

RESEARCH PAPER

Effect of bupivacaine on epidural analgesia produced by xylazine or medetomidine in buffaloes (*Bubalus bubalis*)

Virendra Singh MVSc, Amarpal MVSc, PhD, Prakash Kinjavdekar MVSc, PhD & Hari P Aithal MVSc, PhD
Division of Surgery, Indian Veterinary Research Institute, Izatnagar, India

Correspondence: Amarpal, Division of Surgery, Indian Veterinary Research Institute, Izatnagar-243 122 (UP), India.
E-mail: amarpal@ivri.up.nic.in

Abstract

Objective To evaluate and compare the effect of epidural bupivacaine on analgesia produced by epidural xylazine or medetomidine in buffaloes.

Study design Prospective, blinded study.

Animals Ten male buffalo calves (6–8 months of age; body weight 70–90 kg) were used on two occasions to conduct a total of 20 investigations.

Methods Caudal extradural analgesia was produced in four buffalo calves each by the injection of either xylazine (0.05 mg kg⁻¹), medetomidine (15 µg kg⁻¹) or 0.5% bupivacaine (0.125 mg kg⁻¹), or combinations of xylazine and bupivacaine (0.05 and 0.125 mg kg⁻¹), or medetomidine and bupivacaine (15 µg kg⁻¹ and 0.125 mg kg⁻¹) at the first intercoccygeal extradural space. Analgesia was tested using deep pinprick stimuli.

Results Extradural administration of xylazine or medetomidine resulted in complete analgesia of the tail, perineum, inguinal region and the upper parts of the hind limbs, which was faster in onset and longer in duration in the medetomidine group than in the xylazine group. Addition of bupivacaine increased the intensity of the analgesia produced by xylazine, but not that produced by medetomidine. All the drugs caused mild to moderate ataxia, but signs of sedation were apparent only in animals which received xylazine or medetomidine. The extradural injections of all the drugs caused significant decrease in heart rate ($p = 0.024$), respiratory rate ($p = 0.026$) and

rectal temperature ($p = 0.036$) from the respective baseline values, but the differences between the groups were not significant.

Conclusions Medetomidine produced a longer duration of analgesia than that produced by xylazine. Bupivacaine prolonged the analgesia produced by xylazine, but the analgesia produced by the combination of medetomidine and bupivacaine was not superior to that produced by medetomidine alone.

Clinical relevance Bupivacaine may be used to prolong the extradural analgesia produced by xylazine, but not that produced by medetomidine in buffaloes.

Keywords buffaloes, bupivacaine, extradural, medetomidine, xylazine.

Introduction

Epidural alpha-2 agonists induce analgesia by the stimulation of alpha-2 adrenergic receptors in the dorsal horn of the spinal cord (Grubb et al. 1992; Lin et al. 1998). Caudal epidural administration of xylazine resulted in analgesia of the perineal region in cattle (St Jean et al. 1990), sheep (Kyles et al. 1993), llamas (Grubb et al. 1993) and buffaloes (Singh et al. 2004). Similarly, epidural medetomidine has been used to produce caudal analgesia in cattle (Lin et al. 1998) and goats (Mpanduji et al. 2000). The analgesia produced by epidural alpha-2 agonists may be considered more practical than that produced by commonly used local anaesthetic agents, especially in large ruminants, as it has a

prolonged duration of action and decreased disruption of motor function (LeBlanc et al. 1988; Grubb et al. 1992, 1993). These attributes of the epidural alpha-2 agonists analgesia may be desirable when surgical and obstetrical procedures are performed in standing cattle or buffaloes. However, sedation, cardiopulmonary depression, delayed onset of analgesia (Singh et al. 2004) and rumen hypomotility (St Jean et al. 1990) may limit the use of epidural alpha-2 agonists for analgesia in ruminants. Researchers have used other drugs in combination with extradural alpha-2 agonists, especially xylazine, to decrease some of its unwanted effects (Singh et al. 2006).

Epidural lidocaine has been used in combination with xylazine to produce analgesia in many species including horses (Grubb et al. 1992), goats (DeRossi et al. 2005) and cattle (Grubb et al. 2002). The analgesic effects of extradural xylazine and lidocaine are reported to be additive/synergistic, inducing rapid onset and prolonged duration of analgesia (Grubb et al. 1992; Lee et al. 2004). Bupivacaine is an amino-amine local anaesthetic of high potency, long duration, low degree of motor blockade (DeRossi et al. 2004) and minimal neurotoxicity (Hodgson et al. 1999). Even the long-term use of extradural bupivacaine along with ketamine and methadone was found to be safe in the management of complex pain syndrome in a cow (Bergadano et al. 2006). Bupivacaine thus could be a good choice for extradural use in combination with alpha-2 agonists. However, there is lack of information on the use of epidural bupivacaine in combination with xylazine or medetomidine for caudal analgesia in ruminants.

The purpose of the study was to evaluate and compare the effects of extradural bupivacaine on the time of onset of analgesia, intensity and duration of analgesia, degree of ataxia and sedation, ruminal movements and changes in heart rate (HR), respiratory rate (f_R) and rectal temperature (RT) produced by extradural administration of xylazine or medetomidine in buffaloes.

Materials and methods

Experimental animals

The Animal Ethics Committee of the Indian Veterinary Research Institute, Izatnagar, India, approved the study. Ten clinically healthy male buffalo calves of 6–8 months of age (mean age 6.8 ± 0.64 months) and 70–90 kg body weight (mean weight

81.2 ± 3.5 kg) were used in this study. The calves were acclimatized to being approached and handled for 1 month before the start of the study and were maintained under uniform feeding and management conditions during the period of the study. Each animal was starved of food for 24 hours and water was withheld 12 hours before the experiment.

Experimental design

A total of 10 buffalo calves were used for the study. Extradural injections of xylazine, medetomidine, bupivacaine or combination of xylazine/bupivacaine and medetomidine/bupivacaine were randomly assigned to two animals in each group. After 10 days, two animals were selected randomly for the injection of each drug(s). Thus a total of 20 trials (four trials of each drug/combo) were conducted in 10 animals.

The animals were restrained in the standing position in a chute. The skin over the first intercoccygeal space was clipped and surgically scrubbed before the placement of a sterile needle. Extradural injection was made using a 20-SWG, 4-cm long hypodermic needle. The needle was inserted at an angle of about 45° to the skin surface and directed anteriorly and ventrally to a depth of about 2 cm. Correct placement of the needle into the extradural space was confirmed by the loss of resistance to the injection and absence of any fluid or blood on aspiration. The injection was made slowly over a period of 10–15 seconds. Xylazine 0.05 mg kg^{-1} (Xylazil 100 mg mL^{-1} ; Troy Laboratories, NSW, Australia), medetomidine $15 \text{ } \mu\text{g kg}^{-1}$ (Domitor 1 mg mL^{-1} ; Farnos group, Turku, Finland), 0.5% bupivacaine 0.125 mg kg^{-1} (Sensorcaine 5 mg mL^{-1} ; Astra IDL, New Delhi, India), a combination of xylazine and bupivacaine (0.05 and 0.125 mg kg^{-1}) or medetomidine and bupivacaine ($15 \text{ } \mu\text{g kg}^{-1}$ and 0.125 mg kg^{-1}) was administered to four animals each. Just before making the injection, the volume of the drug was expanded to 4.0 mL by adding normal saline solution. The animals were let loose and allowed to move in a small enclosure after making the extradural injection. Persons unaware of the drugs used, made the observations.

Observations

All the parameters, except for the onset and duration of analgesia and ruminal movements, were recorded before the administration of the drug(s)

Download English Version:

<https://daneshyari.com/en/article/10998983>

Download Persian Version:

<https://daneshyari.com/article/10998983>

[Daneshyari.com](https://daneshyari.com)