

The analgesic properties of transdermal flunixin meglumine when given at the time of castration

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Introduction

Castration is a common husbandry practice performed on cattle in the United States and Canada. There are numerous reports supporting the use of non-steroidal anti-inflammatory drugs at the time of castration. Yet, less than 50% of producers and veterinarians use analgesia at the time of castration. Labor and medicine costs have been cited as reasons for not including analgesic into castration protocols. This study was conducted to assess the impact of transdermal flunixin meglumine on biomarkers of pain in calves when administered at the time of surgical castration without local anesthesia

Materials and Methods

Twenty-three Holsteins were enrolled into the study. The group consisted of 16 intact males and 7 castrated males. All calves were 9 months of age and weighed 770 lb (350 kg). Intact males were randomized into either a flunixin castrated group (CAST+FLU) or a placebo castrated group (CAST+PLBO). The group of steers served a negative control (SHAM+PLBO) group for pain biomarkers. Treated calves received transdermal flunixin meglumine applied to the dorsal midline at the label dose of 1.5 mg/lb (3.33 mg/kg) during the castration procedure. A surgical castration procedure was performed. Biomarkers collected and analyzed included plasma cortisol, substance P, ocular infrared thermography (IRT), and gait analysis. Biomarkers were statistically analyzed using repeat measures.

Results

There were no differences between treatment groups for substance P levels. Mean IRT values were higher for CAST+FLU calves (95.7°F; 35.4°C) compared to CAST+PLBO (94.1°F; 34.5°C) and SHAM+PLBO (93.7°F; 34.3°C) calves ($P=0.0694$). There was significant differences in plasma cortisol levels ($P=0.0016$) and a tendency towards significance for area under the effect curve ($P=0.0979$). Specifically, there were significant differences between the CAST+FLU and CAST+PLBO groups at 2, 3, 4, and 12 hours. The calves undergoing surgical castration placed more force onto their fore limbs ($P=0.02$) indicating a shift in their weight distribution to the front limbs. There were no measured differences in total step contact area and step contact pressure. SHAM+PLBO calves has lower total impulses compared to CAST+FLU and CAST+PLBO ($P=0.004$).

Significance

Transdermal flunixin provided negligible analgesic effects on the pain biomarkers of substance P, IRT, and gait analysis. Calves receiving transdermal flunixin had reduced cortisol concentration and mitigated stress results following castration. Further research is needed to evaluate transdermal flunixin as part of multimodal analgesic protocol.