ORIGINAL RESEARCH

Analysis of Different Doses of Clonidine as an Additive to Intrathecal Isobaric Levobupivacaine in Patients Undergoing Infraumbilical Surgeries: An Institutional Based Study

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ABSTRACT

Background: The present study was conducted for comparing different doses of clonidine as an additive to intrathecal isobaric levobupivacaine in Patients Undergoing Infraumbilical Surgeries.**Materials &Methods:**A total of 60 patients within the age range of 25 to 55 years were enrolled. A total of three study groups were formed with 20 patients in each group as follows: Group 1: Levobupivacaine 0.5% isobaric (3 mL) with normal saline (0.5 mL), Group 2: Levobupivacaine 0.5% isobaric (3 mL) with clonidine 15 µg, & Group 3: Levobupivacaine 0.5% isobaric (3 mL) with clonidine 30 µg. Blood samples were obtained and bassline hemodynamic and biochemical profile was evaluated. During postoperative assessment, Visual Analog Scale (VAS) was used. On a scale of 0 to 10 with 0 indicating no pain and 10 indicating maximum unbearable pain. Rescue analgesia given among patients with VAS Score of more than 3. Continuous monitoring of hemodynamic variables was done intraoperatively and postoperatively. **Results:**Mean age of the patients of group 1, group 2 and group 3 was 43.8 years, 41.8 years and 45.9 years respectively. Significant results were obtained while comparing the sensory block among the patients of the three study groups.Mean duration of analgesia was significantly higher among the patients of group 3 in comparison to patients of group 2 and group 1.**Conclusion:**In comparison to 15µg, the addition of 30 µg of clonidine as an adjuvant could safely prolong the duration of postoperative analgesia.

Key words: Isobaric Levobupivacaine, Clonidine.

INTRODUCTION

Spinal anaesthesia is the gold standard for lower abdominal surgeries. It has got the advantage of being, cost-effective, easy administration technique, rapid onset of action, with relatively less adverse effects and most importantly patient remaining aroused throughout the procedure. But at times short duration and uncomfortable postoperative period offset the above advantages. Therefore; search for an effective adjuvant is still going on.[1,] [2]Bupivacaine 0.5% heavy was the only drug used for spinal anaesthesia after the discontinuation of intrathecal use of lidocaine. However, its cardiotoxic and central nervous system side effects have led to the development of its pure S (-) enantiomers: ropivacaine and levobupivacaine.[3]

In an attempt to further minimize the effects of local anesthetics and prolong the duration of intraoperative and postoperative analgesia, various adjuvants such as vasoconstrictors, alpha-2 agonists, and opioids have

been used.[4]Initially, several attempts were made to combine short rapid acting local anesthetic agents like lignocaine with longer acting agents such as bupivacaine with late onset to make up for the pitfalls such as late onset and inadequate duration of action. From this stemmed the issue of cumulative toxicity of local anesthetics and decreased efficacy due to concentration dilution. Since the 1980s, clonidine, an alpha2 (α2) adrenergic agonist with some α1 adrenergic properties, has been used as an adjuvant to local anesthetics in various regional anesthesia techniques to extend the duration of blockade. It has been proved that clonidine improves the quality and the duration of the local anesthetic nerve blocks as well as in spinal and epidural anesthesia.[5, 6]Hence; the present study was conducted for comparing different doses of clonidine as an additive to intrathecal isobaric levobupivacaine in Patients Undergoing Infraumbilical Surgeries.

MATERIALS & METHODS

The present study was conducted in the Department of Pharmacology and Department of Anaesthesia, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh (India) for comparing different doses of clonidine as an additive to intrathecal isobaric levobupivacaine in Patients Undergoing Infraumbilical Surgeries. A total of 60 patients within the age range of 25 to 55 years were enrolled. Complete demographic and clinical details of all the patients were obtained. Inclusion criteria included patients of ASA grade I/II and schedule to undergo elective infraumbilical surgeries under spinal anesthesia. A total of three study groups were formed with 20 patients in each group as follows:

Group 1: Levobupivacaine 0.5% isobaric (3 mL) with normal saline (0.5 mL),

Group 2: Levobupivacaine 0.5% isobaric (3 mL) with clonidine 15 µg, &

Group 3: Levobupivacaine 0.5% isobaric (3 mL) with clonidine 30 µg.

Blood samples were obtained, and bassline hemodynamic and biochemical profile were evaluated. During postoperative assessment, Visual Analog Scale (VAS) was used. On a scale of 0 to 10 with 0 indicating no pain and 10 indicating maximum unbearable pain.Rescue analgesia given among patients with VAS Score of more than 3. Continuous monitoring of hemodynamic variables was done intraoperatively and postoperatively. All the results were recorded on a Microsoft excel sheet followed by statistical analysis using SPSS software. ANOVA test, and chi-square test were used for evaluation of level of significance. P-value of less than 0.05 was taken as significant.

RESULTS

Mean age of the patients of group 1, group 2 and group 3 was 43.8 years, 41.8 years and 45.9 years respectively. All the three study groups were comparable in terms of age and gender-wise distribution. Mean time of onset of sensory block among the patients of group 1, group 2 and group 3 was 6.96 minutes, 6.53 minutes and 3.96 minutes respectively. Significant results were obtained while comparing the sensory block among the patients of the three study groups. Mean time for maximum sensory blockage among the patients of group 1, group 2 and group 3 was 12.96 minutes, 11.17 minutes and 9.85 minutes respectively; on comparing the results were found to be statistically significant. Mean duration of analgesia was significantly higher among the patients of group 3 in comparison to patients of group 2 and group 1. Non-significant results were obtained while comparing VAS and hemodynamic variables among the patients of the three study groups at different time intervals.

Table 1: Demographic data

Variable	Group 1	Group 2	Group 3
Mean age (years)	43.8	41.8	45.9
Males (n)	13	12	13
Females (n)	7	8	7
Mean BMI (Kg/m^2)	24.3	22.9	24.1

Table 2: Time of onset of sensory and motor block (mins)

Time of onset	Group 1	Group 2	Group 3	p-value
Sensory block	6.96	6.53	3.96	0.001 (Significant)
Motor block	3.43	3.41	3.23	0.745

Table 3: Time for maximum sensory blockage

Time for maximum sensory blockage	Group 1	Group 2	Group 3
Mean	12.96	11.17	9.85
p-value	0.013 (Significant)		

Table 4: Duration of analgesia (mins)

Duration of analgesia	Group 1	Group 2	Group 3
Mean	212.3	281.3	327.1
p-value	0.013 (Significant)		

DISCUSSION

A wide variety of local anesthetic drugs are available for spinal anesthesia, namely, bupivacaine, levobupivacaine, and ropivacaine. The most important physical property affecting the level of analgesia after the intrathecal administration of local anesthetic is its baricity. 0.5% hyperbaric bupivacaine hydrochloride is extensively used because of its longer duration of motor and sensory blockade.[7- 9]Lower doses of local anesthetics along with an adjuvant are preferred for spinal anesthesia in elderly patients. Clonidine, a selective partial alpha 2 adrenergic agonist, when administered intrathecally in adults for unilateral spinal anesthesia in very small doses of less than 1 µg/kg, has shown contradicting results in extending the sensory and motor blockade effects of local anesthetics with low incidence of side-effects e.g., hypotension, sedation and bradycardia.As an alpha-adrenergic agonist in the nucleus tractus solitarii (NTS), clonidine excites a pathway that inhibits excitatory cardiovascular neurons. Clonidine has an alpha-antagonist effect in the posterior hypothalamus and medulla. The final response is reduced sympathetic outflow from the central nervous system (CNS), which clinically causes a decrease in arterial blood pressure.[10- 12]Hence; the present study was conducted for comparing different doses of clonidine as an additive to intrathecal isobaric levobupivacaine in Patients Undergoing Infraumbilical Surgeries.

Mean age of the patients of group 1, group 2 and group 3 was 43.8 years, 41.8 years and 45.9 years respectively. All the three study groups were comparable in terms of age and gender-wise distribution. Mean time of onset of sensory block among the patients of group 1, group 2 and group 3 was 6.96 minutes, 6.53 minutes and 3.96 minutes respectively. Significant results were obtained while comparing the sensory block among the patients of the three study groups. Mean time for maximum sensory blockage among the patients of group 1, group 2 and group 3 was 12.96 minutes, 11.17 minutes and 9.85 minutes respectively; on comparing the results were found to be statistically significant. Krishna, K et al assessed the efficacy 15 µg and 30 µg of intrathecal clonidine along with 3 mL of 0.5% isobaric levobupivacaine in comparison with plain 0.5% isobaric levobupivacaine.Seventy-five patients posted for elective lower-limb orthopedic surgeries were randomly divided into three groups with 25 patients in each group as L (levobupivacaine 0.5%), LC-15 (levobupivacaine 0.5% + clonidine 15 µg), and LC-30 (levobupivacaine 0.5% + clonidine 30 µg). All the patients were given spinal anesthesia using the study drugs, and various parameters were monitored.There was a statistically significant difference among the three groups with respect to the onset of time for maximum sensory blockade and duration of analgesia. A statistically significant difference was noted among the three groups with respect to the onset of time for maximum motor blockade.Both doses of clonidine produced prolonged sensory block compared to the control.[13]

In the present study, mean duration of analgesia was significantly higher among the patients of group 3 in comparison to patients of group 2 and group 1. Non-significant results were obtained while comparing VAS and hemodynamic variables among the patients of the three study groups at different time intervals. Manoharan, M et al, in another study, compared dexmedetomidine and clonidine as additives to hyperbaric levobupivicaine 0.5% for the sub-arachnoid block. Patients who received dexmedetomidine had a longer duration of the block (2-segment regression: 135 ± 15 min vs. 130 ± 20 min, S1 segment regression: 305 ± 50.4 min vs. 290 ± 47.2 min, Bromage 0: 285 ± 60 min vs. 280 ± 45 min), delayed first rescue analgesia request (700 ± 160 min vs. 506 ± 112 min), reduced frequency of rescue analgesics (1 vs. 2), and desired level of sedation (1.3 ± 0.46 vs. 0.4 ± 0.01) when compared to those receiving clonidine. There were insignificant differences between the groups in intraoperative hemodynamic parameters, such as minimal bradycardia and minimal hypotension. Though dexmedetomidine had an early onset, there was no statistically significant difference compared to clonidine.[14]Thakur, A et al, in another study, compared the effects of addition of two different doses of clonidine (15 and 30 mcg) to 11 mg hyperbaric bupivacaine in patients undergoing inguinal herniorrhaphy surgery under spinal anesthesia.Highest level of sensory block, time to achieve this level, and highest Bromage scale recorded were comparable among the groups. The mean time to two-segment regression, regression of sensory block to L3 dermatome, and mean duration of motor block were the greatest in group III followed by group II and group I. There was significant fall in mean arterial pressure (MAP) in groups II and III as compared to group I (P = 0.04). Episodes of hypotension were more in group III than in group II.30 mcg clonidine was associated with more incidence and duration of hypotension than 15 µg of clonidine. 15 mcg clonidine added to 11 mg hyperbaric bupivacaine provides better sensory and motor blockade for inguinal herniorrhaphy.[15]

CONCLUSION

In comparison to 15µg, the addition of 30 µg of clonidine as an adjuvant could safely prolong the duration of postoperative analgesia.

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