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Original Research Article.

Comparative Analysis of Different Doses of Clonidine Used as Adjuvant with Intrathecal Isobaric Levobupivacaine for Spinal Anaesthesia in Caesarean Section at a Tertiary Care Hospital

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ABSTRACT

Background: Spinal anesthesia has been used since long to produce sensory analgesia for surgeries below the level of the umbilicus. Intrathecal clonidine has been extensively evaluated as an alternative to neuraxial opioid for control of pain and has proven to be a potent analgesic, free of at least some of the opioid-related side-effects. This was a comparative study of different doses of clonidine as an adjuvant with isobaric levobupivacaine for spinal anaesthesia in patients undergoing caesarean section.

Materials and Methods: We enrolled 45 patients who underwent caesarean sections at more than 37 weeks of gestation, all classified as ASA physical status class 2 and receiving spinal anaesthesia. The participants were randomly allocated into three groups (Group A, Group B, and Group C), each consisting of 30 patients. In Group A, we administered 10 mg of 0.5% isobaric levobupivacaine (2 ml) combined with 15 mcg of clonidine (0.5 ml); in Group B, 10 mg of 0.5% isobaric levobupivacaine (2 ml) with 30 mcg of clonidine (0.5 ml); and in Group C, 10 mg of 0.5% isobaric levobupivacaine (2 ml) with 45 mcg of clonidine (0.5 ml). Normal saline was utilized to adjust the volume of clonidine to 0.5 ml.

Results: The study involved three groups of subjects with similar demographic profiles: Group A with a mean age of 26.5 years and mean weight of 79.5 kg, Group B with a mean age of 26.9 years and mean weight of 80.2 kg, and Group C with a mean age of 27.3 years and mean weight of 81.7 kg. The study found notable differences in anesthesia times between the groups. The onset of sensory block occurred at 210.5 seconds in Group A, 189.8 seconds in Group B, and 134.8 seconds in Group C. Additionally, the time for two-segment regression was 4268.1 seconds in Group A, 4987.3 seconds in Group B, and 5221.8 seconds in Group C. Lastly, the onset of motor blockade occurred at 262.5 seconds in Group A, 249.8 seconds in Group B, and 219.5 seconds in Group C.

Conclusion: The combination of isobaric 0.5% levobupivacaine with 30 mcg of clonidine (Group B) in spinal anaesthesia achieves enhanced hemodynamic stability and a faster onset of both sensory and motor block, providing superior anaesthesia outcomes.

Keywords: Clonidine, Levobupivacaine, Anaesthesia.

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INTRODUCTION

Spinal anesthesia has been used since long to produce sensory analgesia for surgeries below the level of the umbilicus. Duration of sensory and motor block does not last beyond 2.5-3.0 h with local anesthetic (LA) alone in spinal anesthesia. Many drugs (including opioids) have been used in past to enhance the effect of LAs, but due to catastrophic adverse events, search for an ideal agent continues.[1,2]

Intrathecal clonidine has been extensively evaluated as an alternative to neuraxial opioid for control of pain and has proven to be a potent analgesic, free of at least some of the opioid-related side-effects.[2] Sub-arachnoid block (SAB) is one of the earliest forms of regional anesthetic techniques described.[3] This technique though, suffered a great setback shortly after it was described, is now widely used by anesthetists and clonidine has been introduced with newer hopes.[4,5] This was a comparative study of different doses of clonidine as an adjuvant with isobaric levobupivacaine for spinal anaesthesia in patients undergoing caesarean section.

MATERIALS AND METHODS

The present study was conducted for comparing different doses of clonidine as an adjuvant with isobaric levobupivacaine for spinal anaesthesia in patients undergoing caesarean section. We enrolled 45 patients who underwent caesarean sections at more than 37 weeks of gestation, all classified as ASA physical status class 2 and receiving spinal anaesthesia. The participants were randomly allocated into three groups (Group A, Group B, and Group C), each consisting of 30 patients. In Group A, we administered 10 mg of 0.5% isobaric levobupivacaine (2 ml) combined with 15 mcg of clonidine (0.5 ml); in Group B, 10 mg of 0.5% isobaric levobupivacaine (2 ml) with 30 mcg of clonidine (0.5 ml); and in Group C, 10 mg of 0.5% isobaric levobupivacaine (2 ml) with 45 mcg of clonidine (0.5 ml). Normal saline was utilized to adjust the volume of clonidine to 0.5 ml. All the results were summarized and evaluated using SPSS software.

Table 1: Demographic profile of subjects

Demographic profile	Group A	Group B	Group C
Mean Age (years)	26.5	26.9	27.3
Mean Weight (kg)	79.5	80.2	81.7

Table 2: Time of onset of sensory blockade, time of onset of motor blockade, sedation score in various groups.

	Group A	Group B	Group C	P value
Sensory				
Time for onset of sensory blockade (seconds)	210.5	189.8	134.8	<0.0001
Time of two segment regression (in seconds)	4268.1	4987.3	5221.8	<0.0001
Time for first rescue analgesia (in seconds)	12689.5	14581.1	15677.3	<0.0001
Motor				
Time for onset of motor blockade (seconds)	262.5	249.8	219.5	<0.0001

RESULTS

The mean age of the subjects of Group A, Group B, and Group C were 26.5 years, 26.9 years and 27.3 years, respectively. The mean weight of the subjects in Group A, Group B, and Group C was 79.5 Kg, 80.2 Kg and 81.7 Kg, respectively. In this study, the time for onset of sensory blockage in Group A, Group B, and Group C was 210.5 seconds, 189.8 seconds and 134.8 seconds, respectively. The time of two-segment regression of Group A, Group B and Group C was 4268.1 seconds, 4987.3 seconds and 5221.8 seconds, respectively. The time for onset of motor blockade in Group A, Group B, and Group C was 262.5 seconds, 249.8 seconds and 219.5 seconds, respectively.

DISCUSSION

Intrathecal anesthesia and epidural anesthesia are the most popular regional anesthesia techniques used for lower-limb orthopedic surgeries.[6] Spinal anesthesia is a safe, reliable, and inexpensive technique with the advantage of providing surgical anesthesia and prolonged postoperative pain relief, and it also blunts autonomic, somatic, and endocrine responses to surgical stimulus.[7] For decades, lidocaine had been the local anesthetic of choice for spinal anesthesia. However, its use was limited due to short duration of action and its implication in transient neurologic symptoms and cauda equina syndrome following intrathecal injection.[8] Till recently, hyperbaric bupivacaine 0.5% was the only drug used for spinal anesthesia in India after the discontinuation of lidocaine. Levobupivacaine does not provide prolonged duration of postoperative analgesia; hence, clonidine is used in combination which has been found to prolong postoperative analgesia but has produced significant perioperative hypotension and bradycardia.[9] Minimal effective dose of intrathecal clonidine along with a local anesthetic to produce prolongation of postoperative analgesia without cardiovascular side effects is not yet known. Hence, the present study was conducted comparing 15 µg and 30 µg of intrathecal clonidine along with 3 mL of 0.5% isobaric levobupivacaine.

This was a Comparative Study of Different Doses of Clonidine as an Adjuvant with Isobaric Levobupivacaine for Spinal Anaesthesia in Patients Undergoing Caesarean Section.

In this study, the time for onset of sensory blockage in Group A, Group B, and Group C was 210.5 seconds, 189.8 seconds and 134.8 seconds, respectively. The time of two-segment regression of Group A, Group B and Group C was 4268.1 seconds, 4987.3 seconds and 5221.8 seconds, respectively. The time for onset of motor blockade in Group A, Group B, and Group C was 262.5 seconds, 249.8 seconds and 219.5 seconds, respectively. Sethi BS et al (2007)[10] conducted a study in which sixty adult patients belonging to ASA grade I and II, scheduled for gynaecological surgery under spinal anaesthesia were randomly divided into two groups. Clonidine group received clonidine 1 $\mu g.kg^{-1}$ with 12.5 mg 0.5% bupivacaine and the Control group received an identical volume of saline mixed with 12.5mg0.5% bupivacaine. The maximum dose of clonidine used was70 µg. The meantime from injection to regression of the level of sensory analgesia by two segments was longer in the Clonidine group than in Control group ($P< 0.001$). The duration of motor blockade was longer in Clonidine group than in Control group ($P< 0.05$). There was also a significant difference in the duration of analgesia between the two groups ($P< 0.001$). The rescue analgesia was required earlier in the Control group(mean 223 min) compared to the Clonidine

group(mean614 min). The number of injections of diclofenacin24 hours was higher for Control group (mean2.66) than Clonidine group (mean 1.16) ($P < 0.05$). The patients in the Clonidine group had a significant fall in mean arterial pressure and heart rate and were more sedated than those in Control group, however, no therapeutic interventions needed. They concluded that addition of clonidine to bupivacaine in the dose of 1μg.kg^{-1} significantly increases the duration of spinal analgesia as compared to bupivacaine alone with clinically insignificant influence on haemodynamic parameters and level of sedation. The aim of the study by Singh RB et al (2014)[11] study was to establish efficacy and safety of intrathecal clonidine as adjuvant to bupivacaine. The type of the study was double-blind randomized trial. Hundred patients were randomly allocated in two groups, A and B. Group A received bupivacaine 0.5%, 3 ml with placebo (normal saline 0.33 ml) and Group B, bupivacaine 0.5%, 3 ml with clonidine 50 μg (0.33 ml). Mean duration of motor block was significantly higher in Group B (280.80 ± 66.88 min) as compared with Group A (183.60 ± 77.06 min). Significant difference in duration of sensory block was noted between Group B (295.20 ± 81.17 min) and Group A (190.80 ± 86.94 min). Duration of postoperative analgesia was significantly higher in Group B as compared to Group A (551.06 ± 133.64 min and 254.80 ± 84.19 min respectively). Mean visual analog scale scores at different time intervals were significantly lower in the study group (except for 4-h time interval), but the control group had better hemodynamic stability as compared with study group. The findings in this study suggested that use of clonidine 50 μg added to bupivacaine for spinal anesthesia effectively increased the duration of sensory block, duration of motor block, and duration of analgesia.

CONCLUSION

The combination of isobaric 0.5% levobupivacaine with 30 mcg of clonidine (Group B) in spinal anaesthesia achieves enhanced hemodynamic stability and a faster onset of both sensory and motor block, providing superior anaesthesia outcomes.

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