

RESEARCH ARTICLE

**PROSPECTIVE RANDOMISED CONTROLLED STUDY ON EFFECT OF DEXMEDETOMIDINE AS AN ADJUVANT TO INTRATHECAL BUPIVACAINE ON DURATION OF POST-OPERATIVE ANALGESIA IN PATIENTS UNDERGOING LOWER ABDOMINAL SURGERIES**

**Dr. VINAMRA TIWARI, DR RANJITA TAMBEY**

ASSISTANT PROFESSOR , INCHARGE EMERGENCY

DEPARTMENT OF ANAESTHESIA

TEERTHANKAR MAHAVEER UNIVERSITY, MORADABAD

Email:- [vinamra4ug@gmail.com](mailto:vinamra4ug@gmail.com)

ASSOCIATE PROFESSOR,DEPARTMENT OF ANAESTHESIA,

GOVERNMENT MEDICAL COLLEGE, NAGPUR

Email:-

DR MUKUL S DESHPANDE,

CONSULTANT,

DEPARTMENT OF ANAESTHESIA,

DECCAN HARDIKAR HOSPITAL, PUNE

**Introduction :** spinal anaesthesia has emerged as a most popular technique for abdominal and lower abdominal surgeries for its safety, simplicity and effectivity. Adding adjuvants drugs to intrathecal local anaesthetics improves quality and duration of spinal blockade, and prolongs postoperative analgesia.. Intrathecal dexmedetomidine with low-dose bupivacaine provides faster onset, prolonged sensory and motor block and reduced rescue analgesic requirement in patient undergoing TURP. **Aims and objectives :** To assess the Onset of sensory analgesia, onset of motor block, fixation time of sensory block, highest level of sensory block, quality of analgesia.

**Material and methods :** This Prospective – Randomized study was conducted in the Anaesthesia Department in Rama Medical College Hospital and research centre, Kanpur from December 2018 to November 2020. 60 adult female patients between the age of 18 and 60 years participated in the study. The samples were equally divided into 2 groups, Group D- Case group- 30 patients and Group B- Control group- 30 patients. Intravenous cannula of 18/20 G was secured and patient was preloaded with 10ml/kg of Ringer lactate solution over 10-30 minutes. Baseline vital signs such blood pressure, pulse rate were recorded. **Result :** Maximum number of patients in group D and group B i. e 100% and 60% respectively had an excellent quality of analgesia during the procedure. Quality of analgesia was reported as satisfactory in 30% of patients and poor in 10% patients in group B. Quality of analgesia was found to be comparable in the two groups (p= 0.001). Thus, addition of dexmedetomidine only marginally improved quality of surgical analgesia in our study. **Conclusion:** Intrathecal inj.Dexmedetomidine 5mcg acts synergistically to potentiate

intrathecal local anaesthetic bupivacaine with the result that there is relatively faster onset of sensory block and prolongation of both sensory and motor block

**Key Words:** Dexmedetomidine, bupivacaine, sensory block, motor block, anaesthesia.

## INTRODUCTION

The term “spinal anesthesia” was introduced by a neurologist called Corning due to the personal theory that spinal cocaine could improve some neurological disorders.<sup>[1,2]</sup> spinal anaesthesia has emerged as a most popular technique for abdominal and lower abdominal surgeries for its safety, simplicity and effectivity.<sup>[2,-4]</sup>

Adding adjuvants drugs to intrathecal local anaesthetics improves quality and duration of spinal blockade, and prolongs postoperative analgesia.<sup>[6-8]</sup> Dexmedetomidine antinociceptive properties of intrathecal  $\alpha_2$  adrenoceptor agonists are manifested by suppressing the release of C-fibre transmitters, hyperpolarization of post synaptic dorsal horn neurons and inhibition of release of substance P.<sup>[9-11]</sup> Intrathecal dexmedetomidine with low-dose bupivacaine provides faster onset, prolonged sensory and motor block and reduced rescue analgesic requirement in patient undergoing TURP.<sup>[12-14]</sup>

## MATERIAL AND METHOD

This Prospective – Randomized study was conducted in the Anaesthesia Department in Tertiary care hospital from SEPTEMBER 2018 TO DECEMBER 2020. 60 adult female patients between the age of 18 and 60 years participated in the study. The samples were equally divided into 2 groups, Group D- Case group- 30 patients and Group B- Control group- 30 patients. In the preoperative room, pulse rate, blood pressure, SpO<sub>2</sub> were noted in the pre-anaesthetic room. Patients were

explained about the procedure in simple language and written informed consent was obtained from them. In the operation theatre, resuscitation and general anaesthesia equipment and drugs were kept ready. Intravenous cannula of 18/20 G was secured and patient was preloaded with 10ml/kg of Ringer lactate solution over 10-30 minutes.

Standard multipara monitor containing electrocardiogram, noninvasive blood pressure (NIBP) and pulse oximeter was applied to the patient and baseline parameters e.g. pulse rate, blood pressure, Spo<sub>2</sub> were recorded. Premedication with injection Pantoprazole 40 mg iv and injection Ondansetron 4 mg intravascular was given according to dose per kg body weight of the patient. None of the patients received sedatives as premedication. Lumbar puncture via a midline approach with quince type 25-gauge spinal needle at L2-L3 or L3-L4 interspace. After obtaining free flow of clear cerebrospinal fluid, spinal anaesthesia was given with drug as per group allotted. Group D - Inj. hyperbaric bupivacaine (0.5%) 3.0ml plus 5mcg dexmedetomidine (which is equivalent to 2 units on insulin syringe) in Study Group and Group B - Inj. Hyperbaric bupivacaine 3.0ml (0.5%) plus Normal Saline (equivalent to 2 units on insulin syringe) in Control Group.

**INCLUSION CRITERIA** – ASA grade I and II female patients, Age group 18 to 60 years, Patient of height 150 to 170cm and weight 40-80kg, Written informed consent

**EXCLUSION CRITERIA** - Patients refusal, Patient with ASA Grade III and

above, patients who all are contraindicated to spinal anesthesia.

**RESULT**

**Table 1 : Distribution of patient according to age group (years), Height and weight**

| Parameters          | Group D        | Group B        | P value |
|---------------------|----------------|----------------|---------|
| Age                 | 46.23 ± 10.85  | 46.66 ± 8.60   | 0.8655  |
| Height              | 155.46 ± 4.26  | 156.7 ± 3.96   | 0.0609  |
| Weight              | 60.33 ± 10.4   | 55.93 ± 7.13   | 0.2477  |
| Duration of surgery | 130.06 ± 11.45 | 125.06 ± 19.04 | 0.2229  |

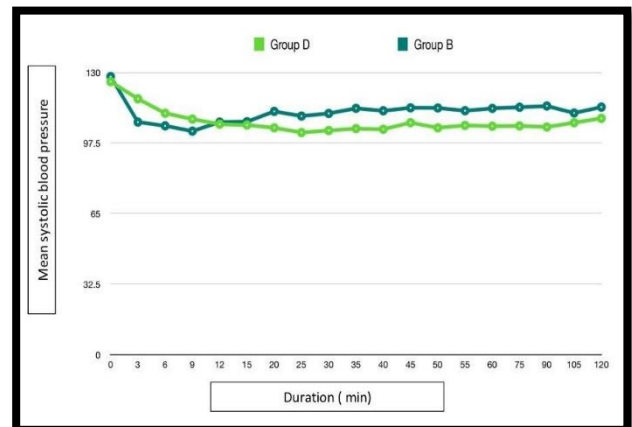
**Table 2 : Distribution of patient according onset of sensory block, onset of motor block, duration of sensory block, duration of motor block, time to rescue analgesia.**

| Parameters                     | Group D        | Group B        | P value |
|--------------------------------|----------------|----------------|---------|
| Onset of sensory block         | 167.5 ± 34.87  | 178 ± 34.41    | 0.2453  |
| onset of motor block           | 194.67 ± 52.11 | 190.33 ± 51.89 | 0.7481  |
| duration of sensory block      | 404.13 ± 39.76 | 171.17 ± 32.37 | 0.0001  |
| duration of motor block        | 452.4 ± 39.34  | 187.97 ± 31.61 | 0.0001  |
| time of rescue analgesia (min) | 450 ± 36.33    | 184 ± 31.68    | 0.0001  |
| Ramsay sedation score          | 1.37 ± 0.49    | 1.4 ± 0.49     | 0.791   |

**Table 3 : Distribution of patient according pulse rate, systolic B.P. and diastolic B.P.**

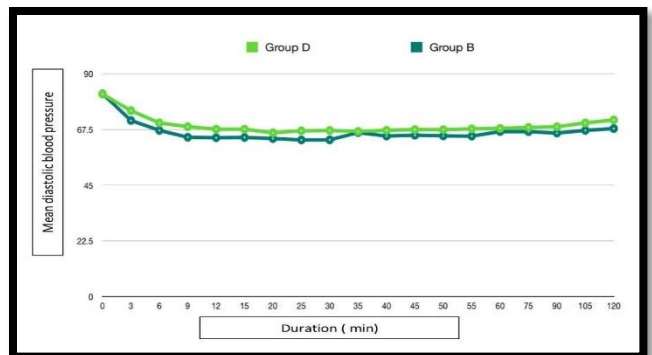
| Parameters               | Group D       | Group B       | P value |
|--------------------------|---------------|---------------|---------|
| pulse rate               | 90.90 ± 12.23 | 85.83 ± 11.12 | 0.0997  |
| systolic blood pressure  | 127.76± 11.91 | 128.10± 13.50 | 0.4808  |
| diastolic blood pressure | 81.76 ± 12.17 | 81.86 ± 12.77 | 0.9753  |

**Fig 1: Comparison of mean Systolic blood**

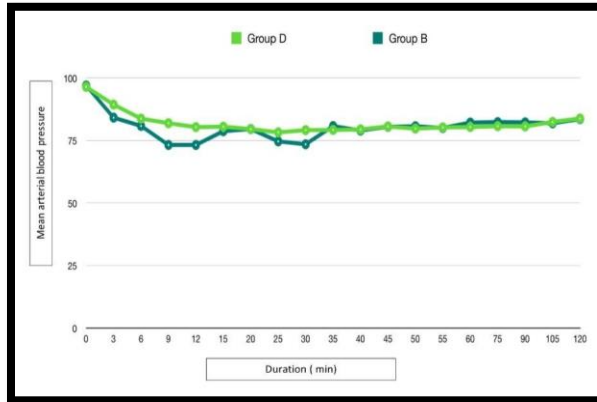


pressure (SBP)

**Fig 2 : Comparison of mean Diastolic blood pressure (DBP)**



**Fig 3: Comparison of mean Arterial pressure (MAP)**



**In table 1** shows the distribution of age, height, weight, duration of surgery in two groups, which were statistically comparable.

**In table 2** shows the distribution of patient in which all parameters (onset of motor block, duration of sensory block, duration of motor block) were more in Group D than Group B except onset of sensory block and time to rescue analgesia. There was no significant difference in the onset of sensory block in both the groups. the difference between the mean values of onset of motor block in Group D and B ( $P= 0.7481$ ) was insignificant.

**In table 3** shows the distribution of patients based on their vital signs in which all the parameters were less in Group D than Group B except pulse rate.

**Fig 1** shows the comparison of the systolic blood pressures at various time intervals in the two groups. The difference in mean systolic blood pressure was statistically significant at the intervals of 3, 20, 25, 30, 35, 40, 45, 50, 55, 60, 75 and 90 min between the two

groups. Observations at other intervals showed no significant differences in mean systolic blood pressure in the two groups at various intervals.

**Fig 2** shows Comparison of mean Diastolic blood pressure and showed no significant differences in mean diastolic blood pressure in the two groups at various intervals.

**Fig 3** shows the Comparison of mean Arterial pressure all the observations were within normal range. Observations at all the time intervals showed no significant differences in mean diastolic blood pressure in the two groups at various intervals.

## DISCUSSION

Regional anaesthetic techniques of spinal anaesthesia offer many advantages over general anaesthesia including reduced stress response to surgery with postoperative analgesia. Since spinal anaesthesia provided postoperative analgesia for a short time, many intrathecal adjuvants to local anaesthetic have been added to augment the clinical efficiency and duration of analgesia.

In our study, all the patients were randomly allocated to two different groups. The dose of hyperbaric 0.5% Bupivacaine, 15 mg, was taken in our study and was identical in the two study groups. Similar doses were studied by Hala E A Eid et al<sup>(15)</sup>, the effects of dexmedetomidine on a dose related manner (control, 10 µg and 15µg) and confirmed the prolongation of duration of analgesia. In the present study the mean onset of sensory block was found to be  $167.5 \pm 34.87$  seconds in group D (case) and  $178 \pm 34.41$  seconds in group B (control group). Samantaray A et al<sup>(16)</sup> found that the onset of sensory block occurred at  $2.3 \pm 1.2$  min and Patro SS et

al<sup>(17)</sup> found that the onset of sensory block occurred at  $129.33 \pm 14.8$  sec our findings correlated to their results .

In the present study the mean onset of motor block was found to be  $194.67 \pm 52.11$  seconds (group D cases) and  $190.33 \pm 51.89$  seconds (group B control). This difference between the groups was clinically and statistically not significant. Mahima Gupta et al<sup>(18)</sup> reported the mean onset of motor block of  $3.90 \pm 0.89$  min (cases) and  $3.30 \pm 0.97$  min (controls) which was clinically insignificant and was relatable to our findings.

In our study, rescue analgesia was defined as duration measured from the time of injection of study drug to the time of first rescue analgesic given to the patient ( $VAS \geq 4$ ) noted in minutes. Nethra et al<sup>(19)</sup> found the average time of rescue analgesia in cases was  $459.80 \pm 100.9$  min and in control group was  $321.85 \pm 95.08$  min. Both the above findings are comparable to our result.

In our study, mean time duration for effective analgesia in group D was  $450 \pm 36.33$  min and in group B it was  $184 \pm 31.68$  min. The difference of the time in the requirement of rescue analgesia between the two groups was clinically and statistically significant. This study supported by a study Sarma J et al<sup>(20)</sup> found out in their studies the time of rescue analgesia  $336.8 \pm 55.38$  minutes in cases and  $204.8 \pm 16.81$  minutes in control which was clinically and statistically significant and was comparable to our findings.

## CONCLUSION

Intrathecal inj. Dexmedetomidine 5mcg acts synergistically to potentiate intrathecal local anaesthetic bupivacaine with the result that there is relatively faster onset of sensory block and prolongation of both sensory and motor block and it reduces the need for

analgesic administration without any significant hemodynamic compromise.

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