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Original Research Paper

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STUDY ON COMPARISON OF 0.5% BUPIVACAINE AND 0.5% OF BUPIVACAINE WITH CLONIDINE 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 clonidine. Intrathecal clonidine an α2 adrenceptor agonist has potent central antinoceptive properties with analgesic effect at spinal level mediated by postsynaptically situated adrenoreceptor in dorsal horn of spinal cord. Low doses of clonidine have shown effectiveness in intensifying spinal anesthesia.

OBJECTIVE: This study was done to evaluate the efficacy of spinal anesthesia with clonidine added to hyperbaric bupivacaine in lower abdominal 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) + 50 μg Clonidine (total volume to 3ml). Group "B" 0.5% hyperbaric bupivacaine 12.5 mg + 0.5ml of normal saline (total volume 3ml). In these subjects, Onset and duration of sensory block and motor block, highest level of sensory blockade, Duration of analgesia and vitals were assessed. **RESULTS:** The onset of sensory and motor blockade was faster in the A group compared to group B. Duration of sensory block and analgesia was significantly prolonged in A group so also was the duration of motor block. There were no significant hemodynamic changes in both the groups. **CONCLUSION:** Clonidine potentiates bupivacaine spinal anesthesia by increasing the duration and improving the quality of analgesia without significant hemodynamic side effects and with mild sedation.

KEYWORDS : Spinal anaesthesia, Clonidine, Bupivacaine, Analgesia

INTRODUCTION:

In the year 1981 Spinal anaesthesia was introduced into clinical practice by Karl August Bier [1]. Till today, it is one of the most popular techniques for carrying out elective and emergency surgical procedures particularly Caesarean sections, lower abdominal surgeries, orthopedic and urological surgeries[2]. Spinal anesthesia, defined, as 'the regional anesthesia obtained by blocking nerves in the subarachnoid space' is a popular and common technique used worldwide. 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.[3] These advantages are sometimes offset by relatively short duration of action and uncomfortable postoperative period when its action wears off. Therefore, it forms a challenging forefront in clinical and research advances, where if one can enhance sensory blockade into postoperative period by combining the lowest dose of the drugs with longer duration of action and least side effects, probably it may go a long way in alleviation of pain and suffering. Recently clonidine which is an α2 adrenergic agonist has been tried as an adjuvant to prolong the action of local anesthetics. Intrathecal clonidine produces dose dependent analgesia and has been successfully used as a sole analgesic via the intrathecal route.[4] Hence, this study was undertaken to evaluate the effectiveness of adding 50 g clonidine to bupivacaine for spinal anesthesia and to compare its use withthat of bupivacaine.

OBJECTIVES OF THE STUDY:

To compare parameters like time of onset and peak sensory blockade, time of onset and peak of motor blockade, Duration of complete and effective analgesia, Quality of intra operative analgesia and Side effects between the two groups B and BC consisting of 50 subjects in each group.

Group "B" Bupivacaine group- Receiving Intrathecal Bupivacaine 12.5mg (2.5mL) +0.5mL normal saline. (total volume of 3mL)

Group "BC" Clonidine group- Receiving Intrathecal Bupivacaine 12.5mg (2.5mL) +50μg clonidine. (Total volume of 3mL).

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 June 2018 to May 2019. Study subjects were randomly divided on an alternative basis into two groups of 50 each. **Group BC** (Clonidine group) patients received intrathecally 0.5% hyperbaric Bupivacaine 12.5 mg (2.5 mL) + 50 μg of Clonidine with total volume 3 mL and **Group B** (Bupivacaine group) received intrathecal 0.5% hyperbaric Bupivacaine 12.5 mg (2.5 mL) with Normal saline 0.5 ml with total volume 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 Sensory Blockade:

The onset of sensory block was tested by pin-prick method using a hypodermic needle. The time of onset was taken from

the time of injection of drug into subarachnoid space to loss of pin prick sensation. The highest level of sensory block and time required to achieve it was noted. The time for two dermatomal segments regression of sensory level was noted. The duration of sensory blockade was taken as time from onset to time of return of pinprick sensation to S1 (heel) dermatomal area.

Assessment of Motor Blockade:
This was assessed by Bromage scale[5].

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".

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.

Assessment of Quality of intraoperative analgesia: Was assessed on a four-point modified Belzarena scale.[5] 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.

Age and Gender:
The mean age of the patient in group BC was 42.4 + 13.4 years and in group B was 44.3±9.5 years. In group BC, there were 25 males and 25 females, and in group B there were 26 males and 24 females.

Sensory and Motor Blockade:
The mean time for onset and mean time for peak for sensory block in group BC was 112.22 seconds & 11.55 min and in group B 137.60 seconds and 6.93 min respectively which were statistically highly significant (p <0.001). The mean time for onset of motor block in group BC was 165.1 seconds and 231.80 seconds in group B and highly significant (p <0.001).

Mean duration of complete and effective analgesia: The mean duration of complete analgesia (without need of analgesics) in group B was 165.1 min as compared to group BC which was 240.2 min. The mean duration of effective analgesia (without need of analgesics) in group B was 209.4 min as compared to group BC which was 321.9 min. These differences were statistically highly significant.

Table 1: Quality Of Intraoperative Analgesia

Quality of intraoperative analgesia	Group B n(%)	Group BC n(%)
2	10 (20%)	0
3	6 (12%)	4 (8%)
4	34 (68%)	46 (92%)
Total	50 (100%)	50 (100%)

Table 1: It is evident from the table that 68% of patients in group B were completely satisfied when compared to 92% in group BC. This difference was statistically highly significant.

Table 2: Visual Analogue Scale (vas) Scores

TIME	GROUP B	GROUP BC	P VALUE
Intraoperative VAS	0.64±0.5	0.38±0.5	S
3 hrs	0.84	0.30	S
6 hrs	3.58	1.56	HS
12 hrs	4.42	2.82	HS

Table 2: It is evident that the intraoperative VAS score in group B and group BC were 0.64±0.5 and 0.38±0.5 respectively, and postoperative vas scores at 3, 6 & 12 hours were 0.84, 3.58, 4.42 in group B as compared to 0.30, 1.56, 2.82 in group BC respectively. These differences were statistically significant (p<0.05).

Table 3: Perioperative Complications

ADVERSE EFFECTS	GROUP B	GROUP BC
Nausea/Vomiting	4 (8%)	0
Sedation	0	6 (12%)
Mouth Dryness	0	0
Bradycardia	5 (10%)	0
Hypotension	8 (16%)	0
Urinary Retention	1(2%)	0
Respiratory Depression	0	0

Table 3: It is evident from the table that 12% in group BC experienced mild sedation as the side effect. Whereas in group B 8% had nausea & vomiting, 10% had bradycardia, 16% had mild hypotension, 2% had urinary retention.

DISCUSSION AND CONCLUSION

We included 100 subjects in our study as per inclusion and exclusion criteria. We evaluated parameters like time of onset and peak sensory blockade, time of onset and peak of motor blockade, Duration of complete and effective analgesia, Quality of intra operative analgesia and Side effects between the two groups B and BC consisting of 50 subjects in each group.

Sensory and Motor Blockade: The mean time for onset and mean time for peak for sensory block in group BC was 112.22 seconds & 11.55 min and in group B 137.60 seconds and 6.93 min respectively which were statistically highly significant (p <0.001). The mean time for onset of motor block in group BC was 165.1 seconds and 231.80 seconds in group B and highly significant (p <0.001). This finding was similar to the study conducted by B.S Sethi et al.[7] and gurudatta et al.[8] Hence we conclude that addition of clonidine has a faster onset and longer duration of sensory and motor blockade.

Postoperative analgesia: In our study, there was significant reduction in the VAS scores of the patients receiving clonidine 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 clonidine. This finding was similar to the study conducted by **B.S Sethi et al[7] and gurudatta et al[8].**

CONCLUSION:

In our study, we can conclude that the addition of 5μg clonidine to 0.5% hyperbaric Bupivacaine 12.5 mg (2.5mL) in spinal anesthesia significantly decreases the onset time, prolongs the duration of both sensory and motor blockade. It also prolongs the duration and improves the quality of postoperative analgesia with better hemodynamic stability as compared to bupivacaine alone.

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