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Original Research

Assessment of efficacy of Clonidine combined with small-dose bupivacaine during spinal anesthesia for inguinal herniorrhaphy

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ABSTRACT:
Background: Abdominal wall hernias are common, with a prevalence of 1.7% for all ages and 4% for those aged over 45 years. The present study was conducted for assessing the efficacy of Clonidine combined with small-dose bupivacaine during spinal anesthesia for inguinal herniorrhaphy. **Materials & methods:** The present study was conducted for comparing different doses of clonidine as an additive to intrathecal isobaric levobupivacaine in Patients Undergoing Infraumbilical Surgeries. A total of 60 patients of ASA grade I/II were enrolled. The patients underwent open inguinal herniorrhaphy as a day-case procedure. They were randomly assigned to one of three treatment groups, with each group consisting of 20 patients. Group 1 received 6 mg of bupivacaine in 8% glucose, Group 2 received 6 mg of bupivacaine in 8% glucose along with 15 µg of clonidine, and Group 3 received 6 mg of bupivacaine in 8% glucose combined with 30 µg of clonidine. Every outcome was entered into a Microsoft Excel spreadsheet, and then SPSS software was used for statistical analysis. **Results:** Mean age of the patients of group 1, group 2 and group 3 was 45.6 years, 47.1 years and 45.9 years respectively. Majority proportion of patients of all the three study groups were males. Mean time to return to Bromage score at 0 was 151.3 mins, 162.8 mins and 179.3 mins respectively among patients of group 1, group 2 and group 3 respectively. Spinal parameters were significantly better among patients of group 3 in comparison to group 2 and group 1. Also mean time to first analgesic requirement among patients of group 1, group 2 and group 3 was 183.3 minutes, 244.3 minutes and 298.2 minutes respectively (p-value < 0.05). **Conclusion:** The incorporation of intrathecal clonidine at doses of 15 or 30 micrograms alongside low-dose bupivacaine enhanced both the distribution and longevity of analgesic effects, resulting in a successful spinal anesthesia.
Key words: Clonidine, Bupivacaine, Inguinal herniorrhaphy

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INTRODUCTION

Abdominal wall hernias are common, with a prevalence of 1.7% for all ages and 4% for those aged over 45 years. Inguinal hernias account for 75% of abdominal wall hernias, with a lifetime risk of 27% in men and 3% in women.[1] Repair of inguinal hernia is one of the most common operations in general surgery, with rates ranging from 10 per 100 000 of the population in the United Kingdom to 28 per 100 000 in the United States.[2] In 2001-2 about 70 000 inguinal hernia repairs (62 969 primary, 4939 recurrent) were done in England, requiring more than 100 000 hospital bed days. Ninety-five per cent of patients presenting to primary care are male, and in men the incidence rises from 11 per 10 000 person years aged 16-24 years to 200 per 10 000 person years aged 75 years or above.[3]

Inguinal hernia repairs consume an important part of health care resources because of the high incidence of the problem. It is estimated that 20 millions of inguinal hernia repairs are performed globally every year. Every recurrence after a primary repair will add an extra cost to health care economics. Moreover, secondary or tertiary operations after previous repairs carry higher risk of re-recurrence and specific complications like testicular atrophy. Therefore, every surgeon should know and perform a current repair method successfully in his/her daily practice.[4, 5]

Inguinal herniorrhaphy is one of the most common operations and is usually carried out with little morbidity and with established techniques for the surgical procedure. However, planned inguinal hernia repair may present a clinical dilemma when the inguinal canal is opened and no hernia is found.[6] Clonidine is an alpha-2 receptor agonist that provides analgesia by acting at central and peripheral receptors. Clonidine causes dose-dependent bradycardia, hypotension, and sedation. Its use in neuraxial blocks is well-studied. Various studies have reported that clonidine when used as an additive in a dose of 90 µg in adults or approximately 1.5 µg/kg increases the duration of peripheral nerve blocks.[7, 8]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 for comparing different doses of clonidine as an additive to intrathecal isobaric levobupivacaine in Patients Undergoing Infraumbilical Surgeries. A total of 60 patients of ASA grade I/II were enrolled. The patients underwent open inguinal herniorrhaphy as a day-case procedure. They were randomly assigned to one of three treatment groups, with each group consisting of 20 patients. Group 1 received 6 mg of bupivacaine in 8% glucose, Group 2 received 6 mg of bupivacaine in 8% glucose along with 15 µg of clonidine, and Group 3 received 6 mg of bupivacaine in 8% glucose combined with 30 µg of clonidine. All solutions were diluted with saline to achieve a total volume of 3 mL. Each patient was administered midazolam at a dose of 1–2 mg intravenously for premedication, along with 1 g of paracetamol rectally. The completion time of the intrathecal injection was designated as zero (t0). In cases where the block was insufficient or if the patient experienced pain unrelieved by two doses of fentanyl, general anesthesia was induced with propofol and maintained with sevoflurane in a mixture of oxygen and nitrous oxide, utilizing a laryngeal mask. The degree of motor block was evaluated bilaterally using a modified Bromage scale (0–3) at consistent time intervals. Following the surgery, patients were interviewed to gather their perceptions of the anesthetic procedure, utilizing the same scale.Every outcome was entered into a Microsoft Excel spreadsheet, and then SPSS software was used for statistical analysis.

RESULTS

Mean age of the patients of group 1, group 2 and group 3 was 45.6 years, 47.1 years and 45.9 years respectively. Majority proportion of patients of all the three study groups were males. Mean time to return to Bromage score at 0 was 151.3 mins, 162.8 mins and 179.3 mins respectively among patients of group 1, group 2 and group 3 respectively. Spinal parameters were significantly better among patients of group 3 in comparison to group 2 and group 1. Also mean time to first analgesic requirement among patients of group 1, group 2 and group 3 was 183.3 minutes, 244.3 minutes and 298.2 minutes respectively (p-value < 0.05).

Table 1: Spinal characteristics

Variable	Group 1	Group 2	Group 3	p-value
Return of Bromage score to 0	151.3 mins	162.8 mins	179.3 mins	0.000*
Return to S1 sensation to pinprick (min)	212.7 mins	183.5 mins	251.3 mins	0.000*
Time to standing (mins)	235.2	258.1 mins	272.4 mins	0.000*
Time to first urination (mins)	358.4	368.1	355.9	0.122

*: Significant

Table 2: Time to postoperative analgesia

Variable	Group 1	Group 2	Group 3	p-value
Time to the first analgesic (mins)	183.3	244.3	298.2	0.000*
Mean dose of Ketogan (mg)	2.9	2.2	1.8	0.000*
Patient without additional analgesia	0	5	9	0.000*

*: Significant

DISCUSSION

Mean age of the patients of group 1, group 2 and group 3 was 45.6 years, 47.1 years and 45.9 years respectively. Majority proportion of patients of all the three study groups were males. Mean time to return to Bromage score at 0 was 151.3 mins, 162.8 mins and 179.3 mins respectively among patients of group 1, group 2 and group 3 respectively. Spinal parameters were significantly better among patients of group 3 in comparison to group 2 and group 1. Also mean time to first analgesic requirement among patients of group 1, group 2 and group 3 was 183.3 minutes, 244.3 minutes and 298.2 minutes respectively (p-value < 0.05). Dobrydnjov I et al assessedwhether the addition of small-dose clonidine to small-dose bupivacaine for spinal anesthesia prolonged the duration of postoperative analgesia and also provided a sufficient block duration that would be adequate for inguinal herniorrhaphy. They randomized 45 patients to 3 groups receiving intrathecal hyperbaric bupivacaine 6 mg combined with saline (Group B), clonidine 15 micro g (Group BC15), or clonidine 30 micro g

(Group BC30); all solutions were diluted with saline to 3 mL. The sensory block level was insufficient for surgery in five patients in Group B, and these patients were given general anesthesia. Patients in Groups BC15 and BC30 had a significantly higher spread of analgesia (two to four dermatomes) than those in Group B. Two-segment regression, return of S1 sensation, and regression of motor block were significantly longer in Group BC30 than in Group B. The addition of clonidine 15 and 30 micro g to bupivacaine prolonged time to first analgesic request and decreased postoperative pain with minimal risk of hypotension. They conclude that clonidine 15 micro g with bupivacaine 6 mg produced an effective spinal anesthesia and recommend this dose for inguinal herniorrhaphy, because it did not prolong the motor block.[10]Rochette Aet al conducted a controlled, prospective, dose-ranging study of clonidine in spinal anesthesia in 75 neonates, including 50% of former preterm infants, undergoing elective inguinal herniorrhaphy. Patients were given a spinal anesthetic with either 0.5% plain isobaric bupivacaine (1 mg/kg), or bupivacaine plus 0.25, 0.5, 1, or 2 micro g/kg clonidine. Mean arterial blood pressure, heart rate, SpO(2), sensory block extension and duration were the main data recorded. Mean arterial blood pressure, heart rate, SpO(2), and block extension were similar in the five groups. Duration of spinal block increased from 67 (58-82) min in the control group up to 111 (93-125) min in the group receiving 1 micro g/kg clonidine ($P < 0.003$). Transient hypotension occurred more often ($P < 0.05$), and caffeine was given more often, when 2 micro g/kg clonidine was given. We conclude that 1 micro g/kg clonidine provides a significant improvement in spinal anesthesia duration in newborns without significant side effects.[11]

CONCLUSION

The incorporation of intrathecal clonidine at doses of 15 or 30 micrograms alongside low-dose bupivacaine enhanced both the distribution and longevity of analgesic effects, resulting in a successful spinal anesthesia.

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