

Assessment of lidocaine local anesthesia and meloxicam analgesia on duration of castration and subsequent feeding and locomotion behavior

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Introduction

Pain management at the time of castration has become a controversial subject among veterinarians and livestock producers. While animal welfare and pain management is a significant concern, veterinarians and producers are also concerned about time needed to implement additional procedures and perceive a lack of economic return. Previous reports have detailed performance and behavioral parameters related to castration; however, little information exists related to feeding behavior and the time needed to implement pain mitigation strategies. The objective of our research was to provide an estimate of time expenditures related to pain mitigation techniques as well as to quantify differences in feeding behavior, locomotion behavior, and growth performance of calves castrated with or without local anesthesia and analgesia.

Materials and Methods

Ninety-four intact male, beef calves were enrolled in the study. The enrolled calves were of auction market origin and weighed on average 568 lb (min: 405 lb, max: 729 lb). Calves were acclimated to the feedlot for an average of 18.5 days prior to initiation of the castration study. Prior to the start of the study, all bulls were randomly assigned to one of the following treatment groups: negative control, lidocaine (LID) local anesthesia, meloxicam (MEL) analgesia, and both LID and MEL. All castrations were performed by incising the scrotum using a Newberry Knife and then removing the testicles using a Henderson Castration Tool. Lidocaine (2%) was administered by injecting 5 mL in each cord and then an additional 5 mL across the scrotal incision location. No delay between LID injection and incision was included. Meloxicam was administered per os at a dose of 1 mg/kg. During processing, all activities were recorded by a digital video recorder. At the time of castration, each calf was fitted with an accelerometer to monitor locomotion behavior. Feeding behavior was monitored using an individual animal feed intake monitoring system (FIMS). Two day bodyweights were measured at study

initiation and at the conclusion of the feeding period. Mixed model repeated measures statistical analysis was conducted for behavioral parameters over the first 14 days following castration. Dependent variables included feed intake, time at bunk (BT), eating time (ET), meal count (MC), standing time (ST), steps, and lying bouts (LB). Analysis of variance was used to assess the significance of castration duration, feed intake (FI), feed conversion (FG), and average daily gain (ADG). For all analysis, LID, MEL, and the interaction of LID and MEL were analyzed as independent variables.

Results

Of the bulls enrolled, twenty-two calves experienced difficulty acclimating to the FIMS and did not have complete feeding behavior and performance data collected. Locomotion data was only collected on half of the cattle (n=47) due to a data compromise. Video footage was unavailable for 2 calves. Interactions between LID and MEL were not significant for any variable analyzed. No differences were detected in FI, MC, ST, LB, Steps, ADG, FG, or castration duration for either MEL or LID. No difference was detected in BT for LID treated calves. Calves treated with MEL tended to spend less time (426 s less) at the bunk and less time actively eating (315 s less) when compared to untreated controls ($P=0.081$, and $P=0.056$, respectively). Calves treated with LID tended to spend less time (315 s less) actively eating compared to untreated controls ($P=0.095$).

Significance

Use of MEL and LID in castration protocols did not have a measurable impact on feeding behavior, locomotion behavior, and performance parameters in our study. Notably, use of local anesthesia did not generate a significant increase in castration duration compared to control calves. Further, parameters related to time spent consuming feed had tendencies toward differences, but feed intake did not differ between groups. Further interpretation of behavioral parameters is difficult due to the lack of uncastrated controls.