



COMPARISON OF DEXMEDETOMIDINE AND CLONIDINE IN COMBINATION WITH BUPACAVINE IN THE SUPRACLAVICULAR BRACHIAL PLEXUS BLOCK

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Authors VKD and HS designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors AJB and RMM managed the analyses of the study. Author AHG managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

The present study attempted to evaluate the effects of dexmedetomidine (1 mcg/kg) and clonidine (1 mcg/kg) on 0.375% of bupivacaine (35 cc) of the supraclavicular brachial plexus block. Occurs as an assistant. To detect sensory/motor blockade, the onset and duration of post-operative analgesia and any possible complications. The objective of the study is to compare Clonidine and Dexmedetomidine as an adjuvant to Bupivacaine in a supraclavicular brachial plexus block. The study included a total of 60 patients related to American Society of Anesthesiologists (ASA) physical condition I and II between the ages of 18-60 years, scheduled for elective upper limb surgery under the supraclavicular brachial plexus block. The presence of dexmedetomidine increases the length of sensory and motor blocks and the duration of analgesia and enhances the consistency of anaesthesia when injected with bupivacaine in the supraclavicular brachial plexus block.

Keywords: Plexus block; supraclavicular brachial; bupivacaine; dexmedetomidine; adjuvant; clonidine.

1. INTRODUCTION

Upper extremity surgeries are complex and of prolonged duration, hence, adequate intraoperative sensory and motor blockade along with adequate postoperative analgesia is quite essential for such

procedures. The main essence of anaesthesia is adequate pain relief, a need for early ambulation, rapid and a complete recovery with minimal side effects. Regional anaesthesia is a low-cost anaesthetic technique as compared to general anaesthesia. In modern anaesthetic practice, it is the most accepted

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technique as they provide ideal operative conditions. It is more popular because of its simplicity, effectiveness and safety as its added advantages. It also has the benefit of extended post-operative pain relief. Supraclavicular brachial plexus block is a common regional anesthetic technique used to provide anesthesia and analgesia for upper extremity surgery [1]. Brachial plexus block provides adequate intraoperative anaesthesia, prevents complications of general anaesthesia and provides a better post-operative profile with an uneventful recovery and effective postoperative analgesia. It is also advantageous over general anaesthesia in emergency situations, where the patients are either high risk or not adequately nil by mouth [2]. Brachial plexus block is administered by various approaches viz. supraclavicular, interscalenus, infraclavicular and axillary routes. Blockade of the plexus provides surgical anaesthesia for hands, upper/lower arms or shoulder depending on the approach. Among the methodologies, supraclavicular approach is related with a rapid onset of anesthesia and a higher achievement rate [3].

The efficacy of brachial plexus blocks has been studied, including several adjuvants opioids, midazolam, neostigmine, and more recently clonidine and dexmedetomidine [4]. Although the results have often been conflicting, but useful. Studies continue in search of the ideal adjuvant which could provide further improvements in operative conditions without side effects. Dexmedetomidine, a pharmacologically active dextro isomer of medetomidine, is a particular α_2 -adrenoceptor agonist which is utilized as an adjuvant during provincial and local anesthesia. The selectivity to α_2 adrenoreceptor is eight times greater than clonidine [5]. The other advantage of dexmedetomidine is that it can be titrated to desired level of sedation without significant respiratory depression. It has potent analgesic sparing effect, reducing the opioid requirements significantly both during intraoperative and postoperative periods.

2. AIM AND OBJECTIVES

Aim: As an adjunct to the comparison of clonidine and dexmedetomidine in relation to the onset of supraclavicular brachial plexus block and duration of sensory and motor block and analgesia in Bupivacaine.

Objectives: To compare the initiation and duration of the sensory blockade. To compare the onset and duration of the engine blockade. To study hemodynamic parameters during the intraoperative phase. To compare the duration and consistency of analgesia.

3. REVIEW OF LITERATURE

Numerous mechanisms, including fracturing, laceration, crushing, burns, dog bite and amputation, are typical in clinical practise. The possible benefits of supplying anaesthesia for upper limb injuries using regional as opposed to general anaesthesia may seem apparent. Regional anaesthesia offer an excellent alternative for patients who are hemodynamically compromised or too ill to tolerate general anaesthesia. It provides adequate intraoperative anaesthesia, prevents complications of laryngoscopy and intubation of general anaesthesia, early and improved absense of pain, diminished postoperative sickness/spewing, improved tissue perfusion. It preserves mental functions and provides a better postoperative profile with an uneventful recovery. Regional anaesthesia is also advantageous over general anaesthesia in emergency situations, where the patients are either high risk or not adequately fasted [6]. In the regions of the limbs, the ventral rami of several spinal nerves weave together in a very specific fashion to form structures called plexuses. From these plexuses, specific named nerves are formed.

The first percutaneous brachial plexus block was performed in 1911 by G Hirschel through an axillary approach and D Kulenkampff introduced the supra clavicular brachial plexus block in 1912. Several modifications of supra clavicular approach emerged in an effort to avoid pneumothorax. In an attempt to approach brachial plexus in the neck and thereby avoid pulmonary complications, M Kappis (1912) attempted to perform the block through a posterior para vertebral approach [7].

4. MATERIAL AND METHODS

This randomised, double-blind prospective study was performed by the Department of Anaesthesiology between December 2015 and November 2017. The research was conducted in 60 adult patients with upper limb surgery under the supraclavicular brachial plexus block. To detect a mean difference of 50 min ($SD \pm 45$ min) between the two groups for power of 90% and level of significance of 0.05 a sample size 30 per group was selected. The study included a total of 60 patients related to ASA physical condition I and II between the ages of 18-60 years, scheduled for elective upper limb surgery under the supraclavial brachial plexus block.

5. OBSERVATION AND RESULTS

The base age of the patient was 18 years and the maximum age was 60 years. The mean age of the

patients in group BC was 34.1 ± 9.79 and in group BD was 33.4 ± 9.20 years. Age occurrences between two gatherings were comparable.

In group BC, 21 (70%) were males and 9 (30%) were females. In group BD, 19 (63.3%) were males and 11 (36.6%) were females. Majority of the patients in both groups were males and the groups were comparable with respect to sex distribution with no significant difference between the groups.

There were 14 ASA grade I and 16 grade II patients in Group BC. In Group BD, 12 patients were ASA grade I and 18 patients of grade II. The groups were comparable with respect to ASA grades, with no significant differences between groups.

In the group BC, mean systolic blood pressure ranged from 116.0 to 6.1 to 120.6 ± 7.45 mm Hg. In group

BD, mean systolic circulatory strain went from 110.4 to 5.67 to 120.8 mean 5.94 mm Hg. There was a similar trend in fall of systolic blood pressure in the dexmedetomidine group from 15 mins to 45mins in the intraoperative period ($P > 0.05$).

6. DISCUSSION

Brachial plexus block, one of the peripheral nerve blockade, has been used commonly for upper limb surgeries. Being a regional anaesthesia technique, it has many advantages over general anaesthesia like awake patient, no airway manipulation, effective analgesia with good motor blockade, extended postoperative analgesia, early mobilization, and less postoperative complications. It provides both adequate intraoperative anaesthesia as well as effective postoperative analgesia.

Table 1. Patients distribution according to age

Age groups (years)	Group BC		Group BD	
	Number	Percentage	Number	Percentage
18-30	10	33.33	9	30
31-40	14	46.66	16	53.33
41-50	4	13.33	3	10
51-60	2	6.66	2	6.66
Total	30	100	30	100

Table 2. Sex distribution

Sex	Group BC		Group BD	
	Number	Percentage	Number	Percentage
Male	21	70	19	63.33
Female	9	30	11	36.66
Total	30	100	30	100

Table 3. ASA grade

ASA Grade	Group BC		Group BD	
	Number	Percentage	Number	Percentage
I	14	46.66	12	40
II	16	53.33	18	60
Total	30	100	30	100

Table 4. Mean systolic blood pressure

Time interval	Mean $\pm$ SD		Mean difference	t* value	p value
	Group BC	Group BD			
Baseline	120.6 ± 7.45	120.8 ± 5.94	0.2	0.11	>0.05 (NS)
5 mins	119.8 ± 7.70	118.5 ± 5.88	1.3	0.73	>0.05 (NS)
15 mins	118.1 ± 6.45	116.2 ± 5.55	1.9	1.22	>0.05 (NS)
30 mins	117.8 ± 7.16	110.4 ± 5.67	7.4	4.43	<0.001(HS)
45 mins	116.0 ± 6.1	110.0 ± 5.43	6	4.02	<0.001(HS)
60 mins	118.3 ± 6.36	116.1 ± 5.55	2.2	1.42	>0.05 (NS)
90 mins	120.0 ± 6.14	116.8 ± 5.76	3.2	2.08	<0.05 (S)
120 mins	120.5 ± 6.48	119.0 ± 5.57	1.5	0.96	>0.05 (NS)

Several studies studied the effectiveness of clonidine or dexmedetomidine on axillary brachial plexus block and found that these medications had an increased effect on the consistency and duration of anaesthesia. However, relatively few scientists have studied the comparative effects of dexmedetomidine and clonidine as an adjuvant to bupivacaine [8-11].

Demographic data: In group BC, most of the patients 14 (46.6%) were in the age group of 31-40 years and in group BD, 16 (53.3%) were in the age group of 31-40 years. There were 21 (70%) males in group BC and 19 (63.3%) males in group BD. Sixteen (53.3%) and 18 (60%) patients were of ASA PS II in group BC and BD respectively. Thus, the demographic parameters like age, sex and ASA status were comparable between the two groups.

7. CONCLUSION

This study concluded that dexmedetomidine is a superior option than clonidine as an adjuvant to bupivacaine for supraclavicular brachial plexus block with beginning stage and delayed span of tangible and engine bar, improving the nature of square with hemodynamic soundness and absence of results. In this manner settling on, dexmedetomidine an appealing decision as an adjuvant to bupivacaine for supraclavicular brachial plexus block.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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