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COMPARISON OF OUTCOMES OF DIFFERENT DOSES OF CLONIDINE ADDED TO HYPERBARIC BUPIVACAINE DURING SPINAL ANAESTHESIA

Anaesthesiology

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ABSTRACT

Background: The addition of clonidine to 0.5% bupivacaine(heavy)during spinal anesthesia has been explored to enhance the quality and duration of anesthesia, as well as to improve postoperative analgesia. However, the optimal dose of clonidine that balances efficacy and safety remains unclear. **Aim:** This study aims to evaluate the effects of different doses of clonidine given intrathecally as adjuvant to 0.5% bupivacaine (heavy) in infra umbilical surgeries. The study focuses on the onset and duration of sensory and motor block, hemodynamic stability, and postoperative analgesia. **Methods:** It was prospective controlled study conducted on 90 patients scheduled for elective lower limb surgeries under spinal anesthesia. Participants were divided into 3 groups, each receiving a different dose of clonidine added to 0.5% bupivacaine(heavy). The primary outcomes measured included the onset time and duration of sensory and motor block, intraoperative hemodynamic changes, and the need for rescue analgesia postoperatively. **Results:** The results demonstrated that increasing doses of clonidine prolonged the duration of both sensory and motor block in a dose-dependent manner. Higher doses were associated with greater hemodynamic variability, particularly in terms of bradycardia and hypotension. However, postoperative analgesia was significantly improved with higher doses, resulting in a reduced need for rescue analgesics. **Conclusion:** Clonidine, when added to 05% bupivacaine(heavy) for spinal anesthesia, enhances the quality of anesthesia and prolongs postoperative analgesia in a dose-dependent manner. However, higher doses are associated with increased risks of hemodynamic instability. Further studies are recommended to establish the optimal dose that maximizes benefits while minimizing risks.

KEYWORDS

0.5% Bupivacaine (heavy), Clonidine, Motor blockade, Sensory blockade

INTRODUCTION

Spinal anaesthesia is the preferred technique for most of lower abdominal and lower limb surgeries. It allows the patient to remain awake and minimizes or completely avoids the problem associated with airway management. Spinal anaesthesia with cocaine was initially produced inadvertently by J Leonard Corning in 1885 and first used deliberately by August Bier in 1898.

For decades lignocaine had been the local anaesthetic of choice for spinal anaesthesia. Its advantages are rapid onset of action and good motor block manifested as good muscle relaxation. Bupivacaine is three to four times more potent than lignocaine and has longer duration of action. Addition of an adjuvant to intrathecal bupivacaine can prolong postoperative analgesia.

The discovery of opioid receptors and endorphins in spinal and supra spinal regions soon led to the use of spinal opiates. Morphine was the first opioid administered intrathecally to augment neuraxial blocks.

Clonidine is an alpha2 adrenergic agonist,it has anti hypertensive properties and the ability to potentiate the effects of local anaesthetics.Addition of of clonidine to bupivacaine intrathecally prolongs analgesia, motor blockade prolonged post operative analgesia and minimal side effects.

MATERIALS AND METHODS

Present clinical study was conducted at Alluri Sitarama Raju Academy of Medical Sciences, Eluru, West Godavari District, Andhra Pradesh, during the period of December 2022 – October 2023. After obtaining approval from institutional ethical committee, present study was undertaken to compare the efficacy of clonidine as an adjuvant to 0.5% bupivacaine (heavy) for subarachnoid block in infra umbilical surgeries. It was prospective controlled study done on 90 patients undergoing elective infra umbilical surgeries.

Inclusion criteria:

a) Patients aged between 20-50 years of either gender
b) ASA grade I & II

Exclusion criteria:

a) Patient with neurological disorders
b) Patients with allergy to study drug
c) Patients with coagulation disorders
d) Patients with local infections at the site of injection
e) Patients with spine deformities

Total 90 patients are included in the study. After a thorough clinical examination and relevant laboratory investigations of all patients, an informed , valid, written consent was obtained, both for conduct of study as well as administration of spinal anaesthesia. All patients were kept nil by mouth from midnight before surgery and tablet alprazolam (0.01mg/kg) was administered at bed time the day before surgery.

All the patients were re-examined, assessed and weighed per-operatively on the day of surgery. Intravenous access was established with an 18G IV cannula and preloading was done with 15ml/kg Ringer's lactate solution 30 minutes before procedure. Anaesthesia machine and accessories were checked and drugs,including emergency drugs were kept ready. Also monitoring equipment like pulse oximeter, NIBP, ECG monitors were checked and applied to the patient on arrival to the operating room and baseline parameters were recorded

Group 1: Bupivacaine and Clonidine 30mcg
Group 2: Bupivacaine and Clonidine 60mcg
Group 3: Bupivacaine and Normal saline

Procedure:

Under strict aseptic conditions,with the patient in the left lateral position, lumbar puncture was performed at L3-L4 intervertebral space. After ensuring free flow of CSF, Group 1 patients received 0.5% heavy bupivacaine 3ml with Clonidine 30mcg and Group 2 patients received 0.5% heavy bupivacaine 3ml with Clonidine 60mcg equal volume and Group 3 patients received 0.5% heavy bupivacaine 3ml with normal saline in equal volume. After the intrathecal injection patients were returned to supine position. Haemodynamic parameters such as pulse rate,systolic blood pressure, diastolic blood pressure, mean arterial blood pressure and SpO2 of the patients were recorded.

Observation And Results

This study compares onset of sensory blockade, intensity of motor blockade, duration of sensory blockade, duration of analgesia, duration of motor blockade, haemodynamic parameters and side effects if any like nausea, sedation by sedation score, dry mouth and bradycardia.

After performing the study, the results were compiled and analysed. For analysing comparison among groups Chi square test was used. Student unpaired t test was used for statistical analysis. It was used because two sets of population were compared which were independent and identically distributed. P value less than 0.05 is considered statistically significant.

The mean duration of two segment regression in Clonidine group 1,2 was 210.5+6.86 minutes, 209.50+22.94 and in control group was 125+5.08 minutes. The prolongation in two segment regression in Clonidine group was statistically significant ($p<0.05$).

The mean duration of motor blockade in Clonidine group 1,2 is 220+9.55 minutes, 216+35 and in control group is 155.2+6.22 minutes. The prolongation in duration of motor blockade in Clonidine group was statistically significant ($p<0.05$).

The mean duration of analgesia in Clonidine group 1,2 is 650.5+9.22, 264.75+44.3 and in control group is 230.2+26.05 minutes. The prolongation in duration of analgesia in Clonidine group was statistically significant ($p<0.05$).

Four (13.33%) patients had sedation, two (6.66%) patient had nausea, three (9.99%) patients had dry mouth in Clonidine group 2, two (6.66%) patients had sedation on Clonidine group 1 and two (6.66%) patients had nausea, one(3.33%) patients had dry mouth in control group.

Table 1: Comparison Of Parameters In The Three Groups

PARAMETERS	GROUP 1	GROUP 2	GROUP 3	P- Value
Onset of sensory blockade (min)	2.54+0.34	2.25+0.18	2.5+0.19	P<0.05
Onset of motor blockade (min)	2.30+0.45	2.20+0.50	7.41+0.55	P<0.05
Two segment regression	209.50+22.94	210.50+6.86	125+5.08	P<0.05
Duration of motor blockade	216+35	220+9.55	155.2+6.22	P<0.05
Duration of analgesia	264.75+44.3	650+9.22	230.2+26.05	P<0.05

DISCUSSION

Clonidine is a selective partial alpha 2 adrenergic agonist. It is known to potentiate both sensory and motor block of local anaesthetic. Most commonly used adjuvants to local anaesthetics for spinal anaesthesia are opioids and they have formed a cornerstone option for the treatment of post operative pain. Spinal opiates prolong the duration of analgesia, but they do have drawbacks of late and unpredictable respiratory depression, pruritus, nausea, vomiting and urinary retention, which requires constant postoperative monitoring and urinary catheterisation. Hence opioids are not ideally suited for all patients and for ambulant surgeries. Hence there is a requirement of an adjuvant to be used along with local anaesthetics which can produce prolonged analgesia without the above said side effects of opioids.

Oral Clonidine has been used to prolong the duration of intrathecal bupivacaine analgesia. Present study was undertaken to evaluate the effectiveness of clonidine as an adjuvant in spinal anaesthesia with 0.5% Bupivacaine (heavy) for prolonging duration of analgesia during prolonged surgeries and in postoperative period as postoperative analgesia. Patients with poor pain control may breathe less deeply, have an inadequate cough and are susceptible to the development of postoperative pulmonary complications. Best method of controlling postoperative pain is by using regional anaesthetic techniques. Using adjuvants along with local anaesthetics for spinal anaesthesia can meet the above requirement.

Hence, an intrathecal adjuvant to these local anaesthetics forms a reliable method of prolonging postoperative analgesia. This technique being simple and less cumbersome has gained a worldwide acceptability by anaesthesiologist.

CONCLUSION

From the present study it is concluded that the addition of clonidine as an adjuvant to bupivacaine in subarachnoid block intrathecally for spinal anaesthesia for infra umbilical surgeries has the following advantages.

1. It prolongs the duration of motor blockade and analgesia
2. It produces sedation in which patients were asleep but easily arousable
3. It is haemodynamically stable
4. It was not associated with side effects like pruritus and respiratory depression and hence can be an attractive alternative for opioids for prolonging spinal analgesia.

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