Original Research Paper

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STUDY ON COMPARISION OF 0.5% BUPIVACAINE AND 0.5% OF BUPIVACAINE WITH DEXMEDETOMIDINE FOR SPINAL ANAESTHESIA FOR LOWER ABDOMINAL SURGERIES

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ABSTRACT **BACKGROUND:** Bupivacaine is the most commonly used drug for spinal anaesthesia. To improve the quality of analgesia and prolong the duration of its action, many adjuvants have been tried. One of such adjuvant widely used is the addition of Intrathecal dexmedetomidine. Dexmedetomidine is an α2 adrenoreceptor agonist, it has potent central antinociceptive properties with analgesic effect at spinal level mediated by post synoptically situated adrenoceptor in dorsal horn of spinal cord **OBJECTIVE:** The objective of the study is to evaluate the effects of adding dexmedetomidine to hyperbaric bupivacaine for lower abdominal and lower limb surgeries. **METHODOLOGY:** We included 100 ASA grade I/II subjects aged between 18-60 years undergoing elective lower abdominal, urologic, lower limb surgeries. These subjects were divided into two groups of 50 each. Group "A" 0.5% hyperbaric bupivacaine 12.5 mg (2.5ml) + 5 µg Dexmedetomidine (total volume to 3ml). Group "B" 0.5% hyperbaric bupivacaine 12.5 mg + 0.5ml of normal saline (total volume 3ml). In these subjects, several parameters like Duration of analgesia, vitals and side effects were assessed. **RESULTS:** In our study, we found that the quality of analgesia was better as the VAS was lower in group A than in group B. We also found better quality of analgesia postoperatively, and reduced need of analgesics with the use of intrathecal dexmedetomidine. **Conclusion:** Dexmedetomidine potentiates bupivacaine spinal anaesthesia by improving the quality of intra operative and post-operative analgesia.

KEYWORDS : Spinal anaesthesia, Dexmedetomidine, Bupivacaine, Analgesia

INTRODUCTION:

Spinal anaesthesia, defined, as 'the regional anesthesia obtained by blocking nerves in the subarachnoid space' is a popular and common technique used worldwide.[1] The advantages of an awake patient, simple to perform, offers rapid onset of action, minimal drug cost, relatively less side effects and rapid patient turnover has made this the choice of many a surgical procedure.[2-3]

Alpha-2($_2$) adrenergic receptor (AR) agonist have been the focus of interest due to sedative, analgesic, perioperative sympatholytic and haemodynamic stabilizing properties. Dexmedetomidine, a highly selective $_2$-AR agonist with a relative high ratio of $_{2/1}$ activity (1620:1) possesses all these properties but lack respiratory depression, making it a safe adjuvant.[4-5] Hence, this study was undertaken to evaluate the effectiveness of adding 5µg dexmedetomidine to bupivacaine for spinal anesthesia and to compare its use with that of bupivacaine.

OBJECTIVES OF THE STUDY:

The objectives of the study were to compare Analgesic-duration of complete and effective analgesia, quality of intra operative analgesia, time to first pain medication and haemodynamic changes like heart rate and blood pressure between the two groups.

METHODOLOGY

It was a prospective clinical study was conducted in 100 subjects in the age group of 18 years to 60 years (ASA physical status 1 & 2), of either sex, posted for elective lower limb, lower abdominal, gynaecological and urological surgeries under spinal anaesthesia after taking informed consent at CM Medical College and Hospital from August 2016 to July 2017. Study subjects were randomly divided on an alternative basis into two groups of 50 each. **Group A** (Dexmedetomidine group) patient's received intrathecally 0.5% hyperbaric Bupivacaine 12.5 mg (2.5 mL) + 5 µg of dexmedetomidine and total volume 3mL **Group B** (Bupivacaine group) received intrathecal 0.5% hyperbaric Bupivacaine 12.5 mg (2.5 mL) with Normal saline 0.5 ml. Total volume made to 3mL. We included the subjects who were scheduled to undergo elective lower abdominal, lower extremity, gynecological or urological surgeries under subarachnoid block. We excluded Patients belonging to ASA grade 3 and grade 4, physically dependent on narcotics, history of drug allergy, gross spinal abnormality, localized skin sepsis, hemorrhagic diathesis or neurological involvement/ diseases, Head injury cases, Patients with cardiac, pulmonary, hepatic or renal disorders, peripheral neuropathy, inadequate subarachnoid blockade and who are later supplemented by general anaesthesia & Obstetric cases for lower segment caesarean section because of drug dosage discrepancy.

PROCEDURE:

Under strict aseptic precautions, lumbar puncture was performed in left lateral position or sitting position by midline approach by using disposable Quincke spinal needle (23 G) at L3-L4 intervertebral space. Patients were monitored continuously using non-invasive blood pressure, pulse oximeter and electrocardiogram. After spinal anesthesia, Oxygen (4L/min) by facemask was given. Fluid therapy was maintained with lactated Ringer's solution (10mL/kg/hr)

The following parameters were observed and recorded

Vital parameters: HR, B.P and RR, SpO2 monitored at 1,3,5,10,15,20,25,30,45,60,120,180 minutes.

Assessment of analgesia

Pain was assessed by visual analogue score (VAS).[6] VAS consists of a 10-cm line anchored at one end by a label such as" No pain" and at the other end by a label such as the "Worst Pain Imaginable".

Linear Visual Analog Scale Score

VAS Score	Intensity of pain
0 – 2	No pain to slight pain
2 – 5	Mild pain.
5 – 7	Moderate pain.
7 – 9	Severe pain.
10	Worst possible pain.

Duration of complete analgesia was defined as the time from the intrathecal injection to VAS >0 - <4 and duration of effective analgesia as the time to VAS >4. Analgesics were avoided until demanded by the patient and the time taken for the first pain medication was also noted (ie, when VAS >6) VAS was also recorded 3, 6, 12 hours postoperatively.

Quality of intraoperative analgesia: Was assessed on a four-point modified Belzarena scale. Sedation scores were assessed every 15 minutes both intra and post operatively using a four point score described by B.S.sethi.[7] Post operatively, monitoring of vital signs, VAS scores and sedation scores was continued every 30 minutes until the time of regression of sensory block to L1 dermatome.

STATISTICAL ANALYSIS

The demographic data were analyzed using either Student's t-test or Chi-square test. Quantitative data was analyzed by student's t test and qualitative data was analyzed by Chi-square test. All values were expressed as mean ± standard deviation. $P < 0.05$ was considered statistically significant.

RESULTS

A total of 100 patients belonging to ASA grade I and II posted for lower abdominal and lower limb surgeries were randomly selected. The patients were divided into 2 groups of 50 each.

The mean age of patient in group A was 37.6±10.6 and in group B was 39.2±12.2 years. In group A there were 31 males and 19 were females.

In group B, there were 31 males and 19 were females. The mean duration of complete analgesia (without need of analgesics) in group A was 332.5±24.8 min and in group B was 189.2±11.5 which was statistically significant ($p<0.001$). The mean duration of effective analgesia (first pain medication) in group A was 361.7±24.6 and in group B was 221.3±14.3 which was statistically significant ($p<0.001$). The difference between either groups is highly significant.

Table 1: Quality Of Intraoperative Analgesia

Quality of intraoperative analgesia	Group D n(%)	Group B n(%)
2	1 (2)	0
3	11(22)	16(32)
4	38(76)	34(68)
Total	50(100)	50(100)

Chi-square = 1.66, p=0.44, NS

Table 1: It is evident that the quality of intraoperative analgesia 76% of patients in group A were completely satisfied when compared to 68% in group B. Some discomfort was complained by 22%, of patients in group A compared to 32% in group B but no additional analgesics was given to patients Intraoperatively quality of analgesia in both groups was not significant.

Table 2: Visual Analogue Scale (vas) Scores

TIME	GROUP A	GROUP B	P VALUE
Intraoperative VAS	0.02±0.12	0.16±0.35	<0.05, S

Table 2: It is evident that the intraoperative VAS score in group A and group B were 0.02±0.14 and 0.16±0.3 respectively, which was statistically significant ($p<0.05$).

Table 3: Visual Analogue Scale (vas) Scores Postoperatively

TIME	GROUP A	GROUP B	P VALUE
3 hrs	0.04±0.20	0.96±1.03	<0.001, HS
6 hrs	3.38±0.97	4.74±1.07	<0.001, HS
12 hrs	6.24±0.96	6.80±0.97	<0.05, S

Table 3: It is evident that VAS were statistically significant at 3, 6 and 12 hours implying patients in group A had better pain relief (lower VAS) in the postoperative period than in group B.

Table 4: Heart Rate

Time Interval in (mins)	Group A	Group B	P Value
0	79.3±7.4	80.2±10.2	0.60, NS
15	68.1±8.1	72.1±8.8	<0.05, S
30	71.6±5.7	74.9±8.9	<0.05, S
120	75.7±4.8	76.6±7.8	0.49, NS

*Student's unpaired t test, NS: Not significant, S Significant

Table 4: It is evident that the two groups differ significantly with respect to heart rate at any interval of 15, 30 minutes.

Table 5: Systolic And Diastolic Blood Pressure (mmhg).

Time Interval in (mins)	SBP			DBP		
	Group A	Group B	P Value	Group A	Group B	P Value
0	129.8±10.5	130.3±14.3	NS	80.7±7.2	78.1±7.1	NS
15	106.8±11.5	110.4±12.9	NS	65.2±7.7	67.7±7.4	NS
30	111.2±9.0	115.7±8.8	S	69.8±5.3	71.9±5.6	NS
120	119.9±8.4	120.9±8.0	NS	75.6±4.9	74.7±6.1	NS

Table 5: it is evident that there were no significant differences in SBP and DBP at 0,15, 120 minutes. There were significant differences in SBP at 30 minutes but not in DBP at 30 min.

DISCUSSION AND CONCLUSION

We included 100 subjects in our study as per inclusion and exclusion criteria. We evaluated the effect of Analgesic-duration of complete and effective analgesia, quality of intra operative analgesia, time to first pain medication and haemodynamic changes like heart rate and blood pressure between the two groups.

We found that the quality of analgesia was better as the VAS was lower in group A than in group B. This finding was in similar to the study conducted by Sharif A Abdelhamid et al[8], Rajni Gupta et al[9] and Gehan et al[10]. They concluded that the time for first rescue analgesia was significantly prolonged in dexmedetomidine group (A).

Postoperative analgesia: In our study, there was significant reduction in the VAS scores of the patients receiving dexmedetomidine as compared with higher VAS scores in patients receiving bupivacaine alone in the first twelve hours post operatively. This implies better quality of analgesia postoperatively, and reduced need of analgesics with the use of intrathecal dexmedetomidine. This finding was similar to the study conducted by **Gehan et al[10].**

Heart Rate: In our study, the two groups had variation in heart rate with group D patient having lower mean heart rate compared to group B. This changes were statistically significant at 15, 20, 30 minutes but clinically insignificant. There was no episodes of bradycardia in either group. This finding was similar to Sherif A Abdelhemid et al[8], GE. Kanazi et al [11] & Rampal Singh et al [12.]

Blood Pressure: In our study, the changes in mean systolic blood pressure was statistically insignificant at any time interval except at 30 min but it was clinically insignificant. Our results with respect to changes in mean systolic and diastolic blood pressure was comparable with studies of Sharif A Abdelhamid et al[8], GE Kanazi et al[11] and Rampl Singh et al[12].

CONCLUSION: In our study, we can conclude that the addition of 5µg dexmedetomidine to 0.5% hyperbaric Bupivacaine 12.5 mg (2.5mL) in spinal anesthesia significantly prolongs the duration and improves the quality of postoperative analgesia with better hemodynamic stability as compared to bupivacaine alone.

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