A PROSPECTIVE RANDOMIZED STUDY TO COMPARE DEXMEDETOMIDINE WITH CLONIDINE AS AN ADJUVANT TO BUPIVACAINE IN SUPRACLAVICULAR BRACHIAL PLEXUS BLOCK

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ABSTRACT: BACKGROUND: Various agents have been used as adjuvants to prolong the duration of action and improve efficacy of local anaesthetic agents. Recently, alpha2 agonists have become the focus of interest as adjuvants to local anaesthetics.

AIM: To compare the onset time, duration of sensory and motor block and duration of analgesia when Clonidine or Dexmedetomidine is added to Bupivacaine in supraclavicular brachial plexus block.

METHODS: Sixty ASA Grade I and II patients scheduled for elective forearm and hand surgeries under supraclavicular brachial plexus block were divided into two equal groups in a randomized fashion. Group C received Bupivacaine 0.25% (35cc)+Clonidine 1µg/kg and Group D received Bupivacaine 0.25% (35cc)+Dexmedetomidine 1µg/kg. Onset and duration of sensory and motor block, and duration of analgesia were compared.

STATISTICAL ANALYSIS USED: Qualitative data- Chi Square test; Quantitative data- Unpaired student's 't' test.

RESULTS: The onset of sensory block was earlier in Group D (8.53±0.72) than in Group C (8.18±0.55) which was statistically significant (p <0.05). There was no significant difference in onset of motor block between the two groups. Duration of sensory block and motor block was 331.43±6.693 and 271.43 6.69min, respectively, in group C, while it was 395.93±12.55 and 335.93±12.55min respectively in group D which was statistically significant (p <0.05). The duration of analgesia (Time to requirement of rescue analgesia) in group C was 407.06±10.90 min, while in group D was 497.06 10.90 and this difference was significant (p <0.001). Patients in Group D were more sedated than those in Group C (p <0.001). There was no significant difference in hemodynamics between the two groups.

CONCLUSION: Dexmedetomidine when added to Bupivacaine in supraclavicular brachial plexus block enhanced the duration of sensory and motor block and also the duration of analgesia when compared with Clonidine.

KEYWORDS: Bupivacaine, Clonidine, Dexmedetomidine, Brachial Plexus block.

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INTRODUCTION: The supraclavicular block of the brachial plexus has the reputation of providing excellent anaesthesia for upper limb surgery. Sometimes the duration falls short of the total duration of surgery in case of long surgical procedures resulting in the need to convert the procedure to general anaesthesia.

α-2 adrenergic receptor agonists as adjuvants to local anaesthetics have been the focus of interest for their sedative, analgesic, perioperative sympatholytic and cardiovascular stabilizing effects with reduced anaesthetic requirements.⁽¹⁾ Clonidine and Dexmedetomidine both are α-2 adrenoceptor agonists.

Since 1980s Clonidine has been used as an adjuvant to local anaesthetics in various regional techniques to extend the duration of block.⁽²⁾

It has been proved that Clonidine improves the quality and duration of local anaesthetic nerve blocks.^(3,4,5)

Dexmedetomidine is approximately eight-times more selective towards the α-2 adrenoceptor than Clonidine.⁽⁶⁾ In previous clinical studies, intravenous Dexmedetomidine resulted in significant opioid sparing effects as well as a decrease in inhalational anaesthetic requirements.⁽⁷⁾ Dexmedetomidine has also been shown to prolong the duration of block and post-operative analgesia when added to local anaesthetic in various regional blocks.⁽⁸⁻¹¹⁾

In this study, we compared Clonidine and Dexmedetomidine as adjuvants to Bupivacaine in supraclavicular brachial plexus block with respect to the onset and duration of sensory and motor block as well as duration of analgesia.

AIM OF THE STUDY:

To study:

1. Onset of sensory and motor block.
2. Duration of sensory and motor block.
3. Duration of analgesia.
4. Sedation
5. Hemodynamic Changes
6. Adverse effects and Complications, if any.

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METHODS: After the Institutional Ethics Committee approval, a prospective, randomized study has been done in sixty patients of either sex aged between 15 years and 60 years and of physical status ASA grade 1 and ASA grade 2 undergoing elective forearm and hand surgeries.

The patients were randomly divided in to 2 groups i.e. group C and D as per computerized random number table and each group had 30 patients.

INCLUSION CRITERIA

- Patients aged between 15 yrs and 60 yrs
- Physical status ASA grade I & II
- Scheduled for elective forearm and hand surgeries.

EXCLUSION CRITERIA:

- Patient's refusal
- Traumatic nerve injury
- Pneumothorax
- Local infection
- Bleeding disorders or patient on anticoagulant therapy
- Known allergy to local anaesthetic agents or study drugs.

Patients were evaluated prior to surgery and relevant investigations done before assessment. Patient was informed about the anaesthesia procedure, drugs that would be used, its effects and side effects. Written informed valid consent was obtained.

PREPARATION OF SOLUTION:

For Group C: To 35 ml of Inj. Bupivacaine (0.25%), Inj. Clonidine 1µg/ kg was added using insulin syringe.

For Group D: To 35 ml of Inj. Bupivacaine (0.25%), Inj. Dexmedetomidine 1µg/ kg was added using insulin syringe.

PROCEDURE: Patient was taken on operation table. Starvation period was confirmed Intravenous access was secured with 18 G cannula on non-operated hand and IV Ringer Lactate was started.

Following monitors were connected to the patients in the operating room;

1. Pulse oximeter.
2. Non-invasive blood pressure.
3. ECG.

Baseline parameters were recorded i.e.

- Pulse rate (PR)
- Systolic blood Pressure (SBP), Diastolic blood Pressure (DBP)
- SpO₂ on room air.

O₂ was given at rate of 4 litre / min through Hudson's mask.

All the necessary equipment and drugs needed for administration of general anaesthesia and for resuscitation were kept ready in order to manage in case of a failed block.

Under aseptic precautions brachial plexus block was performed by supraclavicular approach using peripheral nerve locator. During injection, negative aspiration was done after every 5 ml to avoid intravascular injection.

Pulse rate (PR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and oxygen saturation (SPO₂) were recorded at 0, 5, 15, 30, 60 minutes in the first hour and every hour thereafter up to 6 hours. Patients were monitored up to 24 hours.

PARAMETERS OBSERVED:

- Onset and duration of sensory blockade.
- Onset and duration of motor blockade.
- Duration of analgesia.
- Sedation.
- Hemodynamics.
- Adverse effects and complications, if any.

ASSESSMENT:

Onset of Sensory Blockade: Sensory block was assessed as loss of pinprick sensation using the 23G hypodermic needle. Onset time is the time from the completion of injection of drug to first loss of pinprick sensation.

Onset of Motor Blockade: Onset time of motor blockade was defined as the time from the completion of injection of study drug to first loss of motor power of any of the four nerves.

Duration of Sensory Blockade: Duration of sensory blockade was the time from the onset of sensory blockade to complete recovery of sensation in all the areas of nerve distribution.

Duration of Motor Blockade: Duration of motor blockade was the time from the onset of motor blockade to complete recovery of motor power.

Duration of Analgesia: Duration of post-operative analgesia was taken till the time patient asked for rescue analgesia.

Inj. Paracetamol 1gram was given by slow IV infusion as a rescue analgesic for post-operative pain.

If supplementation with IV analgesia or general anaesthesia was required due to inadequate/ partial block, the case was not included in the study.

SEDATION:

Sedation was assessed by modified Ramsay sedation score.⁽¹²⁾

1. Anxious and agitated or restless or both
2. Co-operative, oriented and tranquil
3. Drowsy but responding to commands
4. Asleep, brisk response to light glabellar tap
5. Asleep, sluggish response to light glabellar tap
6. Asleep, no response to light glabellar tap

Adverse Effects: Patients were monitored for any sign of central nervous system toxicity (tingling and numbness in perioral region, tinnitus, convulsions, loss of consciousness) and cardiovascular toxicity (like changes in heart rate, arrhythmias, hypotension and hypertension).

Complications: Pneumothorax, hematoma at the site of injection and Horner's syndrome were observed for.

Postoperatively, Patients were shifted to PACU. SpO₂, Pulse rate and BP were recorded. All patients received oxygen through Hudson's mask at the rate of 4 liters/min

RESULTS: Overall 60 patients were studied in age group of 15 - 60 years in group C and group D.

Demographic Variables: The difference in age, sex and weight distribution between the two groups was not statistically significant. (p value >0.05)

DISCUSSION: Supraclavicular block with local anaesthetics provides excellent operating conditions with good muscle relaxation, but the duration of analgesia is rarely maintained for more than 4-6 hours even with the longest acting local anaesthetics (Bupivacaine, Ropivacaine and Levo-Bupivacaine). Continuous infusion of local anaesthetics into brachial plexus sheath requires an infusion pump and has potential for cumulative toxicity and unpredictable variability in absorption. Various studies have shown that addition of adjuncts like Clonidine and Dexmedetomidine in local anaesthetic solution in peripheral nerve blocks prolonged the duration of anaesthesia and analgesia.

Since 1980s Clonidine has been used as an adjuvant to local anaesthetics in various regional techniques to extend the duration of block. There have been four proposed mechanisms for the action of Clonidine in peripheral nerve blocks. These mechanisms are centrally mediated analgesia, α -2 adrenoceptor mediated vasoconstrictive effects, attenuation of inflammatory response and direct action on peripheral nerve.⁽¹³⁾

The direct action of Clonidine on the nerve can be explained on the basis of a study conducted by Dalle et al.⁽¹⁴⁾ They proposed that Clonidine, by enhancing activity-dependent hyperpolarisation generated by the Na/K pump during repetitive stimulation, increases the threshold for initiating the action potential causing slowing or blockage of conduction.

Casati et al.⁽¹⁵⁾ observed in their study that adding 1 microgram/kg Clonidine to 20 ml of Ropivacaine 0.75% for axillary brachial plexus anaesthesia provided a 3 hour delay in first analgesic request postoperatively, without clinically relevant effects on the degree of sedation and cardiovascular homeostasis. Therefore, Clonidine was used in a dose of 1 μ g/kg in this study.

Kosugi et al.⁽¹⁶⁾ in their study found that high concentrations of Dexmedetomidine inhibit CAPs in frog sciatic nerves without α -2 adrenoceptor activation. Their result showed that Dexmedetomidine reduced the peak amplitude of CAPs reversibly and in a concentration-dependent manner.

There are very few human studies, i.e. greater palatine and axillary brachial plexus nerve blocks have subsequently demonstrated that increased duration of sensory blockade can be achieved by adding Dexmedetomidine to bupivacaine and levobupivacaine, respectively

Swami SS et al.⁽¹¹⁾(2012) compared Dexmedetomidine (1 μ g/kg) and Clonidine (1 μ g/kg) as an adjuvant to local anaesthesia in supraclavicular brachial plexus block and they concluded that Dexmedetomidine when added to local anaesthetic in supraclavicular brachial plexus block enhanced the duration of sensory and motor block and also the duration of analgesia without any side effects.

After reviewing above literature, Dexmedetomidine was used in a dose of 1 μ g/kg in this study.

A volume of 35 ml of 0.25 % bupivacaine was taken as this volume was associated with a more complete spread for brachial plexus block without any risk of local anaesthetic related systemic toxicity as observed by Swami SS et al.⁽¹¹⁾ in their study.

Our study was conducted at a tertiary care centre after institutional ethical committee approval. The study population included 60 ASA I and II patients undergoing elective forearm and hand surgeries.

These patients were randomly divided into two groups; group C and group D, of 30 patients each as per computer generated randomization.

Group C (n=30): received supraclavicular brachial plexus block with 0.25 % bupivacaine (35 ml)+Inj. Clonidine 1 μ g/kg

Group D (n=30): received supraclavicular brachial plexus block with 0.25 % bupivacaine (35 ml)+Inj. Dexmedetomidine 1 μ g/kg.

RESULTS OBTAINED IN THE STUDY ARE AS FOLLOWS:

1. DEMOGRAPHIC VARIABLES: The two groups were comparable with respect to age, weight, sex distribution, ASA status and duration of surgery

2. CHARACTERISTICS OF SENSORY BLOCK: In the present study, sensory block onset time was defined as the time from the completion of injection of drug to first loss of pinprick sensation in any of the dermatomes.

Onset of sensory blockade was 8.53 ($\pm$ 0.72) minutes in group C and 8.18 ($\pm$ 0.55) minutes in group D. This difference was statistically significant (p < 0.05)

The mean duration of sensory blockade was 331.43($\pm$ 6.693) minutes in group C and 395.93($\pm$ 12.55) minutes in group D. This difference was statistically significant (p < 0.05). Thus; Dexmedetomidine prolonged the duration of sensory blockade compared to Clonidine.

3. CHARACTERISTICS OF MOTOR BLOCK: In the present study, motor block onset time was defined as the time from the completion of injection of drug to first loss of motor power.

Onset of motor blockade was 9.88 ($\pm$ 0.55) minutes in group C and 10.20 ($\pm$ 0.73) minutes in group D. Thus, the onset of motor block was faster in C, but this difference was not quite statistically significant (p >0.05).

4. DURATION OF ANALGESIA: The mean duration of analgesia was 407.06 $\pm$ 10.90 minutes in C group, while in D group; it was 497.06 $\pm$ 10.90 minutes and the difference was statistically significant between the two groups (p <0.001). Thus; Dexmedetomidine increased the duration of analgesia compared to Clonidine.

SEDATION: Higher sedation score was observed in patients belonging to Group D than those of Group C but all patients were arousable. No patient required assistance for airway maintenance.

5. HEMODYNAMICS: The statistical analysis by student's unpaired 't' test showed that there was no significant difference in pulse rate, systolic blood pressure, diastolic blood pressure, Oxygen saturation between the two groups ($p > 0.05$).

6. SIDE EFFECTS/ COMPLICATIONS: In the present study, any side effect like bradycardia, hypotension, nausea, vomiting etc. was not observed. Also, complications like pneumothorax, hematoma etc. were not seen in any of the group.

The following studies substantiate the results of our study: In 2012, Swami SS et al.⁽¹¹⁾ found that onset of sensory block was faster in Dexmedetomidine group than in Clonidine group, but this difference was not statistically significant ($p=0.083$). There was no statistically significant difference in onset of motor block between the Clonidine group and Dexmedetomidine. Mean duration of sensory and motor block was more in Dexmedetomidine group compared to Clonidine group.

Baseline haemodynamic parameters were comparable in both groups. Significantly lower pulse rate was observed at 60, 90 and 120 min, but not less than 60 beats/min, in Group D as compared with Group C ($p < 0.001$). Systolic and diastolic blood pressure were found to be significantly lower than baseline from 30 to 120 min in Group D as compared with Group C ($P < 0.001$). No treatment was required for this fall in blood pressure. The haemodynamic parameters were comparable at the end of 180 min.

No side-effects (nausea, vomiting, dry mouth) were reported during the first 24 h in the post-operative period in both the groups.

Ammar AS et al.⁽¹⁷⁾ compared bupivacaine (0.33%-30cc) alone or combined with Dexmedetomidine (0.75 µg/kg) in infraclavicular block. They found shorter time to onset of sensory and motor blockade, longer duration of sensory and motor blockade in Dexmedetomidine group.

Kaygusuz K et al.⁽¹⁸⁾ studied effects of adding Dexmedetomidine (1 µg/kg) to levobupivacaine (0.5%) in axillary brachial plexus block. They observed that sensory block onset time was shorter in Dexmedetomidine group and duration of sensory and motor block was longer (in Dexmedetomidine group compared to levobupivacaine alone).

No side-effects (Nausea, vomiting, dry mouth) were reported during the first 24 h in the post-operative period in both the groups.

Agarwal S et al.⁽¹⁹⁾ conducted a study to determine the role of Dexmedetomidine (100 µg) added to 30 ml of 0.325 % of bupivacaine in supraclavicular block. They observed that the onset time for sensory and motor block was significantly shorter in Dexmedetomidine group as compared to bupivacaine alone, while the duration of sensory and motor block was significantly longer in Dexmedetomidine group. They observed that heart rate levels in Dexmedetomidine group were significantly lower ($P < 0.001$) compared to bupivacaine alone except for the initial recordings at 0, 5, 10, and 15 min. SBP and DBP levels in Dexmedetomidine group at 15, 30, 45, 60, 90 and 120 min were significantly lower than bupivacaine alone ($P < 0.001$).

Except that, bradycardia was observed in one patient in the dexmedetomidine group, no other adverse effects were observed in either of the groups.

Biswas S et al.⁽²⁰⁾ studied the role of Dexmedetomidine (100 µg) as an adjuvant to levobupivacaine (35ml of 0.5%) in supraclavicular brachial plexus block. They observed that duration of sensory block, motor block, analgesia was longer in Dexmedetomidine group as compared to levobupivacaine alone. They did not observe any side effect during their study in both Dexmedetomidine group and levobupivacaine group.

A meta-analysis was conducted by Daniel M. Popping⁽³⁾ on various studies using Clonidine doses ranging from 90 to 150 µg in brachial plexus block. He found that average duration of motor block and Postoperative analgesia was prolonged in Clonidine group.

A study by Brummett et al.⁽²¹⁾ showed that Dexmedetomidine enhances duration of bupivacaine anaesthesia and analgesia of sciatic nerve block in rats without any damage to the nerve.

The histopathological evaluation of these nerve axons and myelin were normal in both control and Dexmedetomidine+bupivacaine groups.

CONCLUSION:

On the basis of the observation and results of this study, following conclusions are drawn;

- The onset time of sensory block was faster with Dexmedetomidine compared to Clonidine.
- The onset of motor block was clinically faster with Clonidine compared to Dexmedetomidine. But the difference in the onset time of motor block was statistically not significant between the two ($p > 0.05$).
- The duration of sensory block was longer with Dexmedetomidine compared to Clonidine.
- The duration of motor block was longer with Dexmedetomidine compared to Clonidine.
- Dexmedetomidine provided longer duration of analgesia compared to Clonidine.
- Dexmedetomidine causes more sedation than Clonidine.
- No adverse effects were observed with the addition of Clonidine or Dexmedetomidine as an adjuvant.

To summarise, Dexmedetomidine prolongs the duration of sensory and motor block as well as duration of analgesia without any adverse effects as compared to Clonidine when used as an adjuvant to Bupivacaine in supraclavicular brachial plexus block.

BIBLIOGRAPHY:

- Kaur M, Singh P M. Current role of Dexmedetomidine in clinical anaesthesia and intensive care. *Anesth Essays Res* 2011; 5: 128-33
- 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: 112-16
- Popping DM, Elia N, Marret E, Wenk M, and Tramer MR. Clonidine as an adjuvant to Local Anaesthetics for Peripheral Nerve and Plexus Blocks. *Anesthesiology* 2009; 111: 406-15.

4. Cucchiario G, Ganesh A. The Effects of Clonidine on Postoperative Analgesia After Peripheral Nerve Blockade in Children. *Anesth Analg* 2007; 104: 532-7
5. Iskandar H, Guillaume E, Dixmerias F, Binje B, Rakotondriamihary S, Thiebaut R et al. The Enhancement of Sensory Blockade by Clonidine Selectively Added to Mepivacaine After Midhumeral Block. *Anesth Analg* 2001; 93: 771-5.
6. Raimo V, Juha M, Veijo S, Leena N, Virtanen R. Characterisation of selectivity, specificity and potency of Dexmedetomidine as α_2 adrenoceptor agonist. *Eur J Pharmacol* 1988; 150: 9-14.
7. Keniya VM, Ladi S, Naphade R. Dexmedetomidine attenuates sympathoadrenal response to tracheal intubation and reduces perioperative anaesthetic requirement. *Indian J Anaesth* 2011; 55: 352-7.
8. Esmaoglu A, Yegenoglu F, Akin A, Turk CY. Dexmedetomidine added to levobupivacaine prolongs axillary brachial plexus block. *Anaesth Analg* 2010; 111: 1548-51
9. Obayah GM, Refaie A, Aboushanab O, Ibraheem N, Abdelazees M. Addition of Dexmedetomidine to bupivacaine for greater palatine nerve block prolongs postoperative analgesia after cleft palate repair. *Eur J Anaesthesiol* 2010; 27: 280-4.
10. Rancourt MP, Albert NT, Cote M, Letourneau DR, Bernard PM. Posterior tibial nerve sensory blockade duration prolonged by adding Dexmedetomidine to ropivacaine. *Anesth Analg* 2012; 115: 958-62.
11. Swami SS, Keniya VM, Ladi SD, Rao R. Comparison of Dexmedetomidine and Clonidine (α_2 agonist drugs) as an adjuvant to local anaesthesia in supraclavicular brachial plexus block: A randomized double-blind prospective study. *Indian J Anaesth* 2012; 56: 243-9.
12. Ramsay et al - 1974. Controlled sedation with Alaphalone-alphadolone. *BMJ* ii: 656
13. David L. Brown B. Raymond F. The History of Neural Blockade and Pain Management. In: Cousins MJ, Bridenbaugh PO, editors. *Neural blockade in clinical anaesthesia and management of pain*. 3rd ed. Philadelphia: Lippincott-Raven publisher; 1998. p. 3-25.
14. Dalle C, Schneider M, Clergue F, Bretton C, Jirounek P. Inhibition of the I(h) current isolated peripheral nerve: A novel mode of peripheral antinociception? *Muscle Nerve* 2001; 24: 254-61.
15. Casati A, Magistris L, Beccaria P, Cappelleri G, Aldegheri G, Fanelli G. Improving postoperative analgesia after axillary brachial plexus anaesthesia with 0.75% ropivacaine. A double-blind evaluation of adding Clonidine. *Minerva Anesthesiol*. 2001 May; 67(5): 407-12.
16. Kosugi T, Mizuta K, Fujita T, Nakashima M, Kumamoto E. High concentrations of dexmedetomidine inhibit compound action potential in frog sciatic nerve without α_2 adrenoceptor activation. *Br J Pharmacology* 2010; 160: 1662-76.
17. Ammar AS, Mahmoud KM. Ultrasound-guided single injection infraclavicular brachial plexus block using bupivacaine alone or combined with Dexmedetomidine for pain control in upper limb surgery: A prospective randomized controlled trial. *Saudi J Anaesth*. 2012 Apr; 6(2): 109-14.
18. Kaygusuz K, Kol IO, Duger C, Gursay S, Ozturk H, Kayacan U, Aydin R, Mimaroglu C. Effects of adding Dexmedetomidine to levobupivacaine in axillary brachial plexus block. *Curr Ther Res Clin Exp*. 2012 Jun; 73(3): 103-
19. Agarwal S, Aggarwal R, Gupta P. Dexmedetomidine prolongs the effect of bupivacaine in supraclavicular brachial plexus block. *J Anaesthesiol Clin Pharmacol*. 2014 Jan; 30(1): 36-40.
20. Biswas S, Das RK, Mukherjee G, Ghose T. Dexmedetomidine an adjuvant to levobupivacaine in supraclavicular brachial plexus block: a randomized double blind prospective study. *Ethiop J Health Sci*. 2014 Jul; 24(3): 203-8.
21. Brummett CM, Amodeo FS, Janda AM, Padda AK, Lydic R. Perineural Dexmedetomidine provides an increased duration of analgesia to a thermal stimulus when compared with a systemic control in a rat sciatic nerve block. *Regional anaesthesia pain med*. 2010 Sep-Oct; 35(5): 427-31.

PARAMETER	GROUP C MEAN $\pm$ SD	GROUP D MEAN $\pm$ SD	t* VALUE	P VALUE	CHI SQUARE VALUE	ASSOCIATION
AGE	33.56 $\pm$ 10.50	33.76 $\pm$ 11.52	0.0703	0.944	NA	NS
WEIGHT	58.86 $\pm$ 5.47	59.6 $\pm$ 3.87	0.6049	0.5476	NA	NS
SEX (M+F)	21+9	18+12	NA	0.4167	1	NS

Table: 1 Comparison of Demographic variables

NS- Not Statistically Significant; NA- Not Applicable

	C GROUP (MEAN $\pm$ SD)	D GROUP (MEAN $\pm$ SD)	t VALUE	P VALUE	ASSOCIATION
ONSET OF SENSORY BLOCK	8.53 $\pm$ 0.72	8.18 $\pm$ 0.55	2.1158	0.038	SS
ONSET OF MOTOR BLOCK	9.88 $\pm$ 0.55	10.20 $\pm$ 0.73	1.9176	0.0601	NS

Table: 2 Onset of sensory and motor block

SS- Statistically Significant;

Onset of sensory Block: The onset of sensory block was earlier in Group D compared to group C, which was statistically significant. (p value < 0.05).

Onset of motor Block: The difference between the two groups in onset of motor block was not statistically significant. (p value > 0.05).

	BC GROUP (MEAN±SD)	BD GROUP (MEAN±SD)	t VALUE	P VALUE	ASSOCIATION
DURATION OF SENSORY BLOCK	331.43±6.693	395.93±12.55	24.83	<0.05	SS
DURATION OF MOTOR BLOCK	271.43±6.69	335.93±12.55	24.07	<0.05	SS
DURATION OF ANALGESIA	407.06±10.9	497.06±10.90	31.97	<0.001	SS

Table: 3 Duration of sensory & motor block and analgesia

The duration of sensory block, motor block and analgesia was prolonged in group D in comparison with group C which was statistically significant. (P value < 0.05)

Comparison of sedation score between group C and group D;

	Group C		Group D		p value
	Mean±SD	Median	Mean±SD	Median	
Sedation Score	2.13±0.35	2.0	2.93±0.25	3.0	<0.001

Table 4: Comparison of sedation score between group C and group D

The difference between the two groups was statistically significant (p value < 0.001).

Time of assessment	Mean±SD		p Value	Significance
	Group C	Group D		
0(min)	75.16±6.01	78.00±5.81	0.067	NS
5(min)	75.50±5.81	77.30±5.55	0.224	NS
15(min)	75.50±5.81	77.30±5.55	0.224	NS
30 (min)	75.50±5.92	77.06±5.60	0.298	NS
60(min)	75.50±6.40	76.90±5.55	0.369	NS
2(hrs)	75.40±6.01	76.33±5.67	0.540	NS
3(hrs)	75.46±6.25	76.50±5.80	0.506	NS
4(hrs)	75.73±6.16	77.13±5.46	0.355	NS
5(hrs)	75.63±6.16	77.43±5.45	0.235	NS
6(hrs)	76.50±6.04	77.26±5.34	0.607	NS

Table 5: Comparison of Pulse rate between two groups

Time of assessment	Mean±SD		P Value	Significance
	Group C	Group D		
0 (min)	118.20±10.33	121.53±6.76	0.145	NS
5 (min)	117.96±10.19	120.73±6.37	0.211	NS
15 (min)	118.06±9.34	119.80±6.46	0.404	NS
30 (min)	118.33±9.93	119.26±6.44	0.668	NS
60 (min)	118.00±10.03	118.60±6.66	0.785	NS
2 (hrs)	117.90±10.29	118.16±6.61	0.907	NS
3 (hrs)	117.93±10.29	117.60±6.35	0.881	NS
4 (hrs)	118.03±9.84	117.73±6.63	0.890	NS
5 (hrs)	117.83±10.0	118.06±6.59	0.916	NS
6 (hrs)	117.80±9.90	118.06±6.63	0.905	NS

Table 6: Comparison of Systolic Blood Pressure between two groups

Time of assessment	Mean±SD		P Value	Significance
	Group C	Group D		
0 (min)	76.63±7.48	77.73±4.51	0.490	NS
5 (min)	76.30±6.90	77.06±4.54	0.616	NS
15 (min)	76.06±6.54	75.93±4.40	0.928	NS
30 (min)	76.43±6.72	75.46±4.48	0.513	NS
60 (min)	76.66±6.21	75.00±4.12	0.227	NS
2 (hrs)	76.66±6.21	75.00±4.12	0.227	NS
3 (hrs)	76.36±6.84	74.13±4.09	0.130	NS
4 (hrs)	76.36±6.84	74.13±4.09	0.130	NS
5 (hrs)	75.83±6.65	74.26±3.88	0.268	NS
6 (hrs)	76.03±6.48	74.46±3.91	0.260	NS

Table: 7 Comparison of Diastolic Blood pressure between two groups

Time of Assessment	Mean±SD		P Value	Significance
	Bupivacaine-Clonidine	Bupivacaine-Dexmedetomidine		
0 (min)	98.86±0.34	98.90±0.30	0.630	NS
5 (min)	98.86±0.34	98.90±0.30	0.630	NS
15 (min)	98.70±0.46	98.76±0.43	0.603	NS
30 (min)	98.66±0.47	98.60±0.47	0.622	NS
60 (min)	98.66±0.47	98.60±0.47	0.622	NS
2 (hrs)	98.66±0.47	98.60±0.47	0.622	NS
3 (hrs)	98.53±0.50	98.73±0.44	0.105	NS
4 (hrs)	98.53±0.50	98.74±0.44	0.105	NS
5 (hrs)	98.73±0.37	98.70±0.46	0.232	NS
6 (hrs)	98.73±0.44	98.90±0.30	0.857	NS

Table 8: Comparison of Oxygen Saturation between two groups

There was no statistically significant difference in pulse rate, systolic blood pressure, diastolic blood pressure and oxygen saturation between the two groups.