



"COMPARATIVE EVALUATION OF INJ. ROPIVACAINE (0.5%, 30 MILILITRE) + INJ. NORMAL SALINE (0.9%, 2 MILILITRE) AND INJ. ROPIVACAINE (0.5%, 30 MILILITRE) + INJ. DEXAMETHASONE (8 MILLIGRAM, 2 MILILITRE) IN SUPRACLAVICULAR BRACHIAL PLEXUS BLOCK FOR UPPER LIMB SURGERIES"

Anaesthesiology

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ABSTRACT

Introduction: Brachial plexus block is the most widely used approach for upper limb surgeries as an alternative and also in combination with General Anaesthesia to achieve ideal operating conditions by providing adequate muscle relaxation, maintain intraoperative hemodynamic stability and sympathetic block and reduces postoperative pain and requirements of rescue analgesia. Supraclavicular block is easiest to perform among all other approaches to brachial plexus. **Objectives:** To compare efficacy of Ropivacaine with Dexamethasone & Ropivacaine with normal saline in supraclavicular brachial plexus block for upper limb surgeries. **Methods:** Sixty patients aged between 18 to 60 years with ASA grade I or 2 or 3 posted for elective upper limb surgeries will be included in the study. The study patients are randomly divided into 2 groups with 30 patients in each group **Result:** In our study, the mean onset time for complete sensory block in group A (ropivacaine+normal saline) was 20.1 ± 1.62 min. and in group B (ropivacaine+dexamethasone) was 17.6 ± 1.21 min. ($p < 0.05$) mean time for onset of complete motor blockade in group A was 24.5 ± 1.48 min, in group B was 22.5 ± 1.45 min. ($p < 0.05$) duration of sensory blockade in group A was 561.0 ± 33.87 min and in group B was 790.3 ± 39.9 min ($p < 0.05$) The data from our study, reveals that duration of motor blockade was longer in case of Group B (681 ± 67.1) compared to group A (508.0 ± 17.89) (P value < 0.001) **Conclusion:** Dexamethasone as an adjuvant to Ropivacaine in supraclavicular brachial block for upper limb surgery significantly shortens the onset time for sensory & motor block and prolongs the duration of sensory & motor blocks with longer duration of post operative analgesia, causes decrease in need of rescue analgesia in patients with no side effects.

KEYWORDS

INTRODUCTION

Brachial plexus block is the most widely used approach for upper limb surgeries as an alternative to and in combination with general Anaesthesia to achieve ideal operating conditions by providing adequate muscle relaxation, maintain intraoperative hemodynamic stability and sympathetic block. Block also reduces postoperative pain and requirements of rescue analgesia. The upper limb blocks mainly avoid the consequences of general anaesthesia like Polypharmacy, pressure response to laryngoscopy etc. It also circumvents the effects of upper airway instrumentation for bronchial asthmatic patients and difficult airway and helps to maintain better Hemodynamic stability in hypertensive patients. It is beneficial due to its effectiveness in terms of cost, margin of safety, along with good postoperative analgesia.

AIMS & OBJECTIVES:

Primary aim was to evaluate efficacy of ropivacaine with dexamethasone & ropivacaine with normal saline in supraclavicular brachial plexus block for upper limb surgeries. Secondary aims were to compare perioperative hemodynamic changes along with comparison of onset and duration of sensory and motor blockade.

MATERIAL & METHODOLOGY:

After obtaining institutional ethical committee permission and registration for the study in Clinical Trial Registry Of India, Sixty patients aged between 18 to 60 years with ASA grade I or 2 or 3 posted for elective upper limb surgeries were included in the study.

Inclusion Criteria:

Normal adult patients of either sex, aged 18-60 years, ASA grade I, II or III, weighing 30-90 kgs, without any co-morbidity, admitted for elective upper limb surgeries with average duration of surgery within 2 hours.

Exclusion Criteria:

Infection at site of block, H/O any previous reaction to local anaesthetic, Patient refusing consent, Patient with hemorrhagic or neurological disorder, Patient below 18 or above 60 years, Pregnancy, Patients with alcohol abuse, H/O underlying cardiovascular, psychiatric disease, renal or hepatic. After confirming adequate NBM status & obtaining written informed consent, patient were taken on OT

table and monitors like ECG, NIBP and pulse oximeter were attached.

Premedication

{on operation table}

- INJ ONDANSETRON 4 mg IV
- INJ GLYCOPYRROLATE 0.2 mg IV
- INJ MIDAZOLAM 1 mg IV given.

The study patients were randomly divided into 2 groups with 30 patients in each group.

Group A - Inj. Ropivacaine (0.5%, 30 milliliter) + Inj. Normal Saline (0.9%, 2 milliliter) □ Group B - Inj. Ropivacaine (0.5%, 30 milliliter) + Inj. Dexamethasone (8 milligram, 2 milliliter)

Block Technique :

Supraclavicular brachial plexus block [73] Patient will be placed supine with a pillow under the shoulder and head turned towards the opposite side with the arms by the side. The block will be performed, under all aseptic and antiseptic precaution. A 23G 1.5 inch needle will be introduced just lateral to subclavian artery pulsation, 1 cm above the mid-point of clavicle and advanced in backward, inward and downward direction. The needle will be advanced till we get appropriate paresthesia. At this point, the solution as per the group assigned, will be injected after careful aspiration so as to avoid intravascular injection of drug. Adequacy of block checked by pin prick method on skin dermatomes C4 to T2 with 22G hypodermic needle.

- The onset of sensory block is the time only one taken from completion of injection to the loss of pin prick sensations in radial, ulnar, median, nerve.
- Motor block will be checked by modified LOVETT scale rating from 6 (usual muscular force) to 0 (complete paralysis) based on these movements which are as follows -thumb abduction for radial nerve, thumb adduction for ulnar nerve, thumb opposition for median nerve and elbow flexion and extension.
- Duration of motor block taken as time from onset of motor block till patient is able to move his thumb in all directions.
- Duration of Analgesia will be recorded for 24 hours. Assessment

of postoperative pain using visual analogue scale (0-10 cm), if VAS will >3, analgesia will be provided (inj. paracetamol 1 gm intravenous infusion + inj. dynapar AQ 75 mg intravenous slowly)

Complications such as hypotension arrhythmias, bradycardia, nausea, vomiting, shivering, pruritus, arterial puncture, pneumothorax, Horner's syndrome, hematoma, local anaesthetic toxicity and respiratory depression looked for and treated accordingly. Descriptive statistics such as mean, standard deviation, student's 't' test will be used to describe various variables. $P < 0.05$ considered significant⁽⁶⁷⁾

RESULTS

After studying 60 cases, the observation and results were summarized in tabulated form.

Table – 1 Mean demographic data in Group A and Group B

Variable	Study Group				t-Test	Significance
	Group A		Group B			
	Mean	SD	Mean	SD		
Age (Yrs)	35.9	11.4	35.7	10.96	>0.05	NS
Weight (Kg)	64.07	4.8	61.47	9.58	>0.05	NS
Gender (M/F)	23/7		25/5			
ASA Grading (I/II/III)	0/21/9		0/13/17			

Table – 2 Duration Of Surgical Procedure

Duration of surgery (min)	Study Group				t- Test	Signifi- cance
	Group A		Group B			
	Mean	SD	Mean	SD		
	81.67	27.04	93.33	27.96		
				>0.05	NS	

Chart - 2

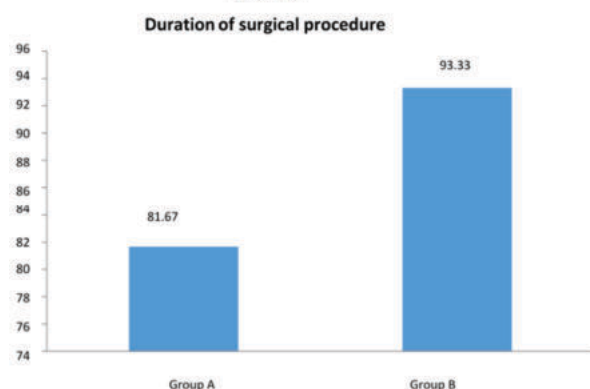


Table – 3 Comparison of complete onset time of sensory block in patients of group A and group B

Variable	Study group				t-Test	Significance
	Group A		Group B			
	Mean	SD	Mean	SD		
Onset of complete sensory block (in min.)	20.1	1.62	17.63	1.21	<0.05	S

Chart - 3

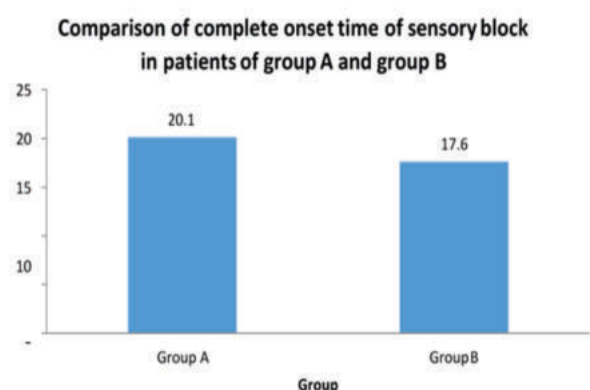


Table – 4 Comparison of complete onset of motor block in patients of group A and group B

Variable	Study Group				t-Test	Significance
	Group A		Group B			
	Mean	SD	Mean	SD		
Onset of complete motor block (in min.)	24.5	1.48	22.5	1.45	<0.05	S

Chart - 4

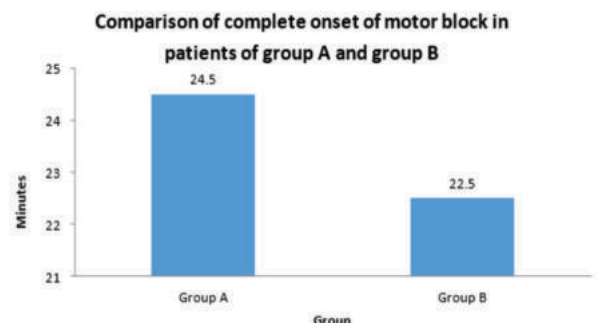


Table – 5 Comparison of mean duration of sensory block in patients of group A and group B

Patients of group A and group B						
Variable	Study Group				t-Test	Significance
	Group A		Group B			
	Mean	SD	Mean	SD		
Duration of sensory block (in min.)	561.0	33.87	790.3	39.9	<0.05	S

Chart - 5

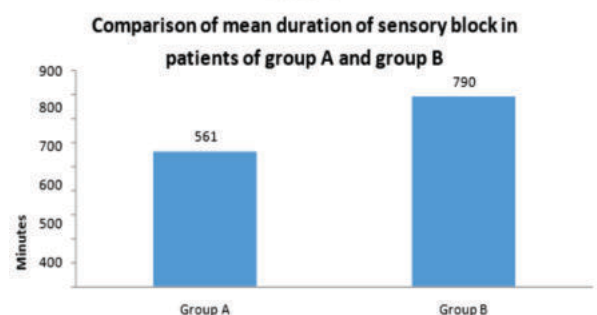
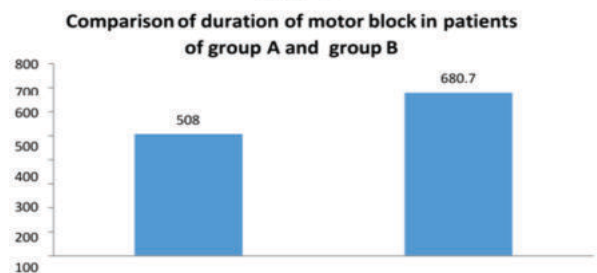


Table – 6 Comparison of duration of motor block in patients of group A and group B

Group and groups						
Variable	Study Group				t-Test	Significance
	Group A		Group B			
	Mean	SD	Mean	SD		
Duration of motor block (in min.)	508.0	17.89	681.0	67.1	<0.05	S

Chart - 6



DISCUSSION:

Brachial plexus block is a versatile and reliable regional anaesthetic technique and a suitable alternative to general anaesthesia for upper limb surgical procedures. Different approaches for brachial plexus block include Interscalene, Parascapular, Subclavian, Perivascular of Winnie, Supraclavicular, Infraclavicular, and Axillary. Supraclavicular approach of brachial plexus block is the most commonly used approach and provides the most complete and reliable anaesthesia for upper limb surgery. Supraclavicular blocks are performed at the level of the brachial plexus trunks. Here, almost the entire sensory, motor, and sympathetic innervations of the upper extremity are carried in just three nerve structures (trunks), confined to a very small surface area.

Local anesthetics alone for supraclavicular brachial plexus block provide good operative conditions but have a shorter duration of postoperative analgesia. Hence various drugs such as opioids, clonidine, Dexmedetomidine, midazolam, magnesium etc, were used as adjuvant with local anesthetics in brachial plexus block to achieve quick, dense and prolonged block but the results are either inconclusive or associated with side-effects. Recently, Dexamethasone has been reported as an effective adjuvant for regional anesthetic agents. When given intravenously after or before regional anesthesia, Dexamethasone increases the duration of regional anesthesia and provide longer post operative analgesia.

When administered as an adjuvant to local anesthetics for peripheral nerve block and plexus block, Dexamethasone shortens the onset time of the block, prolongs the duration of the block, and increases the quality of analgesia without neurologic sequelae. The analgesic effect is caused by enhancement of the hyperpolarization - activated cation current

CONCLUSION

Based on the present clinical comparative study and a short review of past literature I conclude that Ropivacaine 0.5%, newer long-acting local anaesthetic, is an alternative to bupivacaine 0.5% and lignocaine 2% for brachial plexus block. Ropivacaine is pure left-isomers and due to their three-dimensional structure, this agent have better safety profile over other local anaesthetics in terms of reduced CNS and cardiac toxicity. Dexamethasone as an adjuvant to Ropivacaine in supraclavicular brachial block for upper limb surgery significantly shortens the onset time for sensory & motor block and prolongs the duration of sensory & motor blocks with longer duration of post operative analgesia, causes decrease in need of rescue analgesia in patients with no side effects. 106

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