

Effect of Castration on Weight Gain of Beef Calves

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Abstract

Many management practices can be utilized to maximize weight and increase value of calves at weaning. Combining the two management practices of castration and implanting male calves allows producers to maximize weaning weights and avoid discounts for intact males. Crossbred bull calves were randomly assigned at birth to one of three treatment groups: castrated (n=22), banded (n=18) or left intact (n=20). Calves that were castrated or banded within 24 hours after birth received a zeranol implant at that time. Calves in the intact group were castrated at 150 days of age and then implanted, and the calves in the other two treatment groups were re-implanted at that time. There were no differences in weaning weight, average daily gain (ADG) or weight per day of age between the three treatment groups. Castrating calves shortly after birth reduces stress on the animal compared to castration at a older age (day 150 to weaning). Also, early castration may be more acceptable as an animal welfare issue. Combining castration and implanting allows producers to maximize weaning weight of calves as well as reduce the stress of castration at an older age.

Introduction

Many producers face the dilemma of whether it is more profitable to castrate calves shortly after birth or to castrate them at a older age, and whether method of castration affects the weight of calves at weaning. In reality, bull calves gain faster than steer calves. However, implanting steer calves with a growth promotant can reduce the difference in weaning weight between bull calves and steers. The focus of this study was to examine the effects of castration shortly after birth compared to leaving bull calves intact and castrating them at an older age. A second objective was to evaluate two methods of early castration, banding versus surgical castration, on weaning weight.

Materials and Methods

Commercial crossbred nulliparous heifers were bred to Angus bulls to calve at 2 years of age. The bulls were three pairs of paternal half-sibs and had below average birth weight Expected Progeny Differences (EPDs) and average or above weaning weight EPDs as determined by the American Angus Association. Sires of the heifers were either Angus, Hereford, Limousin or Gelbvieh. The heifers were managed together but separate from older cows. They were grouped together or into two or three smaller groups, depending on available forage and pasture size. The heifers calved in January or February in one of two pastures with access to bermuda grass hay. After calving they were also allowed access to dormant bermuda grass pastures overseeded with annual rye. Male calves were tagged at birth, tattooed and weighed. At birth, male calves were randomly assigned to one of three treatment groups: castrated by banding (n=18), surgical castration (n=22) or left intact as a bull (n=20). An order of treatment assignment was established and as male calves were born they were placed in a treatment group; this treatment order was replicated until all calves were assigned to a treatment group. Calves in the banded and castrated groups were also implanted with a zeranol implant.^a Following calving, the heifers and their calves were managed together through the summer in one of three groups on bermuda grass pastures. All three treatments were represented in each pasture management group in approximately equal numbers. Calves did not have access to creep feed. Calves in the intact group were castrated and implanted with zeranol when the average age of the group was about 150 days. At this time, calves in the other two groups were re-implanted with zeranol. Calves were weighed at birth, at 150 days of age (June 20) and at weaning at an average age of 217 days (August 28).

Data were analyzed with SAS⁵ GLM procedures. The model included main effects of treatment, dam breed

^aRalgro[®] Implant, Schering-Plough Animal Health, Kenilworth, NJ.

type, dam's breeding group when bred and calf rearing group. Calf age and birth weight were included as covariates for the weight at 150 days and weaning weight. Least square means and standard errors were obtained from the SAS⁵ LSMEANS procedure associated with GLM. Average daily gain represents gain from June 20 weight to weaning and weight per day of age represent gain from birth to weaning. A POWER³ macro was performed to estimate the sample size required to provide a significant effect test. The limited number of observations per treatment will cause the power of the test to be limited. Least significant difference (LSD)⁴ is defined as the observed difference between two sample means necessary to declare the corresponding population means different. ALSD was figured for birth weight, June 20 weight, weaning weight, average daily gain and weight per day of age.

Results and Discussion

It is generally recommended that producers castrate and dehorn calves prior to weaning. With other things being equal, bull calves are usually discounted at local livestock auctions compared to steer calves. Many producers believe, however, that it is too expensive to castrate calves prior to weaning or that early castration will result in lower weaning weights. This study was designed to objectively compare three alternative methods of castration. All calves were reared by dams of the same age and sired by Angus bulls which were related and had similar growth EPD's.

Birth weights were similar for all three treatment groups (banded, castrated and intact) (Table 1). There were no significant differences for birth day of year or age at weaning for the three treatment groups. The lack of difference in birth weight and age at weaning

were as intended. It was important to minimize factors such as birth date and birth weight that influence weaning weight when evaluating effects of castration method or time of castration. These male calves began the study with equal potential for post-natal growth.

Many producers sell their calves at weaning. Weight, frame, muscle score, sex and condition influence the sale value. Therefore, producers are reluctant to perform practices that are detrimental to weight gain. In this study, the June 20 weight (150 days of age) and weaning weight (average age of 217 days) did not differ between the three treatment groups (banded, castrated and intact) (Table 1). Average daily gain and weight per day of age were similar for all three treatment groups (Table 1). Because all dams were 2 years old when they calved, it was not possible to evaluate a castration method by age of dam interaction. It is possible that mature dams could produce calves with greater growth potential early in life and therefore interact with castration method.

Whether bull calves were banded, surgically castrated shortly after birth or intact (castrated at 150 days of age) did not significantly affect intermediate weights or weaning weight. Method of castration (banded vs surgical castration) did not affect weaning weight. These data suggest that bull calves banded or castrated shortly after birth and implanted achieve weaning weights similar to those calves left intact, castrated at 150 days of age and implanted. Combining the management practices of early castration and implanting allows producers to maximize weaning weight as well as reduce the stress of castration at an older age. Other investigators have reported that age at castration (early or late (4 months)) offered no benefit for feedlot performance or carcass traits,¹ but implanting increased weaning weight.^{1,2}

Table 1. Least square means and standard errors for performance traits for all three treatment groups (banded, castrated and intact).

Treatment	Birth weight (lb)	June 20 weight (lb)	Weaning weight (lb)	Average daily gain ^a (lb)	Weight per day of age ^b (lb)
Banded	73.4 ± 2.0	336 ± 10	467 ± 11	1.67 ± .11	2.14 ± .06
Castrated	73.4 ± 1.8	344 ± 10	469 ± 10	1.69 ± .11	2.16 ± .05
Intact	75.5 ± 1.9	344 ± 9	469 ± 11	1.71 ± .10	2.18 ± .06
Level of Significance	P = 0.68	P = 0.84	P = 0.99	P = 0.96	P = 0.91
Least Significant Difference^c	5.43	22.62	29.32	.252	.161

^aAverage daily gain (lb/day) calculated by weaning weight minus June 20 weight divided by 69 days.

^bWeight per day of age (lb/day of age) calculated by weaning weight of individual divided by weaning age (days).

^cLeast Significant Difference⁶ at the level of significance of 0.05 is calculated $t(0.05) \sqrt{2s^2/r}$ where s^2 is equal to the error variance and r is equal to the number of observations per treatment.

Some cattle producers prefer banding over surgical castration at birth. A concern with banding is the possibility of leaving one or both testicles intact. In fact, in this study 2 of the 18 bulls that were banded had one testicle left intact at 150 days of age. Tetanus prophylaxis should be considered when banding or castrating calves at any age.

Conclusions

Combining early castration and implanting produces weaning weights similar to calves left intact and castrated and implanted at a older age. In addition, castrating calves shortly after birth reduces the stress of castrating calves at an older age. Early castration may be more acceptable as an animal welfare issue. Producers can benefit at weaning by castrating calves early and administering a growth implant. The null hypothesis of no significant treatment effects was accepted for all variables analyzed. However, limited observations per treatment will limit the power of test, therefore, small differences between treatments may not be detectable.

References

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EXCENEL Sterile Suspension is indicated for treatment of bovine respiratory disease (BRD, shipping fever, pneumonia) associated with *Pasteurella haemolytica*, *Pasteurella multocida* and *Haemophilus somnus*. EXCENEL Sterile Suspension is also indicated for treatment of acute bovine interdigital necrobacillosis (foot rot, pododermatitis) associated with *Fusobacterium necrophorum* and *Bacteroides melaninogenicus*.

CONTRAINDICATIONS

As with all drugs, the use of EXCENEL Sterile Suspension is contraindicated in animals previously found to be hypersensitive to the drug.

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WARNINGS

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Penicillins and cephalosporins can cause allergic reactions in sensitized individuals. Topical exposures to such antimicrobials, including ceftiofur, may elicit mild to severe allergic reactions in some individuals. Repeated or prolonged exposure may lead to sensitization. Avoid direct contact of the product with the skin, eyes, mouth, and clothing.

Persons with a known hypersensitivity to penicillin or cephalosporins should avoid exposure to this product.

In case of accidental eye exposure, flush with water for 15 minutes. In case of accidental skin exposure, wash with soap and water. Remove contaminated clothing. If allergic reaction occurs (e.g., skin rash, hives, difficult breathing), seek medical attention.

The material safety data sheet contains more detailed occupational safety information. To report adverse effects in users, to obtain more information or obtain a material safety data sheet, call 1-800-253-8600.

RESIDUE WARNINGS: Treated cattle must not be slaughtered for 48 hours (2 days) following last treatment because unsafe levels of drug remain at the injection sites. No milk discard time is required when this product is used according to label directions. Use of dosages in excess of those indicated or by unapproved routes of administration, such as intramammary, may result in illegal residues in edible tissues and/or in milk. A withdrawal period has not been established in pre-ruminating calves. Do not use in calves to be processed for veal.

PRECAUTIONS

Following intramuscular or subcutaneous administration in the neck, areas of discoloration at the site may persist beyond 11 days resulting in trim loss of edible tissues at slaughter. Following intramuscular administration in the rear leg, areas of discoloration at the injection site may persist beyond 28 days resulting in trim loss of edible tissues at slaughter.

STORAGE CONDITIONS

Store at controlled room temperature 20° to 25° C (68° to 77° F) [see USP]. Shake well before using. Protect from freezing.

HOW SUPPLIED

EXCENEL Sterile Suspension is available in the following package size: 100 mL vial

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