

## Evaluation of the Effects of Dexmedetomidine on Intraoperative Hemodynamic Parameters Following Intrathecal Bupivacaine with Dexmedetomidine

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**Abstract:** Spinal anesthesia is commonly used for surgery because of ease of administration. Spinal anesthesia is a commonly used technique in anaesthetic practice for gynaecological, lower abdominal, pelvic, and lower limb surgeries. The

**Objective** of this manuscript mainly focused the comparative evaluation of hemodynamic parameters following intrathecal bupivacaine with dexmedetomidine and bupivacaine alone in lower abdominal surgeries.

**Methods:** A total of 100 patients of surgery were randomly assigned in two groups. Group A – Patients who had received 3.0 ml of 0.5% Bupivacaine (Heavy) + 0.5 ml normal saline and served as control group. Group B – Patients who were administered 3.0 ml of 0.5% Bupivacaine (Heavy) mixed with 5 µg Dexmedetomidine (0.5 ml). All patients included in the study were normotensive and had no co-morbid medical disease condition and normal preoperative investigations belong to ASA I & II grade. Patients were observed for block characteristics, hemodynamic, occurrences of side effects and adverse reactions.

**Results:** No significant differences in mean systolic BP and diastolic BP between two groups, maximum lowering in heart rate occurred in group B.

**Conclusion-** Dexmedetomidine a newer Alpha 2 agonist seems to be an attractive adjuvant to spinal Bupivacaine even in doses as low as 5 µg. Dexmedetomidine provides longer duration of sensory and motor block without increasing the incidence of significant adverse effects. It provides prolonged sensory and motor blockade, haemodynamic stability.

**Key words:** Dexmedetomidine, hyperbaric 0.5% bupivacaine, intrathecal, Bupivacaine

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### I. Introduction

Spinal anesthesia is a commonly used technique in anaesthetic practice for gynaecological, lower abdominal, pelvic, and lower limb surgeries. Spinal anesthesia is commonly used for surgery because of ease of administration.

Bupivacaine, a pipercolonylidide derivative synthesized in 1957 by Ekenstam and introduced in clinical practice in 1963. It is a racemic mixture of D and L isomers and is relatively more cardio toxic compared to other local anaesthetics<sup>1-8</sup>.

To overcome this adjuvants like epinephrine, phenylephrine, adenosine, magnesium sulphate, sodium bicarbonate, neostigmine and alpha2 agonists like clonidine, dexmedetomidine have been used intrathecally<sup>9,10</sup>. They produce sedation and anxiolysis by binding to presynaptic alpha2 receptors in locus ceruleus. Post synaptic activation in CNS inhibits sympathetic activity thus decreasing heart rate and blood pressure<sup>11</sup>.

Dexmedetomidine is a suitable adjuvant to spinal anaesthesia. It has sedative and analgesic effects due to its more selective alpha 2A receptor agonist activity<sup>13</sup>. The stable hemodynamic and the decreased oxygen demand due to enhanced sympatho adrenal stability make this agent very useful pharmacologic agent for preoperative patient care. Bolus dose of alpha 2 agonists is associated with side effects like hypotension and bradycardia<sup>14</sup>.

### II. Material And Methods

Study was conducted on 100 patients of surgery who were randomly divided into two groups (50 patients in each group). Group A – Patients who had received 3.0 ml of 0.5% Bupivacaine (Heavy) + 0.5 ml normal saline and served as control group. Group B – Patients who were administered 3.0 ml of 0.5% Bupivacaine (Heavy) mixed with 5 µg Dexmedetomidine (0.5 ml). All patients included in the study were normotensive and

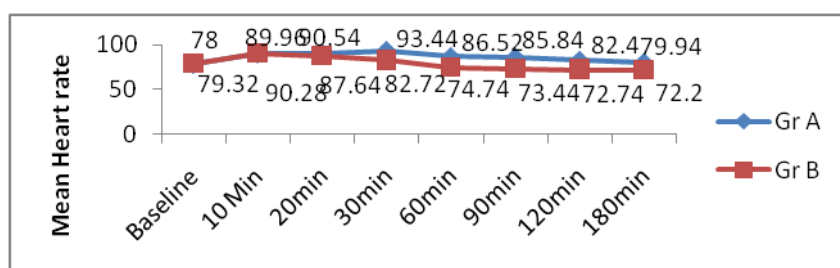
had no co-morbid medical disease condition and normal preoperative investigations belong to ASA I & II grade. Patients were observed for hemodynamic parameters, occurrences of side effects and adverse reactions

Back of the patient was prepared with a solution of povidone iodine and spirit. In midline approach, 25 gauge Quincke needle was placed in the L3-L4 interspace. The drug was injected after confirming the free flow of CSF. Following the injection, the needle was removed and the patient was placed in supine position. Intraoperatively, the pulse rate, respiratory rate, blood pressure, SPO<sub>2</sub>, were monitored and recorded until the end of the surgery.

### III. Observation And Results

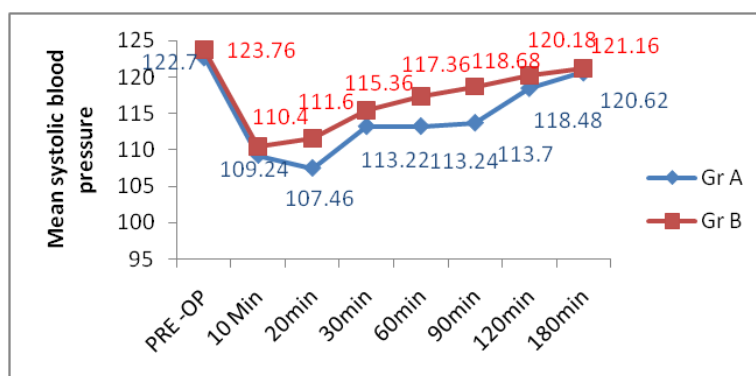
A total of 100 patients were enrolled in the study. All the patients completed the study protocol and were included in the data analysis. Fig 1. Group A consisted of 50 patients and group B of 50 patients. There was no significant difference in the demographic data between the two groups .

The mean heart rate of patients at preoperative was  $78.0 \pm 7.09$  and  $79.32 \pm 7.46$  in patients of Group A and Group B respectively. Maximum lowering in heart rate occurred in group B (90min-120min)



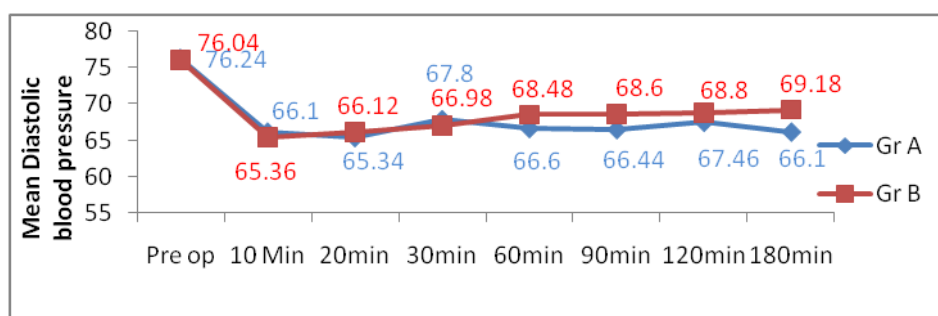
**Fig.1:** Bar graph showing the mean heart rate in different time interval in both groups

Fig 2. Group A baseline mean systolic B P was  $122.7 \pm 8.39$  mm Hg where as in Group B it was  $123.76 \pm 7.97$  mm Hg. After 180 min mean systolic B.P was  $120.62 \pm 5.08$  in group A and  $121.16 \pm 5.07$  in group B. There was no significant difference in mean systolic BP between two groups in different time interval



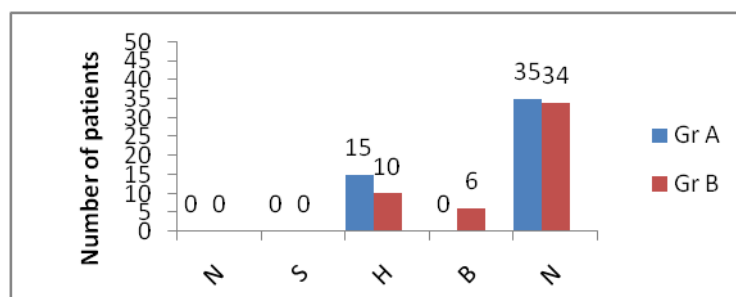
**Fig.2:** Bar graph showing the mean systolic blood pressure (mm Hg) in different time interval in both groups

Fig 3 Group A mean diastolic BP (baseline)  $76.24 \pm 8.67$ . Group B mean diastolic BP (baseline)  $76.04 \pm 6.84$ . Mean diastolic B.P at 180 min was  $66.10 \pm 3.88$  in group A and  $69.18 \pm 6.16$  in group B. There is no significant difference in diastolic BP between two groups in different time interval.



**Fig.3:** Bar graph showing the Diastolic blood pressure (mm Hg) in different time interval in both groups

fig.4 shows hypotension developed in 15(30%) patients in group A whereas 10(20%) patients in group B. Only 6(12%) of 50 patient in group B had bradycardia. 69 patients (35 in Group A and 34 of Group B out of 50 patients in each group) had no complication.



**Fig.4:** Bar graph showing the frequency distribution of different complications in patients of both group (N=100)

#### IV. Conclusion

Dexmedetomidine a newer Alpha 2 agonist seems to be an attractive adjuvant to spinal Bupivacaine even in doses as low as 5 µg. No significant differences in mean systolic BP and diastolic BP between two groups, maximum lowering in heart rate occurred in group B. Thus the observations and finding of above study allow us to conclude that it provide haemodynamic stability, without increasing the incidence of significant adverse effects.

#### Reference

- [1]. Moller R, Cavoni B Cardiac electrophysiologic effects of Lidocaine and Bupivacaine *Anaesth Analg* 1988;107:107-109.
- [2]. Tsuchiya H, Mizogami M R(+)-Rac- and (-)- bupivacaine stereostructure-specifically interact with membrane lipids at cardiotoxically relevant concentrations. *Anaesth Analg* 2012;114:310-2.
- [3]. Whiteside JB Wildsmith AW Developments in local anaesthetic drugs *Br J Anaesth* 2001;87:27-35.
- [4]. Fnedman GA. Rowlingson jc. Difazio CA.Donegan MF Evaluation of the analgesic effect and urinary excretion of systemic Bupivacaine in man. *Anaesth Analg* 1982;61:23-27
- [5]. Yamashino H , Yokihitho c. Bupivacaine included seizure after accident intravenous injection & complication of epidural anaesthesia. *Anaesthesiology* 1977; 47:472-473.
- [6]. Clrkson CW, Hondeglhem CM mechanism for bupivacaine depression of cardiovascular conduction; fast block of sodium channels during the action potential with slow recovery from block during diastole. *Anaesthesiology* 1985; 62:396- 405.
- [7]. Feldman HS, Arthur GR , pitkaun M, Hurley R, Ducette AM, Cavino BG, Treatment of acute systemec toxicity after the rapid intravenous injection of ropivacaine and Bupivacaine in the conscious dog. *Anaesth Analg* 1991; 733:73-384.
- [8]. Elia N, Culebras X, Mazza C, Schiffer E, Tramèr MR. Clonidine as an adjuvant to intrathecal local anesthetics for surgery: Systematic review of randomized trials. *RegAnesth Pain Med.* 2008; 33:159–67.
- [9]. 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.*ActaAnaesthesiol Scand.* 2006 Feb; 50(2):222-7.
- [10]. Boussofara M, Carlès M, Raucoules-Aimé M, Sellam MR, Horn JL. Effects of intrathecal midazolam on postoperative analgesia when added to a Bupivacaine-Clonidine mixture. *RegAnesth Pain Med.* 2006; 31:501–5.

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