

ADMINISTRATION OF ANTIBIOTICS TO BEEF COWS: EFFECTS ON MASTITIS AND CALF GROWTH

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Story in Brief

Range beef cows were used to determine the effects of intramuscular treatment with oxytetracycline at drying-off and/or subsequent calving on mammary health and calf growth. Milk samples from each quarter were collected at drying-off, calving, and weaning for bacteriological and somatic cell count (SCC) analyses. Cows were assigned to four treatment groups: A) no antibiotic at drying-off and calving, B) antibiotic at drying-off, C) antibiotic at calving, D) antibiotic at drying-off and calving. The presence of infectious bacteria did not affect weaning weight. Cows with one or two dry quarters had calves with reduced adjusted weaning weights compared with calves from cows with no dry quarters (156 kg vs 180 kg, respectively). Correlations between average daily gain and maximum SCC and average SCC at weaning were -.33 and -.30, respectively. Treatments did not affect average SCC or maximum SCC per quarter at weaning. Treatment of cows at drying-off and/or after calving with intramuscular oxytetracycline did not influence calf growth, and calves from cows with one or two dry quarters had decreased growth rate.

(Key Words: Beef Cow, Mastitis, Weaning Weight.)

Introduction

Adequate weaning weights are important for cow-calf producers to maintain profitability. The lactational performance of cows is the most important factor influencing weaning weight of calves (Rutledge et al., 1971). Increased somatic cell counts in milk, and the presence of organisms that cause mastitis in beef cows are related to decreased milk production (Watts et al., 1986; Newman et al., 1991; Simpson et al., 1995). If producers can reduce mastitis in their herds, weaning weights may be increased. The objectives of this experiment were to determine the incidence of mastitis in beef cows managed under range conditions, and to determine if intramuscular antibiotics administered at drying off and/or after calving will reduce new and existing intramammary infections and increase weight gain of calves.

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Materials and Methods

Spring calving Hereford and Hereford x Angus cows (n=168) were used to determine the effects of intramuscular treatment with oxytetracycline⁵ at drying-off and/or subsequent calving on mammary health and growth of calves. Cows grazed native range at the Range Cow Research Center, 15 miles west of Stillwater, OK. Cows were assigned to four treatment groups in a 2 x 2 factorial: A) no antibiotic at drying-off and calving, B) antibiotic at drying-off, C) antibiotic at calving, and D) antibiotic at drying-off and calving.

Milk samples from each quarter were collected at drying-off, at 8 to 15 d after calving, and at weaning. Calves were separated from cows 2 to 3 hours before milk collection. Cows were confined in a squeeze chute and administered 10 units of oxytocin⁶ (i.m.) to facilitate milk let-down. Teats were dipped with .1% iodine solution and wiped dry with paper towels. Ten ml of milk were collected from each quarter into plastic vials and preserved with broad spectrum tablets⁷ and analyzed for somatic cell counts (SCC) at the Dairy Herd Improvement Laboratory, Stillwater, OK. Then teats were wiped with a cotton swab soaked in 70% ethyl alcohol, and two streams of milk from each quarter were discarded. Sterile samples (3 ml) of milk were collected from each quarter into plastic tubes and analyzed for bacteria at the Immunology and Disease Resistance Laboratory USDA-ARS, Beltsville, MD.

Weights of calves were determined at calving, mid-lactation, and at weaning. Weaning weights were adjusted to 205 d and for age of cow and sex of calf. Treatment effects on SCC number, average daily gain (ADG), and weaning weight were determined by analyses of variance. The relationship between ADG and SCC were determined by Spearman correlations.

Results and Discussion

We have previously reported that *Coagulase negative staphylococci* was the major infectious organism in cows in their first to fourth lactation, whereas *Staphylococcus aureus* was the major infectious organism in cows with 5 or more lactations (Duenas et al., 1994). One hundred and fourteen cows (68%) were infected with one or more mastitic causing bacteria (*S. coag. neg.*, *S. aureus*, and *Corynebacterium bovis*) in one or more quarters at drying-off. Infection status of the dam at weaning (before treatments were applied) did not

⁵ Liquamycin® LA-200®, Animal Health Division of Pfizer, Inc., New York, NY.

⁶ Vedco, Inc., St. Joseph, MO.

⁷ D & F Control Systems, Inc., SanRamon, CA.

influence ($P>.10$) weaning weight of calves (186 kg). It is possible that not all cows with mastitis causing bacteria had clinical mastitis.

The incidence of dry quarters increased with age of the cow (Duenas et al., 1994). Cows with one or more dry quarters at the weaning after treatment had calves with reduced weaning weights compared with calves from cows with no dry quarters (156 kg vs 180 kg, respectively; $P<.001$). Nonfunctional quarters may decrease a cow's milk production, thus adversely influencing gain of the calf.

Maximum SCC per quarter, per cow and average SCC per cow were not correlated ($P>.10$) with calf growth during the first three months of lactation. However, maximum and average SCC per cow were negatively correlated with average daily gain (ADG) of calves ($r = -.33$ and $-.30$, respectively; $P<.0005$) during the total lactation. A cow may have increased SCC during early lactation and milk production may be decreased without a major influence on calf growth. A calf may not consume the total milk output early in lactation (Newman et al., 1991), thus reduced milk production of the dam early in the life of the calf may not adversely affect calf gain. However, a calf's demand for milk may increase with age, and decreased milk production will cause reduced growth.

Average and maximum SCC at weaning were not influenced by treatment ($P>.10$) of cows with oxytetracycline at drying-off and/or after calving, and ranged from 440×10^3 to 635×10^3 cells/ml, and 154×10^3 to 232×10^3 cells/ml, respectively (Table 1).

Treatment of cows with oxytetracycline at drying-off and/or after calving did not influence ($P>.10$) early gains (first 3 months of lactation) or weaning weights of calves (Table 2). One treatment with antibiotics may reduce infections, however the cow may be reinfected and calf growth adversely influenced. Another possibility for a lack of growth response of calves to treatment of cows with antibiotics is that one treatment of cows at drying-off and/or after calving may not be adequate to decrease infections and improve milk production.

In conclusion, increased somatic cell counts and the presence of dry quarters reduce calf gains. Treatment of beef cows with intramuscular oxytetracycline at drying off and/or after calving did no alter the number of somatic cells in milk or increase growth rate of calves.

Literature Cited

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Table 1. Effect of treatment of beef cows withoxytetracycline (LA200) at weaning and/or after calving on average (AVGSCC) and Maximum (MAXSCC) somatic cell counts.

Treatment		No.	Weaning	
Drying-off	Postpartum		AVGSCC ^d	MAXSCC ^d
LA200	LA200	41	227 ± 74	635 ± 231
LA200	Control	44	198 ± 69	576 ± 244
Control	LA200	40	232 ± 72	501 ± 139
Control	Control	43	154 ± 43	440 ± 138

¹ SCC = x10³ cells/ml.

Table 2. Effect of treatment of beef cows withoxytetracycline (LA200) at weaning and/or after calving on average daily gain (ADG) and weaning weight (WW) of calves.

Treatment		No.	Criteria	
Drying-off	Postpartum		ADG (kg/d)	WW (kg)
LA200	LA200	41	.82 ± .02	180 ± 4.3
LA200	Control	44	.84 ± .02	180 ± 4.3
Control	LA200	40	.81 ± .02	175 ± 4.3
Control	Control	43	.80 ± .03	180 ± 6.5