

After a post-weaning preconditioning period, male calves ( $n = 69$ ) were shipped from the University of Arkansas beef cattle research herd to the West Texas A&M research feedlot and held for a 10 day acclimation period before castration treatments and respiratory vaccinations were administered. Calves had previously been stratified by age and assigned randomly to 1 of 5 treatments at birth in a  $2 \times 2 + 1$  factorial arrangement. Treatments were 1) surgical castration near birth (CON), 2) surgical castration at feedlot arrival (SUR), 3) oral administration of meloxicam followed by surgical castration at feedlot arrival (0.45 mg/lb or 1 mg/kg BW; SMX), 4) banding castration at feedlot arrival (BAN), or 5) banding castration at feedlot arrival with oral meloxicam (0.45 mg/lb or 1 mg/kg BW; BMX). Data were collected from day of castration through a 70 day post-castration phase. Body weights were recorded on all calves at days 0, 7, 14, 32, and 70. A subset of calves ( $n = 50$ ) were selected randomly with equal representation of each treatment for jugular collection of blood samples on days 0, 0.25, 1, 4, 7, 14, and 32. Serum was analyzed for concentrations of BVDV-specific antibody titers and haptoglobin (Hp). For statistical analyses, data were analyzed using the PROC MIXED procedure of SAS. Significance was considered for a  $P$ -value of less than or equal to 0.05.

Average initial body weight for all treatments at time of treatment application was 548 lb (249 kg). Average daily gain did not differ between treatments ( $P = 0.23$ ) throughout the 70 day post-castration period. However, the ADG from day 0 to 32 was greater ( $P = 0.02$ ) in CON compared to other treatments. Serum BVDV antibody titer concentrations were similar ( $P > 0.05$ ) among treatments. Serum Hp concentrations were significantly higher for SUR compared to other treatments ( $P < 0.001$ ). A day effect was noted for Hp with the highest means noted on day 4 post-castration. Furthermore, SUR tended ( $P = 0.08$ ) to have higher Hp concentrations compared to other treatments on day 4.

### Significance

Neither castration method nor oral administration of meloxicam altered BVDV antibody response or ADG during a 70 day post-castration period. The banding castration method and oral meloxicam administration lowered post-castration serum Hp concentrations. Further research is needed to continue to elucidate effects of different castration procedures and the use of analgesics.

## Bispectral index and hemodynamic effects of a constant rate infusion of propofol combined with fentanyl in calves under spontaneous ventilation

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### Introduction

Total intravenous anesthesia is an anesthetic modality which is commonly used in cattle due to its practicality, as it eliminates the need for sophisticated

equipment and can be used under field conditions, providing adequate anesthesia and analgesia for bovine patients. This study evaluated the bispectral index (BIS) and hemodynamic effects of a constant rate infusion of propofol combined with fentanyl in calves.

## Materials and Methods

Five Holstein calves aged 5 to 10 months and weighing 231 to 326 lb (105 to 148 kg) were enrolled in the study. Anesthetic induction was carried out with propofol at 3 mg/kg combined with fentanyl at 0.001 mg/kg administered intravenously (IV). The animals were intubated with an appropriate sized endotracheal tube and positioned in lateral recumbency, where they remained breathing room air spontaneously. Subsequently, anesthesia was maintained with a constant rate infusion of propofol at a rate of 0.6 mg/kg/minute IV, combined with a constant rate infusion of fentanyl at a rate of 0.001 mg/kg/hour IV. The drugs were administered during 60 minutes using an infusion pump. Hemodynamic (HR, SAP, DAP, MAP, CO, CVP, MPAP, MPAOP, CI, SI, SVRI, PVRI) and bispectral index (BIS, IQS, EMG) variables were measured before anesthetic induction ( $T_B$ ) and 15, 30, 45, and 60 minutes after initiating the constant rate infusion of the drugs ( $T_{15}$ ,  $T_{30}$ ,  $T_{45}$ ,  $T_{60}$ , respectively). Data were submitted to repeated measures ANOVA and Tukey's test. Data were considered significantly different when  $p < 0.05$ .

## Results

BIS and EMG values were significantly higher at baseline when compared to the other times, as IQS values did not present significant differences. Regarding hemodynamic parameters, HR was lower at baseline when compared to the other times, and DAP was higher at  $T_{60}$  when compared to  $T_{15}$ , but it did not differ at other times. In addition, MAP was higher at  $T_{60}$  when compared to  $T_{30}$ . SI values were higher at baseline when compared to the other times and SVRI was higher at  $T_{60}$  when compared to  $T_{15}$ , but it did not differ at other times. The remaining variables did not change significantly during the evaluation period.

## Significance

The constant rate infusion of propofol combined with fentanyl at the studied rates did not result in clinically relevant changes in the evaluated parameters. Therefore, this protocol can be safely used in healthy calves; however, its use in cattle in the United States is extra-label, thereby requiring a veterinarian-client-patient relationship when used.

# Co-administration of meloxicam and gabapentin does not compromise beef bull semen quality

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## Introduction

Feet and leg soundness are of critical importance for breeding bulls, and lameness is a common problem affecting bulls. Lameness pain in the bovine typically has both inflammatory and neuropathic components, and often coincides with a decline in fertility. As neuropathic pain is refractory to non-steroidal anti-inflammatory drugs (NSAIDs),  $\gamma$ -aminobutyric acid (GABA) analogues are commonly used in conjunction with NSAIDs to treat lameness in cattle. Meloxicam, an NSAID, and gabapentin, a GABA analogue, are frequently used extra-label under the supervision of a veterinarian to mitigate pain associated with lameness. Though neither of these compounds is currently labeled for use in bovines in the United States, previous research has indicated that the pharmacokinetic profiles of these drugs support further evaluation for clinical use as analgesics in bovines. A decline in fertility is often observed in lame bulls; how-

ever, the pathogenesis of this transient subfertility is unknown. Currently, no controlled studies have been conducted to evaluate the effects of meloxicam and gabapentin analgesics on bull fertility. Thus, the objective of the present study was to evaluate the effects of meloxicam and gabapentin combination therapy on beef bull semen quality. It was hypothesized that treatment with meloxicam and gabapentin might have deleterious effects on semen quality.

## Materials and Methods

To this end, 6 purebred Angus bulls approximately 20 months of age that had previously passed a Bull Breeding Soundness Evaluation (BBSE) were assigned to an analgesic treatment group (TREAT = 3) or control group (CON = 3). Bulls in the TREAT group were treated with the clinically recommended doses of meloxicam (0.45 mg/lb; 1 mg/kg loading dose; 0.227 mg/lb (0.5 mg/