International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

Original Research Article.

Evaluation of Efficacy of Clonidine in Supraclavicular Brachial Block for Surgeries on Upper Limb

Sumit Bansal[1], Rahul Gupta[2], Vikas Kumar[3]

[1,3]**Consultant, Department of Anaesthesia, Max Superspeciality Hospital, Patparganj, Delhi, India.**
[2]**Consultant, Department of Anaesthesia, Artemis Hospital, Gurugram, Haryana, India.**

ABSTRACT

Background: The present study was conducted for evaluating the efficacy of clonidine in supraclavicular brachial block for surgeries on upper limb.

Materials & Methods: 40 subjects scheduled to undergo surgeries for upper limb were enrolled in the present study. Random division of all the subjects was done into two study groups as follows: Control group: 30 ml 0.75% ropivacaine +1 ml normal saline, and Study group: 30 ml 0.75% ropivacaine +1 mcg/kg clonidine diluted to 1 ml with normal saline. The patients were administered brachial plexus block by supraclavicular approach under strict aseptic precautions. In case of block failure, the patient received general anesthesia. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

Results: While comparing onset of sensory block and motor block statistically, significant results were obtained. Mean duration of sensory block and motor block was significantly higher among subjects of study group and control group. The mean time for rescue analgesia in control group was 569.1 min and in clonidine group was 868.2 min. Significantly prolonged duration for rescue analgesia was observed in clonidine group.

Conclusion: From the above results, the authors concluded that Clonidine as an adjuvant significantly enhances the quality of supraclavicular brachial plexus block.

Key words: Supraclavicular brachial block, Upper Limb.

***Correspondence to:**

Dr. Sumit Bansal,
Consultant,
Department of Anaesthesia,
Max Superspeciality Hospital,
Patparganj, Delhi, India.

Article History:

Received: 17-10-2020, **Revised:** 11-11-2020, **Accepted:** 29-11-2020

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2020.6.6.011	

INTRODUCTION

To alleviate pain we use various techniques like general anaesthesia and regional anaesthesia. Acute postoperative pain is the result of a complex physiological reaction to tissue injury. The dorsal horn of the spinal cord is the site of termination of primary afferents and there is complex interaction between such afferent fibers, intrinsic spinal neurons, descending pain modulating fibers, and various associated neurotransmitters such as serotonin, norepinephrine, acetylcholine, adenosine, and glutamate in the dorsal horn.[1-3]

The upper limb surgery is often performed under brachial plexus block to avoid the adverse events of general anesthesia and to have additional benefits such as extended postoperative analgesia, early ambulation, early initiation of oral feed, avoiding airway manipulation, and minimizing post-operative nausea and vomiting. Adjuvants are often added to local anesthetics (LAs) to prolong the duration of analgesia. Clonidine as adjuvant to intermediate-acting or long-acting LAs for peripheral nerve block or plexus block was already found to prolong the duration of postoperative analgesia by about 2 h or even 3–4 h.[4-6]

Hence; the present study was conducted for evaluating the efficacy of clonidine in supraclavicular brachial block for surgeries on upper limb.

MATERIALS & METHODS

The present study was conducted for evaluating the efficacy of clonidine in supraclavicular brachial block for surgeries on upper limb. A total of 40 subjects scheduled to undergo surgeries for upper limb were enrolled in the present study. Complete demographic and clinical details of all the patients was obtained. Written consent was obtained from all the patients after explaining in detail the entire research protocol. All the subjects belonged to the age group of 20 to 60 years. Random division of all the subjects was done into two study groups as follows:

Control group: 30 ml 0.75% ropivacaine +1 ml normal saline

Study group: 30 ml 0.75% ropivacaine +1 mcg/kg clonidine diluted to 1 ml with normal saline.

Complete clinical, biochemical and haematological preoperative assessment of all the patients was done. Baseline cardiogenic

data of all the patients was obtained. All the patients underwent surgical procedure according to their respective study groups. The block was performed by an experienced anesthesiologist. The patients were administered brachial plexus block by supraclavicular approach under strict aseptic precautions. In case of block failure, the patient received general anesthesia. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

Table 1: Duration of block

Mean duration of block	Study group	Control group	p- value
Sensory block (minutes)	712.3	593.2	0.001 (Significant)
Motor block (minutes)	602.1	497.3	0.000 (Significant)

Table 2: Time to first rescue analgesia

Time to first rescue analgesia	Study group	Control group	p- value
Mean (minutes)	868.2	569.1	0.001 (Significant)
SD	82.1	61.7	

RESULTS

Mean age of the patients of study group and control group was 42.3 years and 45.3 years respectively. Majority proportion of subjects of both the study group and control group were males. Mean onset of sensory block among subjects of study group and control group was 4.56 minutes and 4.12 minutes respectively. Mean onset of motor block among subjects of study group and control group was 11.23 minutes and 10.22 minutes respectively. While comparing onset of sensory block and motor block statistically, significant results were obtained. Mean duration of sensory block and motor block was significantly higher among subjects of study group and control group. The mean time for rescue analgesia in control group was 569.1 min and in clonidine group was 868.2 min. Significantly prolonged duration for rescue analgesia was observed in clonidine group.

DISCUSSION

Regional anaesthesia techniques provide important advantages over general anaesthesia by providing excellent analgesia, minimum duration of stay in postanaesthesia care unit and less side-effects. Supraclavicular approach of brachial plexus block, a useful alternative to general anaesthesia, provides the most effective anaesthesia for upper extremity surgeries and is carried out at the level of trunks of brachial plexus where it is most compact, resulting in homogenous spread of anaesthetic throughout the plexus with a fast onset and complete block. It provides excellent and ideal operating conditions by complete muscle relaxation, stable haemodynamics intraoperatively and extended postoperative analgesia. However, these early advantages can be short lived and limited by the relatively brief duration of action of LA, potentially resulting in block resolution before the period of worst postoperative pain. Increasing the volume (dose) of LA may prolong the duration of analgesia but may also increase the risk of LA systemic toxicity. Although continuous catheter-based nerve blocks can extend postoperative analgesia, their placement requires additional time, cost and skill.[5-7] Alpha-2 adrenergic receptor agonists have multiple actions and they provide sedation, analgesia, anxiolysis, sympatholysis and cardiovascular stabilising effects. Studies shows that addition of clonidine and dexmedetomidine to LA in peripheral nerve block fastens the onset of sensory and motor block and prolongs the duration of analgesia. Clonidine, an imidazoline, α-2 adrenoreceptor agonist, has been extensively studied as an adjuvant to LA in peripheral nerve blocks.[8-10] Hence; the present study was conducted for evaluating the efficacy of clonidine in supraclavicular brachial block for surgeries on upper limb.

Mean age of the patients of study group and control group was 42.3 years and 45.3 years respectively. Majority proportion of subjects of both the study group and control group were males. Mean onset of sensory block among subjects of study group and control group was 4.56 minutes and 4.12 minutes respectively. Mean onset of motor block among subjects of study group and control group was 11.23 minutes and 10.22 minutes respectively. While comparing onset of sensory block and motor block statistically, significant results were obtained. Our results were in concordance with the results obtained by previous authors who also reported similar findings. Ali QE et al evaluated the effects of clonidine on nerve blockade during brachial plexus block with ropivacaine using peripheral nerve stimulator. Sixty patients were randomly divided into two groups, Group A and B. Group A received 30 ml of 0.5% of ropivacaine with 0.5 ml normal saline while Group B received same amount of ropivacaine with 0.5 ml (equivalent to 75 µg) of clonidine for supraclavicular brachial plexus block. The groups were compared regarding quality of sensory and motor blockade, duration of post-operative analgesia and intra and post-operative complications. There was a significant increase in duration of motor and sensory block and analgesia in Group B as compared to Group A patients ($P < 0.0001$). There was no significant difference in onset time in either group ($P = 0.304$). No significant side effects were noted. The addition of 75 µg of clonidine to ropivacaine for brachial plexus block prolongs motor and sensory block and analgesia without significant side effects.[10]

In the present study, mean duration of sensory block and motor block was significantly higher among subjects of study group and control group. The mean time for rescue analgesia in control group was 569.1 min and in clonidine group was 868.2 min. Significantly prolonged duration for rescue analgesia was observed in clonidine group. Our results were in concordance with the results obtained by previous authors who also reported similar findings. In a previous study conducted by Chakravarthy NN et al, authors evaluated the efficacy of clonidine added to bupivacaine as compared with bupivacaine alone used in supraclavicular brachial plexus block for upper limb surgeries. Fifty patients of either sex in age group of 18 – 70 years and ASA status I and II scheduled for upper limb surgery under supraclavicular brachial plexus block were randomized to either. Study Group(S) received 40 ml of 0.25% Bupivacaine + 150 mcg of clonidine, Control

Group(C) received 40 ml of 0.25% Bupivacaine + Nacl of 0.9% solutions. The hemodynamic and the analgesic characteristics were recorded and statistically analysed. The time of onset of sensory and motor blockades were fast in clonidine group. The duration of sensory and motor blockades was prolonged with usage of clonidine.[11]

CONCLUSION

From the above results, the authors concluded that Clonidine as an adjuvant significantly enhances the quality of supraclavicular brachial plexus block.

REFERENCES

1. Gaumann DM, Brunet PC, Jirounek P. Clonidine enhances the effects of lidocaine on C-fiber action potential. Anesth Analg. 1992;74:719–25.
2. YaDeau JT, LaSala VR, Paroli L, Kahn RL, Jules-Elysée KM, Levine DS, et al. Clonidine and analgesic duration after popliteal fossa nerve blockade: Randomized, double-blind, placebo-controlled study. Anesth Analg. 2008;106:1916–20.
3. Chakraborty S, Chakrabarti J, Mandal MC, Hazra A, Das S. of clonidine as adjuvant in bupivacaine-induced supraclavicular brachial plexus block: A randomized controlled trial. Indian J Pharmacol. 2010;42:74–7.
4. Hutschala D, Mascher H, Schmetterer L, Klimscha W, Fleck T, Eichler HG, et al. Clonidine added to bupivacaine enhances and prolongs analgesia after brachial plexus block via a local mechanism in healthy volunteers. Eur J Anaesthesiol. 2004;21:198–204.
5. Duma A, Urbanek B, Sitzwohl C, Kreiger A, Zimpfer M, Kapral S. Clonidine as an adjuvant to local anaesthetic axillary brachial plexus block: A randomized, controlled study. Br J Anaesth. 2005;94:112–6.
6. Culebras X, Van Gessel E, Hoffmeyer P, Gamulin Z. Clonidine combined with a long acting local anesthetic does not prolong postoperative analgesia after brachial plexus block but does induce hemodynamic changes. Anesth Analg. 2001;92:199–204.
7. Pertovaara A, Kauppila T, Jyväsjärvi E, Kalso E. Involvement of and spinal alpha-2-adrenergic mechanisms in the medetomidine-induced antinociception. Neuroscience. 1991;44:705–14.
8. Butterworth JF, 5th, 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.
9. Shivinder Singh, Amitabh Aggarwal, A randomized double blinded prospective study of the efficacy of clonidine added to bupivacaine as compared with bupivacaine alone used in supraclavicular brachial plexus block for upper limb surgeries. Ind J Aneasth 2010; 54; 552-556.
10. Ali QE, Manjunatha L, Amir SH, Jamil S, Quadir A. Efficacy of clonidine as an adjuvant to ropivacaine in supraclavicular brachial plexus block: A prospective study. Indian J Anaesth. 2014 Nov-Dec;58(6):709-13
11. Chakravarthy NN, K. Radha Ramana Murthy. A prospective study of the efficacy of clonidine added to bupivacaine as compared with bupivacaine alone used in supraclavicular brachial plexus block for upper limb surgeries. International Journal of Contemporary Medical Research 2017;4(11):2240-2244.

Source of Support: Nil. **Conflict of Interest:** None Declared.

Cite this article as: Sumit Bansal, Rahul Gupta, Vikas Kumar. Evaluation of Efficacy of Clonidine in Supraclavicular Brachial Block for Surgeries on Upper Limb. Int J Med Res Prof. 2020 Nov; 6(6):39-41. DOI:10.21276/ijmrp.2020.6.6.011