidence of the needle approaching the brachial plexus. Wrist flexion and extension of the fingers were taken as acceptable responses and the current was gradually reduced between 0.2 and0.5 mA, whereby maintaining the visible twitches. The total volume of the anaesthetic solution was injected at an incremental dose of 4mLeach, preceded by negative aspiration for air or blood.

III. Results

A prospective, randomised, double-blindedcomparative study consisting of 50 patients in Group A (Bupivacaine alone) and 50 patients in Group B (Bupivacaine plus Clonidine) is undertaken to study the change in pattern of haemodynamics, pain score by VAS, duration of analgesia, duration of sensory and motor blockade and side effects.There were no statistical differences according to demographic data (Age, sex, weight). P-value

for age-0.8375, sex 0.6820, weight-0.6379 being non-significant (p>0.05).The difference in the meantime of onset between Group A and Group B was statistically significant,i.e. p < 0.0001.

	Group A (N=50)	Group B (N=50)
	Mean ± SD	**Mean ± SD**
Time of Onset (Min)	**12.34±1.65**	**7.62±2.14**

	Group A (N=50)	Group B (N=50)
	Mean ± SD	**Mean ± SD**
Time of Onset (Min)	**18.13±2.12**	**13.43±2.12**

Duration of sensory block (min)	Group A (N=50)		Group B (N=50)	
	No of patients	**Percentage (%)**	**No of patients**	**Percentage (%)**
240-320	25	50	0	0
321-400	24	48	11	22
401-480	1	2	28	56
481-560	0	0	11	22
Total	50	100	50	100
Mean ± SD	313.56±23.32		423.3±42	

Duration of Motor block (min)	Group A (N=50)		Group B (N=50)	
	No of patients	**Percentage (%)**	**No of patients**	**Percentage (%)**
220-320	40	80	0	0
321-420	10	20	34	68
421-520	0	0	16	32
Total	50	100	50	100
Mean ± SD	218.56±22.12		408.3±42	

IV. Discussion

Peripheral nerve block given with local anaesthetic drugs alone produce analgesia only limited to the duration of action of the local anaesthetic. To prolong duration of post-operative analgesia, many agents including alpha2agonists have been used. Transmission of input from nociceptors to spinal neurons that project to the brain is mediated by direct monosynaptic contact or by multiple excitatory or inhibitory interneurons. The central terminals of nociceptors contain excitatory transmitters such as glutamate, substance P, neurotrophic factors that activate postsynaptic N-methyl-D-aspartate, neurokinin and tyrosine kinase receptors, respectively. Concurrent with these events powerful endogenous mechanisms counteracting pain unfold both in the periphery and in the central nervous system.

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V. Conclusion

From our study, we conclude that clonidine when administered with bupivacaine is a better option compared to bupivacaine alone, when administered into brachial plexus sheath for providing intra-operative and post-operative analgesia following upper limb surgeries. There is a limitation in our study. The use of

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References

[1]. De Mey JC, *et al*.: The influence of sufentanil and/or clonidine on the duration of analgesia after a caudal block for hypospadias repair surgery in children. Eur J Anaesthesiol 2000; 17: 379-82.

[2]. Constant I, *et al*.: Addition of clonidine or fentanyl to local anaesthetics prolongs the duration of surgical analgesia after single shot caudal block in children. Br J Anaesth 1998; 80: 294-8.

[3]. Baris S, *et al*.: Comparison of fentanyl-bupivacaine or midazolambupivacaine mixtures with plain bupivacaine for caudal anaesthesia in children. Paediatr Anaesth, 2003; 13: 126-3.

[4]. Vercauteren M and Meert TF: Isobolographic analysis of the interaction between epidural sufentanil and bupivacaine in rats. Pharmacol Biochem Behav 1 997; 58: 237-42.

[5]. Palmer CM, *et al*.: Bupivacaine augments intrathecal fentanyl for labor analgesia. Anesthesiology 1999; 91: 84-9.

[6]. Madan R, *et al*.: A dose response study of clonidine with local anesthetic mixture for peribulbar block: a comparison of three doses. Anesth Analg 2001; 93: 1593-7.

[7]. Butterworth JF and Strichartz GR: The alpha 2-adrenergic agonists clonidine and guanfacine produce tonic and phasic block of conduction in rat sciatic nerve fibers. Anesth Analg 1993; 76: 295-301.

[8]. Murphy DB *et al*.: Noval analgesia adjuncts for brachial plexus block. A systemic review. Anaesth Analg 2000; 1122-1128.

[9]. Eisenach JC, Dekock M and Klimscha W: Alpha (2) adrenergic agonists for regional anesthesia. A clinical review of clonidine (1984-1995). Anesthesiology 1996; 85: 655-74.

[10]. Chakraborty S, Chakrabarti J. Mandai MC, Harza A and Das S: Effect of clonidine as adjuvant in bupivacaine-induced supraclavicular brachial plexus block: A randomized controlled trial. Indian J Pharmacol 2010; 42: 74-7.

[11]. Rohan B, Singh PY and Gurjeet K: Addition of clonidine or lignocaine to ropivacaine for supraclavicular brachial plexus block: a comparative study; Singapore Med J. 2014; 55(4): 229-32.

[12]. Gupta S, Gadani HN and Thippeswamy HG: A comparative study between ropivacaine 30 ml (0.75%) and ropivacaine 30 ml (0.75%) with clonidine 150 µg as an adjuvant in brachial plexus block through supraclavicular approach; Sudan Medical Monitor, January- March 2015; 10(1): 11-15.