CLINICO-PHYSIOLOGICAL CHANGES ON EPIDURAL ADMINISTRATION OF ROPIVACAINE ALONE AND IN COMBINATION WITH DEXMEDETOMIDINE IN BUFFALO CALVES

S. Kamble, S.S. Pandey, B.P. Shukla and R. Jain

College of Veterinary Science and A.H., MHOW

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Corresponding Author : stallionride@yahoo.com

ABSTRACT

The present study was conducted on 12 healthy buffalo calves of 6-12 months of age. The objective of the study was to investigate the clinico-physiological changes after administration of ropivacaine alone and in combination with dexmedetomidine as an epidural analgesia. Temperature and respiration showed non significant changes in both the groups, there was non significant change in heart rate in group II whereas in ropivacaine - dexmedetomidine group significant changes were observed. The onset and duration of analgesia was early and prolonged in ropivacaine-dexmedetomidine combination as compared to ropivacaine group. Minimal ataxia was seen in group administered with ropivacaine alone.

KEYWORDS : Clinico-physiological changes, Epidural Ropivacaine, Dexmedetomidine

INTRODUCTION

Epidural analgesia is a central neuraxial block technique with advantage of being able to provide analgesia for prolonged surgeries and better hemodynamic stability. Epidural anaesthesia is able to provide postoperative analgesia too. It also reduce the adverse physiologic responses to surgery (Leon, 2001). Ropivacaine is long acting amide local anaesthetic with both anaesthetic and analgesic effect. Dexmedetomidine is a highly selective and potent alpha 2-adrenergic agonist with several diverse actions like sedation, anxiolysis, sympatholysis, analgesia, decreased intraoperative anaesthetic requirements, cardiovascular stability, smooth recovery and also preserves respiratory functions. Epidural administration of alpha 2 agonists produces potent analgesia with minimal sedative or cardiovascular effects, and considered one of the most reliable techniques in ruminant. Some of the adverse effects of alpha 2 agonists are excessive saliva, bradycardia, depressed respiratory rate, decreased rectal temperature, hyperglycemia, uterine contractions and decreased ruminal and intestinal motility and caused significant haemato-biochemical changes (Shah et al., 2013 and Rayees and Shukla, 2013).

MATERIALS AND METHODS

Twelve apparently healthy buffalo calves of 6-12 months of age were selected. The animals were divided into two groups of 6 animals each. Ropivacaine hydrochloride (0.75%) were administered at 0.25 mg/kg b.wt. and at 0.25 mg/kg b.wt. with Dexmedetomidine at 5 µg/kg b.wt. in sacrococcygeal space for group I and group II respectively. Rectal temperature (^{o}F), Pulse rate (per minute) and respiration rate (per minute) were recorded at 0, 30, 60, 90, 180 and 360 min. The zero hour values were recorded before the start of treatment, and considered as control value. The onset of analgesia was ascertained by response to pain at inguinal region till loss of reflexes. The duration of analgesia was ascertained by noting the time of reappearance of reflex. Animals were observed for incoordination in gaits after epidural administration of drugs and results were interpreted as 0, +, ++, +++ for no staggering, staggering, animal unable to stand and recumbency respectively. The onset, persistency and cessation of salivation were recorded in both the groups. All the animals were observed for their standing recovery which is time taken for standing and walking without support.

RESULTS AND DISCUSSION

The onset of analgesia was 14.42 ± 0.79 minutes in Group I and 5.4 ± 0.29 minutes in Group II animals. The duration of analgesia was 106 ± 8.74 minutes in Group I and 322.83 ± 2.73 minutes in Group II animals. Onset and duration of analgesia was early and prolonged in Group II as compared to group I. Bajwa et al. (2011) observed that Dexmedetomidine is a better neuraxial adjuvant with ropivacaine compared to clonidine for providing early onset of sensory analgesia, adequate sedation and a prolonged post-operative analgesia. Similar findings were reported by Harshvardhan (2014). The complete recovery time from analgesia was 278.16 ± 8.71 and 359.16 ± 3.45 minutes in Group I and Group II respectively. Complete recovery was quick in group I animals. Recumbency was earlier in group II (15.97 ± 0.96 minutes) animals as compared to group administered with ropivacaine alone (26.24 ± 0.61 minutes). Minimal ataxia was seen in group I animals. Temperature and respiration rate showed non significant changes in both the groups, there was non significant change in heart rate in group II whereas in ropivacaine -dexmedetomidine group I significant changes was observed. Chaudhary (2013) observed non significant decrease in temperature and respiration rate of cow calves, after epidural administration of ropivacaine. Temperature and Heart rate tend to resume the 0 min control value after 3 hours of administration of anaesthetic agents in both the groups.

The heart rate in group II decreased steadily from 46.83 ± 0.70 at 0 min to 3 hours (41 ± 1.59* at 30 minutes, 38.16 ± 1.16 at 1 hour ,38.33 ± 1.11 at 1.5 hours and 41.5± 0.71 respectively).

The more rapid onset may be due to rapid diffusion of the drug through meninges. Ropivacaine is less lipophilic and hence less likely to penetrate the large myelinated nerve fibres resulting in relatively late onset. In this study significantly decreased heart rate may be due to inhibition of sympathetic tone due to reduction in the norepinephrine release and direct increase in release of acetycholine from parasympathetic nerves by dexmedetomidine (Macdonald and Virtanen, 1992).

It may be concluded from the above study that combination of Ropivacaine hydrochloride and Dexmedetomidine is a better option for epidural analgesia instead of using Ropivacaine hydrochloride alone .

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