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Milking twice daily in the presence of a cow's own calf fails to prolong postpartum anestrus

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Abstract

Six treatment s were initiated approximately 15 days after calving: 1) calf was weaned permanently from its dam (calf weaned; CW); 2) calf was present continuously with its dam but contact with the udder was prohibited (calf restricted; CR); 3) calf was present continuously with its dam (calf present; CP); 4) CR dam was suckled twice daily by her own calf (CR+S2x); 5) CW dam was milked twice daily (CW+M2x); 6) CR dam was milked twice daily (CR+ M2x). During the 4-week treatment period , cows in the CR+M2x treatment had twofold greater yield milk and milk components than CW+M2x cows. After completing treatments, calves were returned to their dams and allowed to suckle ad libitum. At the time when suckling was reestablished, milk yield was greatest in CP cows, followed by CR+S2x, CR+M2x, and CW+M2x cows, respectively. Although, lactation in CW an dCR cows ceased, it was reinitiated after 1 week of renewed suckling, and increased further by 5 weeks. Cows milked twice daily (CR+M2x and CW+M2x) h ad their first postpartum ovulation about 2 weeks after weaning, similar to cows not milked or suckled (CW and CR). In contrast, cows suckled by their calves either twice daily (CR+S2x) or ad libitum (CP) first ovulated about 5 weeks after initiation of treatments. We concluded that milk removal by suckling, but not mechanically by milking 2x daily, is essential to prolong postpartum anestrus. Furthermore, suckling limited to 2x daily prolonged postpartum anestrus as much as ad libitum suckling.

Keywords

Cattlemen's Day, 1997; Kansas Agricultural Experiment Station contribution; no. 97-309-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 783; Beef; Milking; Suckling; Calf presence; Anestrus

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MILKING TWICE DAILY IN THE PRESENCE OF A COW'S OWN CALF FAILS TO PROLONG POSTPARTUM ANESTRUS

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Summary

Six treatments were initiated approximately 15 days after calving: 1) calf was weaned permanently from its dam (calf weaned; CW); 2) calf was present continuously with its dam but contact with the udder was prohibited (calf restricted; CR); 3) calf was present continuously with its dam (calf present; CP); 4) CR dam was suckled twice daily by her own calf (CR+S2×); 5) CW dam was milked twice daily (CW+M2×); 6) CR dam was milked twice daily (CR+ M2×). During the 4-week treatment period, cows in the CR+M2× treatment had twofold greater yield milk and milk components than CW+M2× cows. After completing treatments, calves were returned to their dams and allowed to suckle ad libitum. At the time when suckling was reestablished, milk yield was greatest in CP cows, followed by CR+S2×, CR+M2×, and CW+M2× cows, respectively. Although, lactation in CW and CR cows ceased, it was reinitiated after 1 week of renewed suckling, and increased further by 5 weeks. Cows milked twice daily (CR+M2× and CW+M2×) had their first postpartum ovulation about 2 weeks after weaning, similar to cows not milked or suckled (CW and CR). In contrast, cows suckled by their calves either twice daily (CR+S2×) or ad libitum (CP) first ovulated about 5 weeks after initiation of treatments. We concluded that milk removal by suckling, but not mechanically by milking 2× daily, is essential to prolong postpartum anestrus. Furthermore, suckling limited to 2× daily prolonged postpartum anestrus as much as ad libitum suckling.

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

Introduction

Because duration of gestation in cows limits them to one calf crop per year, loss in potential calf gains is attributed to the failure of cows to conceive during the normal breeding season. That loss can be reduced by shortening the interval to first postpartum estrus.

The cow-calf suckling interaction is a critical component in maintaining anestrus. Previous KSU research showed that cows suckled continuously had longer intervals to first estrus than cows whose calves were weaned. Maintaining cows continuously with their muzzled or nose-plated nonsuckling calves prolonged anestrus as long as when calves were allowed to suckle, because continued calf presence maintained the perception of suckling or milk removal.

Cows nursing foster calves continuously or nursing alien calves continuously in the presence of their own nonsuckling calves (their own calves were present continuously but contact with the udder was prohibited) had intervals to first ovulation similar to those of cows nursing their own calves and longer than those of weaned cows. These observations suggest that a cow must first recognize the suckling calf to be her own (bonding to her natural born calf or reforming a bond with an alien "foster" calf) before subsequent suckling will prolong anestrus. The present experiment was designed to confirm our earlier report (1996 Cattlemen's Day; KAES Report of Progress 756:22) that milking a cow 2× daily in the presence of her own udder-restricted calf would prolong the postpartum interval to first ovulation. An additional objective was to determine to what extent lactation could be reestablished after cows were neither suckled

nor milked for 4 weeks, followed by renewed ad libitum suckling by their own calf.

Experimental Procedures

Crossbred (Angus × Hereford) cow-calf pairs were used in two replicates following calvings during the spring of 1995 and 1996. Cows were assigned randomly to six treatments, 15 days after calving: 1) calf was weaned permanently from its dam (calf weaned; CW; n=9); 2) calf was present continuously with its dam but contact with the udder was prohibited (calf restricted; CR; n=9); 3) calf was present continuously with its dam (calf present; CP; n=9); 4) CR plus dam was suckled twice daily by her own calf (calf restricted + suckled; CR+S2×; n=8); 5) CW plus dam was milked twice daily (calf weaned + milked; CW+M2×; n=9); 6) CR plus dam was milked twice daily (calf restricted + milked; CR+M2×; n=9). Cows remained on treatments for 4 weeks and then were reintroduced to their calves and allowed to nurse them continuously. Daily blood samples were collected from cows to determine their first increase in serum progesterone after the initiation of treatments. Ovulation occurred 1 to 2 days before serum progesterone exceeded .5 ng/ml for at least 2 days.

Cows were fed individually to meet or exceed NRC recommendations, and intakes were adjusted weekly according to individual body weight and condition. The CW and CR cows were fed as dry second-trimester, pregnant, beef cows and the CP, CR+S2×, CW+M2×, and CR+M2× cows were fed as superior milk producers. Restricted calves in the CR and CR+M2× treatment were fed a whole-milk replacer twice daily.

Milk production was recorded daily and milk samples were collected weekly to assess contents of fat, protein, lactose, and solids-not-fat (SNF) and somatic cell counts (SCC) in the CW+M2× and CR+M2× treatments. Before and 1 and 5 weeks after reintroducing cows to their calves and suckling ad libitum, 24-hour milk production (two milkings during 24 hours after receiving 40 IU of oxytocin) and fat, protein, lactose, SNF, and SCC in milk were measured.

Results and Discussion

Average daily milk production characteristics of CW+M2× and CR+M2× cows during the 4-week treatment period are shown in Table 1. Percentage of milk components was similar between treatments, but daily yields of fat, protein, lactose, and SNF in milk were greater ($P<.05$) in CR+M2× cows than in CW+M2× cows. In addition, average daily milk production throughout the 4-week treatment period was 15.8 lb for CR+M2× compared to 8.4 lb for CW+ M2× cows. Therefore, the nonsuckling presence of a cow's calf is a critical component in maintaining milk production in milked beef cows.

Milk yield and SNF for all cows at the initial reestablishment of suckling (0 weeks) and 1 and 5 weeks later are shown in Figure 1. At the time that suckling was reestablished, CP cows had the greatest milk yield, followed by CR+S2×, CR+M2×, and CW+M2×, respectively.

Because CW and CR cows were not suckled during the 4-week treatment period, they were no longer lactating. However, after 1 week of renewed suckling, lactation in both groups was reinitiated. After 5 weeks of suckling, milk production had increased further, but not to the extent of those cows whose lactation was not interrupted.

Percentages of milk fat, milk protein, milk lactose, and milk SNF before renewed suckling were less in CW and CR cows than in the other four treatments, but after 1 week of suckling, milk composition was restored to normal percentages. Therefore, although those cows were neither suckled nor milked for 4 weeks, when suckling was reestablished, they reinitiated sufficient lactation to support a growing calf.

The postpartum interval to first increase in progesterone (first ovulation) was shorter ($P<.05$) in the CW (14.1 ± 3.1 d), CR (14.2 ± 3.1 d), CW+M2× (13.0 ± 31 d), and CR+M2× (17.2 ± 3.1 d) treatments than in the CP (34.7 ± 3.1 d) and CR+S2× (33.9 ± 3.3 d) treatments. These results contradict our earlier report (1996 Cattleman's Day; KAES Report of Progress

756:22), which indicated that anestrus was no t prolonged when a cow is milked (by machine) twice daily. In the present study, anestrus was prolonged when a cow was suckled only twice daily by her own calf.

Maintaining anestrus involves two critical components: 1) a cow must first recognize and remain bonded to her own calf and 2) milk must be removed by suckling (at least 2× daily) but not by machine milking . We conclude that milk removal by suckling is essential to prolong postpartum anestrus. Furthermore, suckling limited to twice daily prolonged postpartum anestrus as much as ad libitum suckling.

Table 1. Average Daily Milk Production Characteristics of Cows during a Four-Week Treatment Period Initiated on Day 15 Postpartum

Treatment[a]	No. of cows	Milk (lb)	Fat (lb)	Protein (lb)	Lactose (lb)	SNF[b] (lb)	SCC[c] (×1000)
CR+M2x	9	15.8[x]	.69[x]	.53[x]	.81[x]	1.43[x]	140
CW+M2x	9	8.4	.34	.28	.39	.74	104

[a]CW+M2x = calf weaned + milked and CR+M2× = calf restricted + milked.
[b]SNF = solids-not-fat.
[c]SCC = somatic cell count.
[x]Different (P < .05) from CW+M2×.

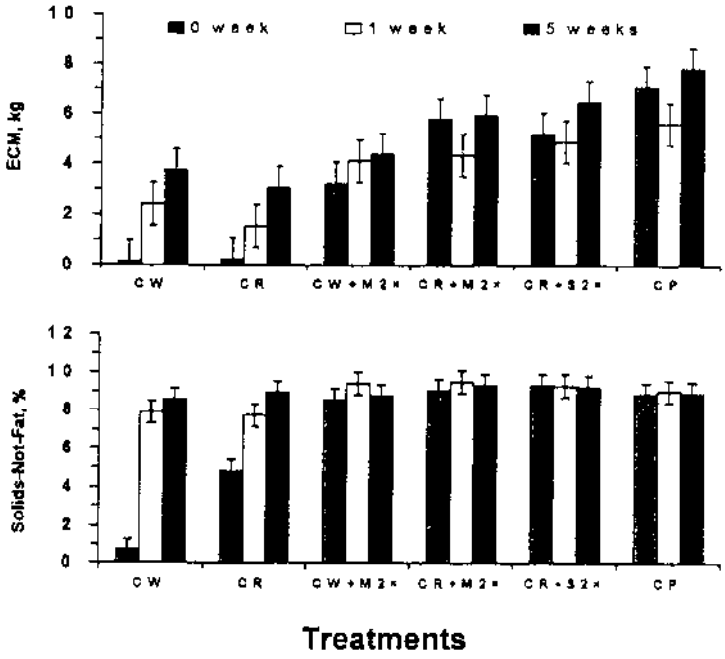

Figure 1. Energy-Corrected Milk (ECM; upper panel) and SNF (lower panel) at 0, 1, and 5 weeks in Cows after Ad Libitum Suckling was Reestablished Following the End of Treatments. Cows were suckled ad libitum until 15 days postpartum and then treatments imposed were: calves were weaned (CW); calves were udder restricted (CR); CW + milked twice daily (C W+M2×); CR + milked twice daily (CR+M2×); CR + suckled twice daily (CR+S2×); cows were suckled ad libitum (CP). Treatments continued for 4 weeks and then calves were reunited with their dams (0 week) and allowed to suckle ad libitum thereafter.