



Int. J. Modn. Res. Revs.

Volume 2, Issue 10, pp 463-465, October, 2014

ISSN: 2347-8314

ORIGINAL ARTICLE

COMPARISON OF DEXMEDETOMIDINE AND CLONIDINE AS AN ADJUVANT TO LOCAL ANAESTHESIA IN SUPRACLAVICULAR BLOCK

***¹Dr. Jeby Mathew, ²Dr. R. Gowthaman and ²Dr. Dhakshinamoorthy**

*¹Post Graduate, Department of Anaesthesia, Annamalai University, Annamalainagar – 608 002, Tamilnadu, India

²Professor, Department of Anaesthesia, Annamalai University, Annamalainagar – 608 002, Tamilnadu, India

Article History: Received 5th September, 2014, Accepted 10th October, 2014, Published 11th October, 2014

ABSTRACT

Background and objective: The supraclavicular brachial plexus blocks are one of the most commonly performed upper limb brachial plexus blocks. Alpha-2 agonists are mixed with local anaesthetic agents to extend the duration of spinal, extradural and peripheral nerve blocks. We compared clonidine and dexmedetomidine as an adjuvant to local anaesthetic agent in supraclavicular brachial plexus block with respect to onset and duration of sensory and motor block. **Methods:** Sixty ASA I and II patients scheduled for elective upper limb surgeries under supraclavicular brachial plexus block were divided into two equal groups in a randomized, double blinded fashion. Group C received clonidine 1µg/kg and Group D received dexmedetomidine 1µg/kg added to bupivacaine 0.25%. Onset and duration of sensory and motor block and quality of block were studied in both the groups. **Results:** The onset of sensory and motor blockade was faster with clonidine group 2.67 ± 0.59 ; 3.97 ± 0.55 (in minutes) than dexmedetomidine group 2.70 ± 0.63 ; 4.71 ± 0.71 (in minutes). The duration of sensory and motor blockade was prolonged with dexmedetomidine group 418.0 ± 27.93 ; 456.0 ± 25.13 (in minutes) compared to clonidine group 232.0 ± 27.93 ; 301.67 ± 29.01 (in minutes). **Conclusion:** From the present study, it can be concluded that dexmedetomidine prolongs the duration of sensory and motor blockade and enhances the quality of blockade compared to clonidine when used as an adjuvant to 0.5% bupivacaine in supraclavicular block.

Keywords: supraclavicular brachial plexus block, adjuvant, alpha-2 agonist, clonidine, dexmedetomidine

1. INTRODUCTION

Peripheral nerve blocks provide an ideal operating condition when used optimally. They are said to cause least interference with the vital physiological functions of the body with reduced stress response and avoiding polypharmacy with an alert, awake and cooperative patient when compared to general anaesthesia. Most of the local anaesthetics developed between 1900-1940 were basically aminoester compounds. They lost their importance due to shorter duration of action, the associated allergic reaction and systemic toxicity. This paved the way to synthesis of newer agents namely the amino amide compounds. The advent of long acting drugs have made it possible to carry out prolonged surgeries in extremities especially for vascular, orthopaedic and plastic procedures and also for chronic pain relief.

The main drawbacks of these agents were the delayed onset of action, varying quality of blockade and the inadequate post operative analgesia. To overcome these problems, various additives are being tried along with local anaesthetic solutions.

2. MATERIALS AND METHODS

Study Population: Sixty adult patients in the age group of 18-60 years belonging to ASA I and II scheduled to undergo elective upper limb procedures were chosen. All the patients were assessed and those with normal clinical, biochemical, hematological and radiological parameters were selected. Informed written consent was obtained from all the patients. All the patients were randomly assigned to two groups Group C, Group D containing 30 patients in each group.

Inclusion criteria: Patients belonging to ASA class I and II were included in the study after obtaining ethical committee clearance as well as informed consent from all patients. The patients were normotensive with age varying from 18 to 60 years belonging to both sexes.

*Corresponding author: Dr. Jeby Mathew, Post Graduate, Department of Anaesthesia, Annamalai University, Annamalainagar – 608 002, Tamilnadu, India

Exclusion criteria: Patients with hypertension, with heart rate less than 60bpm, systolic blood pressure less than 100mm of Hg, presence of 1st, 2nd or 3rd degree heart block, hyperthyroid patients, patients on adrenoceptor agonist or antagonist therapy, with known hypersensitivity to local anaesthetic drugs, pregnant women and pre-existing peripheral neuropathy, were excluded from the study.

Methods

On arrival of the patient in the operating room, monitors like pulse oximetry, non invasive blood pressure and electrocardiogram were connected and baseline values of heart rate, blood pressure, respiratory rate and oxygen saturation were recorded. An intravenous access was obtained in the opposite arm. Assessment of pain using verbal rating score intra operatively and visual analogue score post operatively was explained to the patients preoperatively. Under aseptic precautions, perivascular supraclavicular brachial plexus block performed using paresthesia technique. Bupivacaine 0.5% with clonidine or dexmedetomidine, depending on the group was injected with careful negative aspiration. Immediately following the administration of the drug patients were evaluated every minute till the onset for sensory and motor blockade. Time of onset of sensory blockade was tested by assessment of pinprick sensation in the C5 dermatome with a 26G hollow needle. Onset of motor blockade was assessed by loss of shoulder abduction. Failure of the establishment of block to appear in 20 minutes was taken as failure and the patients were administered general anaesthesia and were excluded from the study.

Statistical methods employed

Independent sample ‘t’ test (to measure difference between two groups i.e. intergroup comparison). Contingency table analysis (for association between the rows and columns) $p < 0.05$ was considered as significant and $p < 0.001$ was considered as highly significant.

3.RESULTS

A randomized prospective, clinical study of comparison between dexmedetomidine and clonidine as an adjuvant to local anesthetic in supraclavicular brachial plexus block was conducted in ASA I and II adult patient in the age group 18 to 60 years in elective upper limb surgeries.

Table 1: Characteristics of sensory and motor block in both the groups

	Group C	Group D	P value
Onset of sensory blockade (in minutes)	2.67 ± 0.59	2.70 ± 0.63	0.85
Onset of motor blockade (in minutes)	3.97 ± 0.55	4.71 ± 0.71	0.05
Duration of sensory blockade (in minutes)	232.17 ± 27.93	418.1 ± 2.25	0.001
Duration of motor blockade (in minutes)	301.67 ± 29.01	456 ± 25.13	0.001

The results of present study indicate that the onset of sensory and motor blockade was faster with clonidine group $2.67 \pm$

0.59 ; 3.97 ± 0.55 (in minutes) than dexmedetomidine group 2.70 ± 0.63 ; 4.71 ± 0.71 minutes.

The duration of sensory and motor blockade was prolonged with dexmedetomidine group 418.0 ± 27.93 ; 456.0 ± 25.13 compared to clonidine group 232.0 ± 27.93 ; 301.67 ± 29.01 . [Table 1]. There is significant difference in the systolic, diastolic pressure and heart rate during surgery. Further all the parameters take 120 minutes of time to reach to the baseline value. There was no other untoward effect, there was also no incidence of cardiac (or) respiratory arrest and neurological injuries.

Table 2: Comparison of pulse rate in both the groups

Pulse Rate	Group C		Group D	
	Mean	Standard Deviation	Mean	Standard Deviation
Pre Op	77.93	7.48	77.93	7.48
10	80.60	8.39	60.83	4.68
20	80.60	8.39	60.03	5.70
30	81.67	8.63	65.90	5.96
60	78.93	8.74	70.82	6.54
120	80.60	8.39	75.52	7.23

Table 3: Comparison of Systolic Blood Pressure

Systolic Blood Pressure	Group C		Group D	
	Mean	Standard Deviation	Mean	Standard Deviation
Pre Op	123.47	8.97	124.36	8.97
10	118.00	6.64	114.33	5.68
20	118.00	6.64	110.67	5.68
30	115.60	10.8	114.60	9.08
60	116.80	9.33	110.70	6.10
120	118.00	6.64	118.00	6.64

Table 4: Comparison of Diastolic Blood Pressure

Diastolic Blood Pressure	Group C		Group D	
	Mean	Standard Deviation	Mean	Standard Deviation
Pre Op	81.20	6.13	82.30	6.13
10	77.17	5.20	72.83	4.48
20	77.17	5.20	70.17	4.85
30	73.93	5.62	70.03	5.62
60	80.53	5.89	75.42	5.89
120	77.17	5.20	77.17	5.20

4.DISCUSSION

Brachial plexus block is one of the most commonly performed peripheral nerve blocks in day to day practice. It can be used as a sole anaesthetic technique or in combination with general anaesthesia for intraoperative or postoperative analgesia. The subclavian perivascular approach to the brachial plexus has gained popularity because of the satisfactory anaesthesia and less failure rate with this approach. Franco CD, Viera ZE⁴⁴ in their study on subclavian perivascular brachial plexus block found that the subclavian perivascular block provides an effective block for the surgery on the upper extremity. They concluded that at the site of injection with this technique, the plexus is reduced to its smallest components and the sheath is reduced to its smallest volume, which explains in greater part the success obtained with this block.

In the present study, we have used clonidine 1 ug/kg or dexmedetomidine 1 ug/kg as an adjuvant to bupivacaine 2 mg/kg in supraclavicular block.

Similar studies have been conducted before using dexmedetomidine and clonidine as adjuvants to various local anaesthetic agents.

In the present study the onset of sensory blockade for group C was 2.67+ 0.59 minutes and in group D was 2.70 + 0.63 minutes. There was no difference in the onset of sensory blockade in both the groups.

Similarly Harshavardan HS³⁸ found that there was no statistically significant difference between the groups with respect to the onset time of sensory blockade. In Group C onset of sensory blockade was 3.26+1.4 and in group D 2.59 +2.2 minutes. Saritha SS et al.,³⁷ and kenan kaygusuz et al.,⁴⁵ found that the onset of sensory blockade was shorter with dexmedetomidine.

In the present study the onset of motor blockade for group C was 3.97+ 0.55 minutes and in group D 4.71 + 0.71 minutes(P=0.001) It is inferred that there is significant difference in the onset of motor blockade between both the groups, group C had faster onset of motor blockade than group D.

Similarly Saritha SS et al., found that the onset of motor blockade was shorter with clonidine compared to dexmedetomidine. The onset of motor blockade for group C was 3.87± 1.78 minutes and in group D it was 4.65 ± 2.46 minutes whereas Harshavardan HS found that the onset of motor blockade was faster for Dexmedetomidine 4.21±1.6 than clonidine 5.36 +3.2 minutes.

In the present study the duration of sensory blockade for group C was 232.17+27.17 minutes and in group D it was 418.17 minutes(P=0.001) and the duration of motor blockade for group C was 301.67+29.13 minutes and in group D it was 456+25.13 minutes. It is inferred that there is a significant difference in duration of sensory blockade and motor blockade between both the groups, group D had longer duration of sensory and motor blockade than group C.

Similarly Harshavardan HS and Saritha SS et al., found that Dexmedetomidine prolongs sensory block and motor block duration than Clonidine.

In the present study patients were haemodynamically stable and there were no side effects. [Table 2,3 & 4]

5. REFERENCES

1. Morgan. Clinical anaesthesiology. Fourth edition. Peripheral nerve blocks. 324-337.
2. Aantaa R, Marjamaki A, Scheinin M. Molecular pharmacology of alpha 2-adrenoceptor subtypes. *Annals of Medicine*. 1995;27(4):439-49.
3. Eason MG, Kurose H, Holt BD, Raymond JR, Lihgett SB. Simultaneous coupling of alpha 2-adrenergic receptors to two G-proteins with opposing effects. Subtype selective coupling of alpha 2C10, alpha 2C4 and alpha 2C2 adrenergic receptors to Gi and Gs. *J Biol Chem*. 1992;267(22):15795-801.
4. Gary R. Strichartz and Charles B. Berde. Local anaesthetics. In: Miller's Anaesthesia. 6th edition. Churchill Livingstone 2004: 573-603.
5. Sarita S Swami, Varshali M Keniya, Sushma D Ladi, Ruchika Rao Comparison of dexmedetomidine and clonidine as an adjuvant to local anaesthesia in supraclavicular brachial plexus block: A randomised double-blind prospective study; *Indian Journal of Anaesthesia* | Vol. 56 | Issue 3 | May-Jun 2012.
6. Harshavardhana H S Efficacy of Dexmedetomidine Compared to Clonidine added to Ropivacaine in Supraclavicular Nerve Blocks: A Prospective, Randomized, Double Blind Study; *Int J Med Health Sci*. April 2014, Vol-3; Issue-2.
7. Susmita chakraborty, Jayatha chakraborty, Mohan chandra mandal, Avijit hazra, Sabyasathi das; studied the effect of clonidine as adjuvant in bupivacaine induced supraclavicular brachial plexus block: A randomized controlled trial; *Indian J Pharmacol*, April 2010, Vol 42, Issue 2, 74-77.
8. F. W. Abdallah and R. Brull; Facilitatory effects of perineural dexmedetomidine on neuraxial and peripheral nerve block: a systematic review and meta-analysis; *BJA Advance Access* published April 15, 2013.
