ORIGINAL RESEARCH PAPER INTERNATIONAL JOURNAL OF PURE MEDICAL RESEARCH

Anaesthesiology

KEYWORDS:

EPIDURAL ALKALINIZED ROPIVACAINE 0.2% FOR POSTOPERATIVE PAIN RELIEF PRIMARILY ON ONSET AND DURATION OF ANALGESIA

Volume - 8, Issue - 7, July - 2023 ISSN (O): 2618-0774 | ISSN (P): 2618-0766

Dr Satyansh Sangal Assistant Professor, Department of anaesthesiology, Govt Doon Medical College.

Dr Swati Singhal Assistant Professor, Department of anaesthesiology, Govt Doon Medical College.

Dr Sharad Kaushik Senior Resident, Govt Doon Medical College.

INTERNATIONAL JOURNAL OF PURE MEDICAL RESEARCH

ABSTRACT

Introduction: Postoperative pain management is crucial to promote better recovery and overall wellbeing of the patient. The addition of an alkaline substance to local anesthetics is believed to facilitate quicker penetration into nerves, but the literature is inconclusive. Ropivacaine is a long-acting local anesthetic that is increasingly used for postoperative pain management. This study aimed to evaluate the onset and duration of analgesia after single shot epidural dose of ropivacaine 0.2% with or without the addition of an alkaline substance.

Objective: The study aimed to determine the time of onset and duration of analgesia after single shot epidural dose of ropivacaine 0.2%.

Materials and Methods: The prospective study was conducted at a hospital for a year, involving 90 adult patients. Patients were randomly assigned to one of three groups: Group A received plain ropivacaine 0.2%, Group B received alkalinized ropivacaine 0.2%, and Group C received alkalinized ropivacaine 0.2% and clonidine 37.5mcg. The onset and duration of analgesia were assessed by monitoring the Visual Analog Scale (VAS) score, sensory block level, and duration of motor block.

Results: The duration of surgery did not differ significantly among the groups. However, the time of onset of analgesia was significantly different among the groups, with a mean of 24.2±3.96 mins for Group A, 8.06±1.63 mins for Group B, and 7.56±1.16 mins for Group C ($p<0.05$). The intra-group analysis showed that onset of analgesia was significantly faster in Group C than Group A or Group B.

Conclusion: The addition of an alkaline substance to ropivacaine 0.2% for postoperative pain relief significantly reduced the onset time of analgesia. However, the duration of analgesia did not differ significantly between the groups. This study suggests that adding an alkaline substance to ropivacaine 0.2% can be a useful technique for reducing the time of onset of analgesia in postoperative pain management.

INTRODUCTION

Postoperative pain management is not only to reduce the physical discomfort experienced by the patient, but also to decrease the transmission of pain signals caused by surgery in order to prevent autonomic and somatic reflex responses that can prolong the healing process. By achieving effective pain control, the patient's physiological function can be improved, promoting better recovery and overall wellbeing.

The addition of an alkaline substance to local anesthetics increases the proportion of non-ionized molecules, which can facilitate quicker penetration into the nerves. This would logically suggest that the onset of nerve block should be faster, but the scientific literature on this topic is inconclusive, with some studies failing to show a significant difference in the speed of onset when bicarbonate is added to epidurals containing bupivacaine 0.5% or lidocaine 2%(1). Nevertheless, other studies have demonstrated the effectiveness of this technique.

In adults, epidural R produces effective sensory blockade, but the motor blockade is slower in onset [2], less intense, and shorter in duration [2,3].

Ropivacaine is a long-acting local anesthetic that has gained popularity in recent years for its effectiveness in providing postoperative pain relief. Ropivacaine has a lower risk of cardiotoxicity compared to other local anesthetics, making it a preferred choice for regional anesthesia techniques. The 0.2% concentration of ropivacaine is commonly used for postoperative pain management in various surgical procedures.

Objective:

The time of onset and duration of analgesia after single shot epidural dose of ropivacaine 0.2%.

MATERIAL AND METHODS

The study, which received approval from the Ethical Committee, was conducted at S. R. N. Hospital (affiliated with M. L. N. Medical College, Allahabad) for a year. The prospective study involved 90 adult patients, aged 18 to 60 years, with ASA physical status 1 and 2, who were scheduled for elective or emergency abdominal surgery. Patients were fully informed about the study and asked for their written consent before participating. A random allocation method was used to assign patients to one of the three groups, with 30 patients in each group. To ensure double-blinding, both the patients and the researchers were unaware of the type of drug solution being used.

After randomization, patients were allocated one of the following groups, receiving epidural drugs for postoperative pain relief.

Group A: Patients who received plain ropivacaine 0.2% (10ml+1ml normal saline)

Group B: Patients who received alkalinized ropivacaine 0.2%(20ml 0.2% ropivacaine mixed with 0.1 ml 7.5% sodium bicarbonate of which 11 ml is taken)

Group C: Patients who received alkalinized ropivacaine 0.2% and clonidine 37.5mcg

Assessment of Onset and Duration of Analgesia:

The time of onset and duration of analgesia was assessed by monitoring the Visual Analog Scale (VAS) score, sensory block level, and duration of motor block. VAS scores were recorded at 0, 5, 10, 15, 30, 45, and 60 minutes after administration of the drug, and then every hour until 12 hours. Sensory block level was assessed by pinprick method, and the duration of motor block was assessed by Bromage scale.

Data Analysis:

The data obtained from the study was analyzed using appropriate

statistical methods to determine the time of onset and duration of analgesia after the administration of single shot epidural dose ropivacaine 0.2% for postoperative pain relief.

RESULTS:

Table 1: Comparison And Analysis Of DURATION OF Surgery

Demographic Profile	Group A	Group B	Group C	p value (ANOVA)
Duration of surgery (mins (Mean ± SD)	130.66± 44.58	139.5± 57.88	141.6± 250.55	>0.05

Duration of surgery (mean ± SD in minutes) were compared among the three groups (Group A, Group B, and Group C) using ANOVA, and there was no statistically significant difference observed ($p > 0.05$). Group A had a duration of surgery of 130.66 ± 44.58 mins, Group B had a duration of 139.5 ± 57.88 mins, and Group C had a duration of 141.6 ± 250.55 mins.

Table 2: Comparison Of Comparison And Analysis Of ONSET OF ANALGESIA (VAS =<3)

Demographic Profile	Group A	Group B	Group C	p value (ANOVA)
Time of onset(mins) (Mean ± SD)	24.2± 3.96	8.06± 1.63	7.56± 1.16	<0.05

The time of onset of analgesia (in minutes) was significantly different among the three groups, with a mean of 24.2±3.96 for group A, 8.06±1.63 for group B, and 7.56±1.16 for group C ($p<0.05$).

Table 3: Intra Group Analysis Of Time To Onset Of Analgesia

Comparison	Time of Onset of analgesia.	
	T	P
A vs C	22.27	<0.05
B vs C	1.21	0.2
A vs B	18.96	<0.05

Onset of analgesia is lesser in group C in comparison to group A and this difference was statistically significant ($p<0.05$).

Onset of analgesia is lesser in group C in comparison to group B and this difference was statistically insignificant ($p>0.05$).

Onset of analgesia is lesser in group B in comparison to group A and this difference was statistically significant ($p<0.05$).

Table 4: Comparison Of Comparison And Analysis Of DURATION OF ANALGESIA (VAS =<3)

Demographic Profile	Group A	Group B	Group C	p value (ANOVA)
Duration of Analgesia (hrs (Mean±SD)	10.46±1.96	10.2±1.16	26.7±2.87	<0.001

The table shows that the duration of analgesia was significantly longer in Group C compared to Group A and B, with a p-value of less than 0.001. The mean duration of analgesia was 10.46±1.96 hours in Group A, 10.2±1.16 hours in Group B, and 26.7±2.87 hours in Group C.

Table 5: Analysis Of Time To Duration Of Analgesia

Comparison	Time to first analgesic requirement.	
	T	P
A vs C	-26	<0.05
B vs C	-30	<0.05
A vs B	0.64	0.52

Duration of analgesia is greater in group C in comparison to group A and this difference was statistically significant ($p<0.05$).
Duration of analgesia is greater in group C in comparison to group B and this difference was statistically significant ($p<0.05$).
Duration of analgesia is greater in group A in comparison to group B and this difference was statistically insignificant ($p>0.05$).

DISCUSSION

Effective postoperative pain relief cannot be achieved through a single drug or method without putting significant strain on equipment or surveillance systems. Multimodal or balanced analgesia refers to the utilization of two or more analgesic drugs or techniques in combination. Currently, the most efficient approach to postoperative pain management is through multimodal analgesia.

In this study the onset & duration of analgesia after administration of these drugs epidurally & hemodynamic parameters postoperatively were evaluated in all the groups.

Graham H. McMorland M. Joanne Douglas et al(1986)[4] had conducted a study investigating the effects on time to onset and duration of analgesia, of pH adjustment of 0.25 per cent bupivacaine immediately prior to injection into the epidural space in parturients. They had found that alkalinisation of bupivacaine significantly reduced the time of onset of analgesia as in our study as well. However they had also concluded that alkalinisation also increased the duration of action of bupivacaine significantly which does not concur with our study. In our study we have found out that there was no significant increase in duration of action of alkalinized 0.2% ropivacaine (Group B) in comparison with plain 0.2% ropivacaine (Group A).

We found that there was a significant increase duration of analgesia when alkalinized ropivacaine was combined with clonidine (37.5mcg). These findings were in concurrence with those of **João Florêncio de Abreu Baptistal, Renato Santiago Gomez et al (2014)**[5]**.** They also observed increase in duration of analgesia when the added clonidine at the dose of 4mcg/kg to 0.75% ropivacaine in haemorrhoidectomy patients.

CONCLUSION

The parametric data of the three groups were analysed using student t-test and one-way ANOVA test. The study concluded that the onset of analgesia was reduced in patients receiving alkalinized ropivacaine, while the addition of clonidine did not further reduce the time of onset. Duration of analgesia was significantly increased in patients receiving alkalinized 0.2% ropivacaine and clonidine. No significant sedation was observed in any of the groups, and hemodynamic variables were comparable in all three groups.

REFERENCES:

1. Michele Curatolo, Steen Petersen-Felix, Lars Arendt-Nielsen et al : Adding Sodium Bicarbonate to Lidocaine Enhances the Depth of Epidural Blockade Anesthesia & Analgesia 1998; 86(2):341-7.
2. Brockway MS, Bannister J, McClure JH, et al. Comparison of extradural ropivacaine and bupivacaine. Br J Anaesth 1991; 66: 31–7.
3. Morrison LM, Emanuelsson BM, McClure JH, et al. Efficacy and kinetics of extradural ropivacaine: comparison with bupivacaine. Br J Anaesth 1994; 72: 164–9.
4. McMorland GH, Douglas MJ, Jeffery WK, et al. Effect of pH-adjustment of bupivacaine on onset and duration of epidural analgesia in parturients. Can J Anaesth (1986) 33:537–541
5. João Florêncio de Abreu Baptista , Renato Santiago Gomez , Danilo Nagib Salomão Paulo Epidural anesthesia with ropivacaine with or without clonidine and postoperative pain in hemorrhoidectomiesActa Cirurgica Brasileira Acta Cir. Bras. vol.29 no.3 São Paulo Mar. 2014