BEEF CATTLE RESEARCH UPDATE

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Effect of Castration Method and Analgesia on Performance and Welfare Measures in Feedlot Cattle

Castration of beef cattle is routinely performed in the U.S. to mitigate aggressive and sexual behavior and improve meat quality. It is well documented that castration of feeder calves on arrival or shortly after arrival at a feedlot decreases daily gains and increases morbidity.[1, 2] This is clearly illustrated in Kansas State University research from 2011 that evaluated the effects of castration on calves that were castrated post-arrival relative to those castrated before.[3] In that study, data on 3,380 male calves (2,197 bulls and 1,183 steers) used in 11 receiving trials from March 2006 to October 2008 was analyzed. This analysis showed that surgical castration of calves after arrival reduced daily gains by 9.6% (0.35 lb/day) as compared to steers over a 44-day receiving period. Yet, a 2007-08 USDA survey of U.S. beef cow operations found that nearly 41% of operations do not castrate any bull calves prior to sale.[4] The percentage of operations that castrated any bull calves prior to sale increased as herd size increased (50.3, 75.0, 85.1, and 95.3% of operations, respectively, for herd size of 1-49, 50-99, 100-199, and 200 or more beef cows). This same survey reported that most operations (74.5%) castrated bull calves at an average age of less than 93 days, but almost one of five operations (18.4%) did not castrate calves until they were over 122 days old.

Surgical removal of testes or application of a restrictive elastic band are the two primary methods of castration currently employed in older bulls upon feedlot arrival, but there is no consensus regarding best method. A 2011 USDA survey of large feedlots with a capacity of 1,000 or more head estimated that of bulls placed on feed, 50.4% are castrated surgically, while 42.9% are banded, and 6.5% are not castrated.[5] The American Veterinary Medical Association encourages the use of pain management during procedures such as castration. A non-steroidal anti-inflammatory drug, such as meloxicam, can be prescribed by a veterinarian under the guidelines of the Animal Medicinal Drug Use Clarification Act for such purpose.

Recent joint research between the University of Arkansas and West Texas A&M University (WTAMU) evaluated the effect of castration timing (birth vs. feedlot entry), method of castration (surgical vs. banding) and use of the analgesic meloxicam on performance, behavior, inflammation, and carcass traits in beef cattle.[6] This study was conducted over three consecutive years (2013 to 2015) at the WTAMU Research Feedlot using Angus X Herford calves (152 bulls and 42 steers) sourced from the University of Arkansas cow herd near Savoy. The calves were assigned randomly to the following five treatments at birth: 1) controls castrated at birth, 2) bulls surgically castrated upon feedlot arrival without meloxicam, 3) bulls surgically castrated upon feedlot arrival with meloxicam, 4) bulls band castrated upon feedlot arrival without meloxicam, and 5) bulls band castrated upon feedlot arrival with meloxicam. After weaning and a 56 day preconditioning period, the calves were transported 478 miles to the feedlot. Upon feedlot arrival, the animals were blocked by body weight and assigned randomly to treatment pens (6 pens/ treatment). In addition, accelerometers were placed on the rear right leg of 5 randomly selected animals/treatment pen to determine baseline and post-castration changes in behavior data indicative of pain. The bull calves were castrated after a 10-day acclimation period. Oral meloxicam was administered at 1 mg/kg of BW concurrent with castration. Treatment pens within BW class were harvested according to BW and visual appraisal and carcass data were collected.

These researchers reported that both castration methods reduced average daily gain (ADG) early in in the feeding period (P= 0.02) compared to control calves (castrated at birth). However, the period of reduced performance was earlier (days 0 to 7) for surgically castrated animals and the

performance reduction was delayed (days 14 to 32) in banded animals. ADG over the entire feeding period was greater for control calves (3.88 vs. 3.72 lb/day; P = 0.04) and when meloxicam was administered concurrent with either castration method (3.82 vs. 3.61 lb/day; P < 0.01). Method of castration had no effect on overall (P = 0.80) ADG (3.73 vs. 3.70 lb/day, respectively, for surgically and band castrated). Control animals had increased marbling score (P = 0.03) compared to castrates. Cattle surgically castrated with meloxicam had greater (P >< 0.05) backfat thickness than other castrated treatments but did not differ from controls (P = 0.15).

Method of castration had contrasting effects on specific behavior variables. The surgically castrated animals spent more time standing immediately following castration (P < 0.01), whereas, the banded calves had more lying bouts throughout the day (P < 0.01). In addition, step count was increased for banded calves (P< 0.01) immediately following application of the band. These activity changes corroborated behavioral observations in that surgical castration caused standing with less steps to avoid weight bearing on the surgical area, whereas, banding promoted a lateral recumbent position with frequent lying bouts.

In conclusion, these results illustrate that castration at cow calf origin near birth has long-term production and welfare benefits through finishing. Beef Quality Assurance Guidelines recommend that bull calves that are not herd sire prospects be castrated as early in life as possible (preferably, between birth and four months of age). The data also showed that meloxicam was able to reduce inflammation increasing overall gains. Either castration method caused a temporary decrease in performance, and briefly altered behavior indicative of acute pain. These authors suggested that banding with meloxicam may be the most advantageous regimen in castrated feedlot cattle.

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