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Milking two or five times daily in the presence of a cow's own nonsuckling calf fails to prolong postpartum anovulation

Abstract

Three treatments were initiated at approximately 15 days after calving and continued for 4 weeks: 1) cows were suckled ad libitum by their calves (calf present [CP]); 2) calves were present but nonsuckling 24 hr/day and cows were milked twice daily (CR+2xM); 3) or same as CR+2xM but cows were milked five times daily (CR+5xM). Interval to the first postpartum ovulation was similar between CR+2xM and CR+5xM cows but about 2 weeks less than that in cows suckled ad libitum by their own calves. Cows in the CR+5xM treatment produced more milk than cows in the CR+2xM treatment, whereas only slight differences occurred in the percentages of milk fat, protein, lactose, and solids-not-fat. Prior to initiation of treatments, CR+2x cows yielded more milk than either CR+5xM or CP cows, but by the end of 4 weeks of treatment, milk yields were similar among treatments. We conclude that mechanical milking either two or five times daily in the presence of a cow's own nonsuckling calf fails to prolong postpartum anovulation to the extent of ad libitum suckling. However, increasing milking frequency to 5x daily enhanced milk yield.

Keywords

Kansas Agricultural Experiment Station contribution; no. 97-309-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 804; Cattlemen's Day, 1998; Beef; Cows; Milking; Suckling; Calf presence; Anestrus

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**MILKING TWO OR FIVE TIMES DAILY IN THE
PRESENCE OF A COW'S OWN NONSUCKLING CALF
FAILS TO PROLONG POSTPARTUM ANOVULATION**

*G. C. Lamb, K. E. Thompson¹, J. S. Heldt,
C. A. Löest, and J. S. Stevenson*

Summary

Three treatments were initiated at approximately 15 days after calving and continued for 4 weeks: 1) cows were suckled ad libitum by their calves (calf present [CP]); 2) calves were present but nonsuckling 24 hr/day and cows were milked twice daily (CR+2×M); 3) or same as CR+2×M but cows were milked five times daily (CR+5×M). Interval to the first postpartum ovulation was similar between CR+2×M and CR+5×M cows but about 2 weeks less than that in cows suckled ad libitum by their own calves. Cows in the CR+5×M treatment produced more milk than cows in the CR+2×M treatment, whereas only slight differences occurred in the percentages of milk fat, protein, lactose, and solids-not-fat. Prior to initiation of treatments, CR+2×M cows yielded more milk than either CR+5×M or CP cows, but by the end of 4 weeks of treatment, milk yields were similar among treatments. We conclude that mechanical milking either two or five times daily in the presence of a cow's own nonsuckling calf fails to prolong postpartum anovulation to the extent of ad libitum suckling. However, increasing milking frequency to 5× daily enhanced milk yield.

(Key Words: Cows, Milking, Suckling, Calf Presence, Anestrus.)

Reproduction is a major factor limiting efficiency of production in beef cattle enterprises. Duration of postpartum anestrus largely determines the likelihood of pregnancy during the breeding season and maintenance of a yearly calving interval. Suckling and cow nutrition are two critical components that alter duration of postpartum anestrus. The suckling mechanism is key to maintaining anovulation; cows suckled continuously have longer postpartum intervals to first estrus than cows whose calves are weaned.

Dairy cows that are milked 3× daily tend to have longer postpartum anestrus intervals than cows only milked 2× daily, whereas those milked 6× daily remain anestrus even longer. We previously demonstrated (1997 Cattlemen's Day; KAES Report of Progress 783:99) that milking cows 2× daily in the presence of their own calves failed to prolong anovulation, whereas 2× daily suckling was sufficient to prolong anovulation. Our objectives were to determine whether milking a beef cow 5× daily in the presence of her nonsuckling calf would alter the postpartum interval to first ovulation and to evaluate the effects of milking beef cows 2× or 5× daily on milk yield and composition.

Introduction

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Experimental Procedures

During the spring of 1997, 30 Angus \times Hereford cow-calf pairs were assigned randomly on day 15 postpartum to three treatments of 10 pairs each; 1) calf was present continuously with its dam (CP); 2) calves were present but nonsuckling 24 hr/day, plus cows were milked twice daily (6:00 AM and 6:00 PM) (CR+2 \times M); and 3) calves were present 24 hr/day, plus cows were milked at 6:00 AM, 10:00 AM, 2:00 PM, 6:00 PM, and 10:00 PM daily (CR+5 \times M). Cows remained on treatments for 4 weeks, after which calves were allowed to nurse until weaning at 205 days of age. During treatments, daily blood samples were collected from cows for serum progesterone analysis. Ovulation occurred 1 to 2 days before serum progesterone exceeded .5 ng/ml for at least 2 days.

Cow-calf pairs were housed individually in pens located in two separate open-front barns. After initiating treatments on day 15 postpartum and throughout the treatment period, calves in the CR+2 \times M and CR+5 \times M treatments were confined to a hutch within their dam's pen. The hutch permitted head and neck contact between cow and calf, but no contact with the udder. Cows were fed individually to meet or exceed NRC recommendations for superior milk producers, and intakes were adjusted weekly according to changes in individual body weight and condition.

Cows assigned to the two milking treatments were milked in an enclosed restraining chute, using a portable milking machine. Milk yield was recorded at each milking, and weekly samples were collected for measurements of fat, protein, lactose, solids-not-fat (SNF), and somatic cell count (SCC). During each milking, the cow's own calf was

shuttled from its hutch to the chute where cow and calf were permitted visual, audible, tactile, and olfactory contacts during milking. To establish milk production at the onset and termination of all three treatments, pairs were separated for 8 to 10 hr and cows were milked after a 40 I.U. injection of oxytocin. Milk yield was recorded and adjusted to a 24-hr period. Individual samples also were collected for component analysis.

Results and Discussion

Average daily milk yields for CR+2 \times M and CR+5 \times M cows during the 4-week treatment period are shown in Figure 1. Average daily milk yield was 17% greater ($P < .05$) for cows milked 5 \times daily than for cows milked 2 \times daily. Therefore, increasing the frequency of milk removal enhanced total daily milk yield, which has been observed also in dairy cows.

Intervals to the first postpartum increase in serum progesterone (1 to 2 days after ovulation) are summarized in Table 1. Cows in both CR+2 \times M and CR+5 \times M treatments had similar intervals to ovulation, which were shorter ($P < .05$) than that for cows in the CP treatment. Previously (1997 Cattleman's Day; KAES Report of Progress 783:99), we demonstrated that milking cows 2 \times daily in the presence of their own nonsuckling calves (CR+2 \times M) failed to prolong postpartum anovulation to the extent observed in cows suckled 2 \times daily or ad libitum by their own calves. Moreover, increasing the frequency of milking from 2 \times to 5 \times daily also failed to prolong postpartum anestrus, unlike the situation in dairy cows. We conclude that milk removal by suckling is essential to prolong postpartum anestrus in beef cows.

Table 1. Days to First Postpartum Ovulation in Beef Cows Suckled Ad Libitum, Milked Twice Daily, or Milked Five Times Daily

Treatment ^a	No. of cows	Days to First Postpartum Increase in Progesterone (Ovulation) ^b	
		Range	Mean \pm SE
Calf restricted + cows milked twice daily (CR+2xM)	10	9 to 44	23.6 \pm 3.5 ^x
Calf restricted + cows milked five times daily (CR+5xM)	9	8 to 40	26.1 \pm 3.7 ^x
Calf present continuously (CP)	9	20 to 56	37.7 \pm 3.7 ^y

^aCows were suckled by their own calf until 4-week treatments were initiated on day 15 postpartum.

^bDays from initiation of treatments.

^{x,y}Means with uncommon superscript letters differ ($P < .01$).

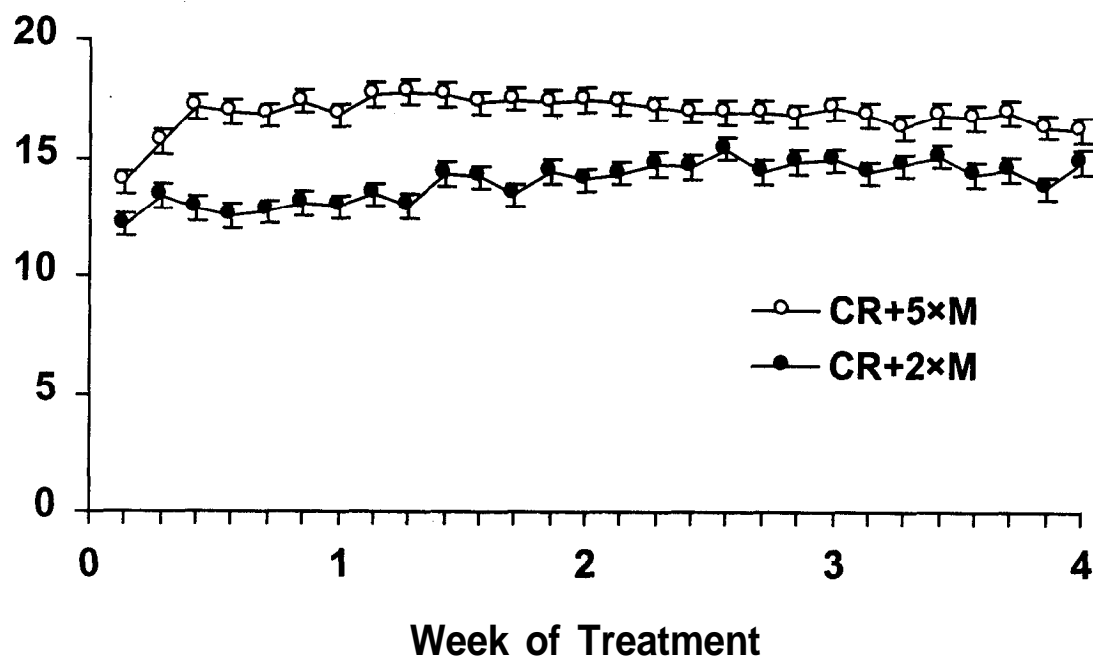


Figure 1. Average Daily Milk Yield in Cows that Were Milked during 4 Weeks Starting 15 Days Postpartum. Cows Were Suckled Ad Libitum by Their Own Calves until Treatments Began.