

# Effects of Flunixin Meglumine and Local Anesthetic on Plasma Cortisol Concentration and Performance in Dairy Calves Castrated at Two to Three Months of Age

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## Introduction

Dairy calves and early-weaned beef calves are often weaned at 2-3 months of age and castrated at that time. Most studies examining the effects of analgesic and anesthetic agents on responses to castration focus on older or younger cattle. Also, no analgesic or local anesthetic agents are approved for reducing castration-associated pain in calves in the US. Extra-label use of such agents should be based on evidence of efficacy. Our objective was to provide tangible data on the effects of flunixin meglumine (FM) and local anesthesia (LA) on cortisol and performance responses associated with surgical castration in 2- to 3-month-old dairy calves.

## Materials and Methods

Thirty Holstein-Friesian bull calves were randomly allocated to individual pens in six replicates. Within each replicate, five treatments were administered: 1) castration under LA (2% lidocaine injected SQ around base of scrotum and into the testes); 2) castration after IV administration of FM; 3) castration with a combination of LA and FM (LA-FM); 4) castration without LA or FM (castration control, CC); and 5) handling but no castration (handling control, HC). Calves were surgically castrated 20 minutes after moving them to a chute and administering the drugs or placebos.

Plasma for cortisol analysis was obtained through pre-placed jugular catheters before and every 15 to 30 minutes after castration for 8 hours. Feed intake was recorded for four days pre-operatively and 10 days post-operatively. Body weights were recorded pre-, mid- and

post-trial, and average daily gain and feed conversion ratio calculated.

Data were analyzed in SAS using the Kruskal-Wallis Nonparametric 1-way ANOVA and paired t-tests. Significance was declared at  $P < 0.05$ .

## Results

Median and peak cortisol concentrations appeared to be lower (5.8 ng/mL and 13.4 ng/mL, respectively) for HC calves than for calves in the CC (11.3 and 33.2 ng/mL), LA (10.8 and 32.8 ng/mL), FM (10.3 and 33.3 ng/mL) and LA-FM (8.2 and 22.8 ng/mL) groups, but differences among groups were not significant ( $P > 0.20$ ).

Weight gain and feed conversion ratio were numerically higher in HC calves (median, 2.36 lb/d and .34, respectively) than in all castrated groups ( $\leq 1.8$  lb/d and  $\leq 0.26$ ), but differences among groups were not significant ( $P > 0.05$ ). Pre-castration feed intake ( $P < 0.0001$ ) and average daily gain ( $P < 0.036$ ) were lower than post-castration values.

## Significance

Due to high variances within treatment groups and the relatively small number of replicates, we were unable to detect significant differences in performance and plasma cortisol concentrations between calves administered analgesic and/or local anesthetic and calves castrated without these agents. Analysis of behavioral responses is in progress and may be more sensitive in detecting differences among groups.