

# Evaluation Of Effect On Post-Operative Analgesia And Side Effects Of Supplementation Of Low Dose Intravenous Dexmedetomidine On Characteristics Of Spinal Anaesthesia With Hyperbaric Bupivacaine

Dr Mahima Lakhanpal<sup>1\*</sup>, Dr Shefali Singh<sup>2</sup>, Dr Abhishek Singh<sup>3</sup>, Dr Rahul Singh<sup>4</sup>

2. Assistant Professor, Department of Anaesthesia, Santosh Medical College & Hospital, Santosh Deemed to be University, Ghaziabad.
3. Assistant Professor, Department of Anaesthesia, Santosh Medical College & Hospital, Santosh Deemed to be University, Ghaziabad.
4. Assistant Professor, Department of Anaesthesia, Santosh Medical College & Hospital Santosh Deemed to be University.
5. Associate Professor, Department of Anaesthesia, Santosh Medical College & Hospital, Santosh Deemed to be University, Ghaziabad.

**\*Dr. Mahima Lakhanpal- Corresponding Author**

## ABSTRACT

**Background:** Surgery involving the spine frequently uses spinal anesthesia. It decreases mortality and morbidity, uses fewer medications, results in less blood loss, and provides good postoperative pain management. It is preferred to general anesthesia and epidural anesthesia for intractable operations.

**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 post-operative analgesia and side effects.

**Methodology:** The present study was carried out on 50 patients undergoing lower abdominal and lower limb surgeries at Santosh Medical College & Hospital. Ages of the patients ranged from 18 to 65, and both sexes' weights ranged from 30 to 70 kg.

**Result:** There were 32 men and 18 women in the study's sample. As opposed to  $39.36 \pm 13.43$  years in groups C, the mean age in groups D was  $36.28 \pm 12.70$  years. For 90 minutes following the administration of the medication, the mean VAS score in the D & C group remained 0. Rescue analgesia took  $177.25 \pm 28.90$  seconds to provide in the C group versus  $181.25 \pm 41.48$  seconds in the D group. ( $p=0.725$ )

**Conclusion:** Dexmedetomidine administered intravenously during spinal anesthesia therefore reduced postoperative pain and painkiller usage, according to the study's findings.

**Keywords:** Dexmedetomidine, Spinal Anaesthesia, Analgesia, Lower limb surgery.

## INTRODUCTION

Pain is the most frequent symptom that leads patients to seek medical attention. Both an experience and a sensory modality, pain is both. According to the International Association for the Study of Pain, pain is a distressing sensory and emotional experience associated with actual or potential tissue damage or expressed as such harm. This phrase recognizes how psychological and emotional factors interact. [1] Controlling pain, especially after surgery, is a crucial procedure in the field of anaesthesia. Morphine's prolonged surgical analgesia results in postoperative nausea and vomiting, itching, and postoperative nausea. [2]

Dexmedetomidine, a novel selective  $\alpha_2$  adrenoceptor agonist, is mostly used for IV sedation. Dexmedetomidine has been demonstrated to lengthen the duration of anesthesia brought on by single-injection neuraxial [3-6] and peripheral [7-9] nerve blocking. This is due to the fact that it is used off-label as a local anesthetic adjuvant. The bulk of research examining the impact of IV dexmedetomidine on the duration of regional anesthesia, however, are limited by their small sample numbers and have generated qualitatively variable results.

Regional anesthesia is the primary technique for administering anaesthetic during the majority of lower abdomen and lower leg surgeries. It keeps the patient awake and significantly lessens or completely eliminates problems with airway control. Spinal anesthesia is a well-known procedure that requires less anesthetic substance and has a speedy start of action, great muscle relaxation, and safety record. [10-12]

0.5% hyperbaric bupivacaine is frequently used for spinal anesthesia. Bupivacaine has an extended effect, but it won't give you long-lasting post-operative analgesia. Adjuvant has been combined with intrathecal local anesthetic to lengthen the duration of postoperative analgesia. The characteristics of spinal anesthesia with hyperbaric bupivacaine are affected when low dosage intravenous dexmedetomidine is added for the lower abdominal and lower leg procedures covered in our study.

## 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. According to Visual Linear Analogue Scale, pain score was recorded by the linear analogue method for assessing pain described by Ravil et al.

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.**

	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

	<b>Mean±SD</b>	54.56 ± 10.71	65.16 ± 10.98
--	----------------	---------------	---------------

Demographic information about the study individuals is included in Table 1. The study included 62.5% women and 37.5% men. Bupivacaine patients had a mean age of 39.26 years and a mean weight of 55.62 kilograms, whereas Bupivacaine + Butorphanol patients had a mean age of 36.44 years and a mean weight of 57.34 kilograms.

**Table2: Showing variation of mean VAS values among the patients in both the groups**

VASSC ORE	Mean±SD		p-value
	DVAS	CVAS	
VAS0	0.00±0.000	0.00±0.000	N/A
VAS30	0.00±0.000	0.00±0.000	N/A
VAS60	0.00±0.000	0.00±0.000	N/A
VAS90	0.00±0.000	0.00±0.000	N/A
VAS120	1.15±0.489	1.50±0.827	0.112
VAS135	1.50±0.946	1.40±0.821	0.023
VAS180	2.40±1.095	2.10±0.968	0.006

Table 2 shows that, Mean VAS score in the D & C group remained zero for 90 minutes after the administration of the drug. Mean VAS score at 105 min was 1.10±0.447 for D group as compared to 1.15±0.489 for C group. Mean VAS score at 120 min was 1.15±0.489 for D group as compared to 1.50±0.827 for C group. Mean VAS score at 180 min was 2.40±1.095 for the D group as compared to 2.10±0.968 for C group. p value came out be <0.05 for VAS score at 135 &180 min which was statistically significant.

**Table3: Showing administration time (min) of rescue analgesia among both the groups.**

Group	Time(Min)			Mean±SD
	100-150	151-200	201-250	
<b>GroupD</b>	5	13	7	181.25±41.48
<b>GroupC</b>	4	16	5	177.25±28.90

Administration time of rescue analgesia was  $177.25 \pm 28.90$  in the C group while it was  $181.25 \pm 41.48$  in the D group. p value came out to be 0.725 which was statistically not significant & comparable.

**Table4: Showing complications in groups D and C.**

Complication	GroupD	GroupC
Shivering	2(8%)	6(24%)
Bradycardia	3(12%)	0
Hypotension	0	0
Nausea	0	0
Vomiting	0	0
Pdph	0	0
Backache	0	0
Others	0	0
Vasopressor	0	0
Antiemetic	0	0

According to Table 4, Major complications among the patients in groups D and C respectively were shivering (8% vs 24%) and bradycardia (12% vs 0%).

## DISCUSSION

Infraumbilical procedures typically use spinal anesthesia rather than general or epidural anesthesia. G.A. has been linked to pulmonary aspiration-related morbidity and mortality. The epidural procedure requires high dosages of local anesthetics and is less reliable than a spinal block. Due to its extended duration of action, bupivacaine is the local anesthetic drug that is used the most frequently.

Age, sex, and the type of procedures were statistically equal for the groups in this study. The average age of the participants in our study was 39.36 years for group C and 36.28 years for group D. In our study, the D group had the majority of patients who were between the ages of 18 and 40 (68%) whereas the C group had the minority of patients who were between the ages of 41 and 65 (32%). With a mean weight of  $65.16 \pm 0.98$  for patients in the 51-70 kg weight range and

54.56±10.71 for those in the 30-50 kg weight range, the majority of the patients in our study fell into the 51-70 kg weight category in both groups. SS Harsoor et al. [13] and Anbarasu Annamalai et al. [14] found no statistically significant difference in the distribution of age, height, weight, and sex between the groups ( $p>0.05$ ).

In this study pain was assessed by visual analogue scale method in our study. This includes the use of a 10 cm scale on which severity of pain was represented as 0- 10 marking, 10 was represented as worst pain possible & 0 as no pain at all. Mean VAS score remained zero for 90 min in D group as well as for C group after administration of the drug.

At 120 min mean VAS was 1.15±0.48 for the D group as compared to 1.5±0.827 for the C group while at 180 min it was 2.40±1.09 for D group & 2.10±0.968 for C group. P-value came out to be 0.02 & 0.006 for VAS score at 135 & 180 min respectively which was statistically significant however a study done by Harsoor et al [15] and Anbarasu Annamalai et al [16] showed no significant results among the groups.

Incidence of hypotension (16% vs 8%) in our study was comparable with other studies by Harsoor et al [15], Al-Mustafa MM [4] and Hong JY [17]. Shivering was another side effect which was observed in our study as regional anesthesia produces vasodilation, which facilitate core to peripheral redistribution of heat and cause shivering. Dexmedetomidine decreases the thermoregulatory threshold for vasoconstriction and shivering. In our study, only 2 patients of Group D and 6 patients of Group C showed shivering, but the intensity of shivering was lesser in patients of Group D which was comparable with the study done by Gupta K et al [18] and Moorf M [19] who showed similar findings.

## CONCLUSION

The present study is carried out on 50 patients undergoing lower abdominal and lower limb surgeries at Santosh Medical College & Hospital. In this study VAS pain score is less with intravenous dexmedetomidine as compared to saline while Rescue analgesia is required early in the saline group as compared to dexmedetomidine group. Side effects such as bradycardia, hypotension and shivering are found in few patients. Hence the study concluded that Dexmedetomidine given intravenously during spinal anaesthesia reduces post operative pain and analgesic consumptions.

## REFERENCE

1. Mighty things from small beginning grow' John Dryen (1631-1700) *Annus mirabilis*. *Anaesthesia*. 1999;54(9):823-825.
2. Stappendal R., Weber E.W., Benraad B., Van Limbeek J., Dirksen R., itching after intrathecal morphine, incidence and treatment, *eur j anaesthesiol* 2000;17:616-21.
3. Kanazi GE, Aouad MT, Jabbour-Khoury SI, Al Jazzar MD, Alameddine MM, Al-Yaman R, Bulbul M, Baraka AS. Effect of low-dose dexmedetomidine or clonidine on the characteristics of bupivacaine spinal block. *Acta Anaesthesiol Scand* 2006;50:222–7
4. Al-Mustafa MM, Abu-Halaweh SA, Aloweidi AS, Murshidi MM, Ammari BA, Awwad ZM, Al-Edwan GM, Ramsay MA. Effect of dexmedetomidine added to spinal bupivacaine for urological procedures. *Saudi Med J* 2009;30:365–70
5. Eid H, Shafie M, Youssef H. Dose-related prolongation of hyperbaric bupivacaine spinal anesthesia by dexmedetomidine. *Ain Shams J Anesthesiology* 2011;4:83–95
6. Parkhouse J, Lambrechts W, Simpson BRL- The incidence of postoperative pain. *Br J Anaesth* 1961;33:345-353
7. Gupta R, Bogra J, Verma R, Kohli M, Kushwaha JK, Kumar S. Dexmedetomidine as an intrathecal adjuvant for postoperative analgesia. *Indian J Anaesth* 2011;55:347–51
8. Shukla D, Verma A, Agarwal A, Pandey HD, Tyagi C. Comparative study of intrathecal dexmedetomidine with intrathecal magnesium sulfate used as adjuvants to bupivacaine. *J Anaesthesiol Clin Pharmacol* 2011;27:495–9
9. Bonica JJ, Yaksh T, Liebeskind JC, Pechick RN, De Paulis A; Biochemistry and modulation of nociception and pain. Philadelphia; Lea and Febiger 1990;95-121.
10. Corning J.L.N.Y. *Med. J.* 1885;42:483(reprinted in 'Classical File', *Survey of Anaesthesiology* 1960;4:332)
11. Lund PC. *Principles and Practice of Spinal Anesthesia*. Springfield, IL: Charles C. Thomas, 1971.
12. *Deutsh. Zeit. F. Chir.* 1899;51:361(translated and reprinted in 'Classical File', Bier

Survey of Anesthesiology 1962;6:352).

13. SS Harsoor, D Devika Rani, Bhavana Yalamuru, K Sudheesh, SS Nethra. Effect of supplementation of low dose intravenous dexmedetomidine on characteristics of spinal anaesthesia with hyperbaric bupivacaine. Indian J Anaesth 2013;57:265-269

14. Annamalai A, Singh S, Singh A and Mahrous DE. Can Intravenous Dexmedetomidine Prolong Bupivacaine Intrathecal Spinal Anesthesia? J Anesth Clin Res 2013; 4:372.

15. SS Harsoor, D Devika Rani, Bhavana Yalamuru, K Sudheesh, SS Nethra. Effect of supplementation of low dose intravenous dexmedetomidine on characteristics of spinal anaesthesia with hyperbaric bupivacaine. Indian J Anaesth 2013;57:265-269.

16. Anbarasu Annamalai, Sanjeev Singh, Arti Singh and Deigheidy Ehab Mahrous. Can Intravenous Dexmedetomidine Prolong Bupivacaine Intrathecal Spinal Anesthesia? J Anesth Clin Res 2013;4:372.

17. Hong JY, Kim WO, Yoon Y, Choi Y, Kim SH, Kil HK. Effects of intravenous dexmedetomidine on low-dose bupivacaine spinal anaesthesia in elderly patients. Acta Anaesthesiol Scand 2012;56:382-387.

18. Gupta K, Tiwari V, Gupta PK, Pandey M.N., Agarwal S, Arora A. Prolongation of subarachnoid block by intravenous dexmedetomidine for sub umbilical surgical procedures: A prospective control study. Anesth Essays Res 2014;8:175- 178.

19. Moorf M, Khan SA, Jain D, Khan RM, Maroof SM. Evaluation of effect of dexmedetomidine in reducing shivering following epidural anesthesia. Anesthesiology 2004;101:495.