ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 7, Oct 2022

Evaluation of Effect on motor block parameters of Supplementation of low dose Intravenous Dexmedetomidine on characteristics of Spinal Anaesthesia with Hyperbaric Bupivacaine

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ABSTRACT

Background: The most typical symptom that prompts patients to visit a doctor is pain. Pain is an experience as well as a sensory modality. People's reactions to pain might vary greatly from one another as well as from moment to moment within the same person.

Aim and Objective: The present research was aimed to examine effect of Supplementation of low dose Intravenous Dexmedetomidine on characteristics of Spinal Anaesthesia with Hyperbaric Bupivacaine on motor block parameters.

Methodology: The current study was conducted at Santosh Medical College & Hospital in Ghaziabad on 50 patients who were ASA l & ll and had lower abdomen and lower limb procedures. The patients' ages ranged from 18 to 65, and their weights ranged from 30 to 70 kg for both sexes.

Result: In the study's sample, there were 32 men and 18 women. The mean age in groups D was 36.28 + 12.70 years, compared to 39.36 + 13.43 years in groups C. Mean onset time of sensory

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block was reported as 5.95±3.486 in group D and 7.90±3.538 in group C which was statistically significant, p=0.001 Mean VAS score in the D & C group remained zero for 90 minutes after the administration of the drug.

Conclusion: Dexmedetomidine group's sensory block onset time is earlier. The study found that Dexmedetomedine administered intravenously during spinal anesthesia decreased the onset and maximum motor blockage of sensory blocks.

Keywords: Dexmedetomidine, Hyperbaric Bupivacaine, Spinal Anaesthesia, Motor block parameters.

INTRODUCTION

The most typical symptom that prompts patients to visit a doctor is pain. Pain is an experience as well as a sensory modality. Pain is a distressing sensory and emotional experience connected to real or potential tissue damage or expressed as such damage, according to the International Association for the Study of Pain. This term acknowledges the interaction between psychological and emotional elements. [1] An key practice in the field of anaesthesiology is pain control, particularly in the post-operative period. The extended surgical analgesia caused by morphine produces itching, postoperative nausea, and vomiting. [2]

The main application of the novel selective -2 adrenoceptor agonist dexmedetomidine is IV sedation. The duration of anesthesia caused by single-injection neuraxial [3-6] and peripheral [7-9] nerve blocking has been found to be prolonged by the off-label use of dexmedetomidine as a local anesthetic adjuvant. However, the majority of studies looking at how IV dexmedetomidine affects the length of regional anesthesia are constrained by their small sample sizes and have produced quantitatively inconsistent results.

Most lower abdomen and lower leg procedures use regional anesthesia as their preferred method of anesthesia delivery. It keeps the patient awake and reduces or totally avoids the issues related to airway control. A trusted treatment, spinal anesthesia has a quick onset of effect, excellent muscular relaxation, and uses less anesthetic material. [10-12]

For spinal anesthesia, 0.5% hyperbaric bupivacaine is frequently employed. Bupivacaine has a long-lasting effect, however it won't provide persistent post-operative analgesia. To extend the duration of the postoperative analgesia, adjuvant has been used in conjunction with intrathecal local

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anesthesia. In the lower abdomen and lower limb procedures covered in our study, the addition of low dosage intravenous dexmedetomidine affects the features of spinal anesthesia with hyperbaric bupivacaine.

MATERIALS AND METHODS

The Department of Anaesthesiology at Santosh Medical College & Hospital in Ghaziabad, Uttar Pradesh, conducted this Randomized comparative double blind study between the years of 2014 and 2015 with approval from the Board of Studies and Ethical Committee. There were 60 ASA grade I/II patients in the overall sample. Patients will be divided into two groups of 25 patients each.

Patients with Anatomical deformities like lordosis, scoliosis, khyphosis, Local infection on site, Coagulopathies, Allergy to local anesthetics, History of chronic pain/ neuropathy, Hypersensitivity reaction and Psychiatric and Neurological diseases were not included in the study.

Group D: 25 patients receiving IV dexmedetomidine 0.5 mcg/kg diluted to 20 ml with normal saline and infused over 10 minutes as a loading dose, prior to SAB, and infusion of dexmedetomidine at the rate of 0.5 mcg/kg/hr.

Group C: 25 patients receiving similar volume of normal saline, maintenance infusion of normal saline was administered at the rate of 0.5 mcg/kg/hr.

A detailed pre anesthetic examination was done in all the patients. Necessary investigations were done and informed consent was taken. Onset the sensory block, maximum level of sensory block and time of achieving maximum level of sensory block was assessed by pin prick method. Motor blockade in the lower limbs was assessed using the Bromage Scale and modified by Axelsson and Windman of motor function.

The statistical analysis was carried out using the statistical program SPSS version 21.0 after the data had been imported into Microsoft Excel. T-test was used to compare mean values and chi-square test was used to compare frequency. P value of less than 0.5 i.e. $p<0.05$ will be considered statistically significant.

RESULTS

Table1: Demographic data distribution of study subject.

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	Demographic Distribution		
		Group D	Group C
Age	**18-40**	17(68%)	13(52%)
	41 – 65	8(32%)	12(48%)
	Mean±SD	36.28 ± 12.70	39.36 ± 13.43
Gender	**Male**	16	16
	Female	9	9
Weight	**30 – 50**	10	3
	51 – 70	15	22
	Mean±SD	54.56 ± 10.71	65.16 ± 10.98

The study respondents' demographic characteristics are shown in Table 1. In the study, there were 62.5% women and 37.5% men. Patients receiving bupivacaine had an average age of 39.26 years and a weight of 55.62 kilograms, whereas those receiving bupivacaine with butorphanol had an average age of 36.44 years and a weight of 57.34 kilograms.

Table2: Showing sensory block onset, time taken to achieve maximum sensory block level, duration of sensory regression to S2 level and maximum motor block blockage among both the groups.

Comparison Parameters		**Number (Percentage)**		**p-value**
		D GROUP	**C GROUP**	
Sensory Block Onset (Minute)	1-5	14(56%)	7(28%)	p=0.001
	6-10	8(32%)	13(52%)	
	11-15	3(12%)	5(20%)	
	Mean±SD	5.95±3.486	7.90±3.538	
Time Taken To Achieve Maximum Sensory Block (Minute)	0-5	2(8%)	2(8%)	p=0.664
	6-10	5(20%)	6(24%)	
	11-15	15(60%)	13(52%)	
	16-20	3(12%)	4(16%)	
	Mean±SD	24.45±6.05	25.20±4.67	
Duration of Sensory Regression To S2 Level (Minutes)	150-200	0	6	p=0.352
	201-250	8	7	
	251-300	14	8	
	301-350	2	3	
	351-400	1	1	
Max Motor Blockage (Minutes)	Mean±SD	271.20±41.48	257.20±51.55	
	1-10	24	24	p=0.97

ISSN PRINT 2319 1775 Online 2320 7876

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	11-20	1	0	
	21-30	0	1	
	Mean±SD	5.25±3.851	5.30±5.05	

Maximum number of patients 14(56%) in D group had sensory onset time between 1-5 minutes whereas in C group, 13(52%) of patients had sensory onset time of 6-10 min, which was statistically significant. 6(24%) patients in group C took between 6-10 minutes as compared to 5(20%) patients in group D. Mean for D group came to be 24.45±6.05 as compared to 25.20±4.67 for C group. All the data were comparable & statistically not significant.

Duration of sensory regression to S2 level was 257.20±51.55 in C group as compared to 271.20±41.48 in group D. p value came out to be p= 0.352 which was statistically not significant & comparable. Time taken for maximum motor blockage was in between 0-10 minutes in maximum number of patients (96%) in both the groups

DISCUSSION

Spinal anaesthesia is the technique of choice for infraumblical surgeries over General& Epidural anaesthesia. G.A is associated with difficult airway & pulmonary aspiration associated morbidity & mortality. Epidural lacks reliability of spinal block and requires large doses of local anaesthetics. Bupivacaine is the most commonly used local anesthetic agent because of its longer duration of action.

In this study, the groups' demographic characteristics—age, sex, and kind of surgeries—were statistically equivalent. In our study, the mean age of the participants was 36.28 12.70 years for group D and 39.36 13.43 years for group C. In our study, the D group had the highest percentage of patients (68%) who were in the 18–40 age range, whereas the C group had the lowest percentage (32%) of patients in the 41–65 age range. The majority of the patients in our study fell into the weight category of 51-70 kg in both groups, with a mean weight of 54.56 10.71 for patients in the 30-50 kg weight range and 65.16 10.98 for those in the 51-70 kg weight range. There was no statistically significant difference in the distribution of age, height, weight, and sex in the groups, according to research by SS Harsoor et al. [13] and Anbarasu Annamalai et al. [14] (p>0.05).

In our study Time taken to achieve maximum level of sensory block was between 11-15 minutes for 52% of the patients in the C group as compared to 60% patients in D group. 24% patients in group C took between 6-10 minutes as compared to 20% patients in group D. Mean for D group came to be 24.45 ± 6.05 as compared to 25.20 ± 4.67 for C group. All the data were comparable &

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statistically not significant whereas in studies conducted by Kanazi GE et al [3], Al-Ghanem SM et al [15], Gupta R et al6 in dexmedetomidine group there was no statistically significant difference in the maximum level of sensory blockade which concurs with our study. The results of this study indicate that infusion of dexmedetomidine hastens the onset of sensory block, though the onset of motor blockade was not affected. Lugo et al [16] in their study noted prolongation of sensory block and duration of analgesia without significant effect on motor block while using 1 mcg/kg bolus followed by 0.5 mcg/kg/h infusion of dexmedetomidine.

There was no statistical significant difference in the maximum level of sensory blockade in D group compared C group whereas in studies conducted by Gupta R et a [17] in dexmedetomidine group there was no statistically significant difference in the maximum level of sensory blockade which concurs with our study. Another study done by Hong JY et al [18] and Kaya FN et al [19] reported administration of a single bolus of 1 mcg/kg and 0.5 mcg/kg to prolong the duration of analgesia and sensory blockade.

CONCLUSION

The present study is carried out on 50 patients undergoing lower abdominal and lower limb surgeries at Santosh Medical College & Hospital. Time of sensory block onset is earlier with dexmedetomidine group. The study concluded that Dexmedetomedine given intravenously during spinal anaesthesia reduces sensory block onset and max motor blockage.

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