

# Assessment of Complications and Haemodynamic Stability with the Use of Dexmedetomidine with Bupivacaine: An Institutional Based Study

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## ABSTRACT

**Background:** Lesser doses of local anesthetic in addition with additives provides the necessary sensory level with enough analgesia. Dexmedetomidine is the S enantiomer of medetomidine that carries a high degree of specificity for adrenoceptor. The present study was conducted with the aim to assess the complications and haemodynamic stability with the use of dexmedetomidine with bupivacaine.

**Materials and Methods:** The present study was conducted in a prospective manner for a period of 1 year at Department of Anaesthesiology, Lady Hardinge Medical College & Smt. S. K. Hospital, New Delhi, India. No anaesthesiologist enrolled in the present study was conscious of the group assigned till the entire 30 subjects were enrolled and the study was completed. After verifying a clear and free flow of the CSF, the drug administration was completed and the subjects were placed at the supine position. For every patient, heart rate and mean arterial pressure monitoring was done every 2 min for the initial 10 minutes after spinal anesthesia, then after every 5 minutes till 30 minutes and then every 30 minutes till complete motor and sensory recovery. All the data thus obtained was arranged in a tabulated form and analyzed using SPSS software. Probability value of less than 0.05 was regarded as significant.

**Results:** The present study enrolled 30 subjects with 15 patients in each group. The mean age of the subjects was

39.22+/-4.67 years. The preoperative BP in Group I was 94.67+/-8.22 and in group II was 91.52+/-5.38. There was no significant difference between them. There was 1 subject each in Group I and II with nausea and shivering respectively.

**Conclusion:** The study showed no significant alterations in the haemodynamic stability the side effects between subjects who received bupivacaine alone or bupivacaine plus dexmedetomidine.

**Keywords:** Adrenoceptor, Bupivacaine, Dexmedetomidine, Haemodynamic.

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## Article History:

Received: 03-01-2019, Revised: 01-02-2019, Accepted: 27-02-2019

Access this article online	
Website: <a href="http://www.ijmrp.com">www.ijmrp.com</a>	Quick Response code 
DOI: 10.21276/ijmrp.2019.5.2.056	

## INTRODUCTION

Spinal blockage is the most frequently opted method for surgical procedures. Sensory blockage up to the level of T10 is regarded favorable to eliminate the uneasiness produced by bladder distension. Sensory blockage cephalad to this level masks the capsular signs related with perforation of the bladder and may restrict its prompt diagnosis and management. Additionally, due to the restricted cardiovascular and respiratory levels in elderly subjects undergoing TURP, it is crucial to hinder the cephalad extension to minimize haemodynamic changes.<sup>1</sup> Lesser doses of local anaesthetic in addition with additives provides the necessary sensory level with enough analgesia.<sup>2</sup> Dexmedetomidine is the S enantiomer of medetomidine that carries a high degree of specificity for adrenoceptor.<sup>3</sup> To date, very few studies have been performed on the effect of intrathecal dexmedetomidine on the spinal block with bupivacaine for urological surgeries.<sup>4</sup>

The present study was conducted with the aim to assess the complications and haemodynamic stability with the use of dexmedetomidine with bupivacaine.

## MATERIALS AND METHODS

The present study was conducted in the Department of Anaesthesiology, Lady Hardinge Medical College & Smt. S. K. Hospital, New Delhi (India) after the approval by the institutional ethical board. The present study was conducted in a prospective manner for a period of 1 year. All the subjects were informed about the study and a written consent was obtained from them in their vernacular language. Subjects with the spinal surgery, infection on back, neurological disorders or hepatic diseases were excluded from the study. Total 30 subjects were included in the study belonging to ASA grade I or ASA grade II category. Using

random sampling technique subjects were divided two categories- Group I received 7.5 mg of 0.5% hyperbaric bupivacaine hydrochloride and Group II received 3 µg of dexmedetomidine hydrochloride with bupivacaine hydrochloride. No anaesthesiologist enrolled in the present study was conscious of the group assigned till the entire 30 subjects were enrolled and the study was completed. All the subjects were told not to take solid food after midnight before surgery initiation and took clear liquids only upto 2 hours before surgery initiation. On reaching the Operating Room monitors were attached for noting non-invasive blood pressure, peripheral oxygen saturation, electrocardiography. The baseline readings of blood pressure, heart rate and partial pressure of oxygen were recorded. Spinal puncture was performed at the level of L3 –L4 or L4 –L5 with a 25-gauge

Quincke needle at the sitting posture. After verifying a clear and free flow of the CSF, the drug administration was completed and the subjects were placed at the supine position. For every patient, heart rate and mean arterial pressure monitoring was done every 2 min for the initial 10 minutes after spinal anesthesia, then after every 5 minutes till 30 minutes and then every 30 minutes till complete motor and sensory recovery. Subjects were considered to have bradycardia if heart rate was below 40 while hypotension was considered when mean arterial pressure of <50 in our study. Adverse reactions (bradycardia, hypotension, nausea, shivering, vomiting and pruritus) were noted during surgery. All the data thus obtained was arranged in a tabulated form and analyzed using SPSS software. Probability value of less than 0.05 was regarded as significant.

**Table 1: Comparison of haemodynamic parameters amongst the groups**

Variable	Group I	Group II	P value
<b>Preoperative vitals</b>			>0.05
Pulse	81.34+/- 3.54	82.89+/-2.65	
BP	94.67+/-8.22	91.52+/-5.38	
<b>Intraoperative vitals</b>			>0.05
Pulse	81.23+/-2.11	80.78+/-5.33	
BP	88.48+/-1.77	89.66+/-4.65	
<b>Postoperative vitals</b>			>0.05
Pulse	83.28+/-1.33	78.26+/-3.11	
BP	88.12+/-2.17	90.34+/-5.73	

**Table 2: Intraoperative complications encountered during the study**

Complications	Group I	Group II	P value
<b>Nausea</b>	1	1	>0.05
<b>Hypotension</b>	1	2	>0.05
<b>Bradycardia</b>	2	2	>0.05
<b>Vomiting</b>	0	1	>0.05
<b>Respiratory depression</b>	0	0	>0.05
<b>Pruritis</b>	0	0	>0.05
<b>Shivering</b>	1	1	>0.05

**RESULTS**

The present study enrolled 30 subjects with 15 patients in each group. The mean age of the subjects was 39.22+/-4.67 years. Table 1 illustrates the haemodynamic parameters amongst both the groups. The preoperative pulse in Group I was 81.34+/- 3.54 and in group II was 82.89+/-2.65. There was no significant difference between them. The preoperative BP in Group I was 94.67+/-8.22 and in group II was 91.52+/-5.38. There was no significant difference between them. The intraoperative pulse in Group I was 81.23+/-2.11 and in group II was 80.78+/-5.33. There was no significant difference between them. The intraoperative BP in Group I was 88.48+/-1.77and in group II was 89.66+/-4.65. There was no significant difference between them. The postoperative pulse in Group I was 83.28+/-1.33 and in group II was 78.26+/-3.11. There was no significant difference between them. The postoperative pulse in Group I was 88.12+/-2.17 and in group II was 90.34+/-5.73. There was no significant difference between them.

Table 2 shows the intraoperative complications encountered in the study. There was 1 subject each in Group I and II with nausea and shivering respectively. There were 2 subjects in each group with bradycardia. There was 1 subject in Group II with vomiting. There was 1 subject in Group I and 2 in Group II with hypotension. There was no significant difference between the groups.

**DISCUSSION**

Spinal blockage has the tendency of being a safe anesthetic method till the time physiological trips are in certain limits after which, complications of the anesthetic starts showing. The drawbacks of spinal blockage, primarily, hypotension, decreased heart rate, headache, nausea, emesis and infrequent neurological side effects have affected its reputation. In spite of the waxing and waning of the popularity, spinal blockade stands one of the elementary methods in the arena of modern anesthesiologists. The motive for its transformed popularity in present years is

because of the realization that spinal anesthesia can associate a low level of physiological bypass on the one side and deep degree of sensual denervation and relaxation of muscle on the other side.<sup>5</sup> The usage of spinal blockage has its setbacks for Surgeries of longer duration due to short duration of action of anesthetics. Therefore, it became compulsory to see for methods to increase the duration of spinal blockade. Different drugs like morphine, phenylephrine, pethidine, neostigmine, and alpha 2 agonists are used intrathecally for this usage.<sup>6</sup> In the present study, the mean age of the subjects was 39.22±/4.67 years. The preoperative pulse in Group I was 81.34±/ 3.54 and in group II was 82.89±/2.65. There was no significant difference between them. The preoperative BP in Group I was 94.67±/8.22 and in group II was 91.52±/5.38. There was no significant difference between them. The intraoperative pulse in Group I was 81.23±/2.11 and in group II was 80.78±/5.33. There was no significant difference between them. The intraoperative BP in Group I was 88.48±/1.77 and in group II was 89.66±/4.65. There was no significant difference between them. The postoperative pulse in Group I was 83.28±/1.33 and in group II was 78.26±/3.11. There was no significant difference between them. The postoperative pulse in Group I was 88.12±/2.17 and in group II was 90.34±/5.73. There was no significant difference between them. There was 1 subject each in Group I and II with nausea and shivering respectively. There were 2 subjects in each group with bradycardia. There was 1 subject in Group II with vomiting. There was 1 subject in Group I and 2 in Group II with hypotension. There was no significant difference between the groups. The additives like clonidine and opioids intrathecally to enhance the action of local anesthetics have obtained great popularity because of the belief that they give longer time of postoperative analgesia and allow the decrease of the amount of local anesthetic, thus decreasing the incidence of side effects. The advent of receptors for opioid and endorphins in spinal and supra spinal areas led to the use of spinal opioids.<sup>7</sup> Opioids bring intense, long term analgesic effect without any autonomic alterations, loss of motor load or impairment in sensation additional to pain when administered intrathecally or epidurally.<sup>8</sup> Researches that considered 10–15 mg as the general dosage of bupivacaine, did not observe any significant alterations in peak sensory blockage level between bupivacaine and bupivacaine with dexmedetomidine, but disproportionately reached the median blockade level of T5–T6.<sup>9,10</sup> Intrathecal administration of α2-agonists produces a dose-dependent Sedation amongst humans.<sup>11</sup> Since today, there have been few researches amongst human on the use of intrathecal dexmedetomidine.<sup>12,13</sup>

## CONCLUSION

The study showed no significant alterations in the haemodynamic stability the side effects between subjects who received bupivacaine alone or bupivacaine plus dexmedetomidine. Though addition of dexmedetomidine produced better sensory and motor blockage and analgesia.

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**Source of Support:** Nil.

**Conflict of Interest:** None Declared.

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**Cite this article as:** Jai Prakash Tak, Ajai Kumar, Vidhi Chandra, Mrinal Kamal. Assessment of Complications and Haemodynamic Stability with the Use of Dexmedetomidine with Bupivacaine: An Institutional Based Study. *Int J Med Res Prof*. 2019 Mar; 5(2):252-54. DOI:10.21276/ijmrp.2019.5.2.056