

Factors Influencing the Postpartum Anestrous Interval in Range Cows

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Story in Brief

Sixty-seven anestrous Hereford cows were used to investigate treatments that may be useful to decrease the interval from parturition until estrus. The treatments used singularly or in combinations were progesterone releasing intravaginal devices (PRID), an injection of gonadotropin releasing hormone (GnRH) and 48-hr calf separation.

The interval from parturition to the onset of cyclic ovarian activity was decreased by PRID treatment ($P < .05$). The other treatments (GnRH and calf separation) did not significantly improve ovarian function. The interval from parturition to estrus was not significantly influenced by PRID or GnRH treatment. However, there was a tendency ($P = .13$) for calf separation to decrease the interval from treatment to first estrus. These data indicate that progesterone treatment and calf separation may be potential methods to decrease the postpartum anestrous interval in beef cattle.

Introduction

Many factors influence the interval from calving until the first estrus and ovulation in beef cattle. If cows are suckling calves, the anestrous interval is longer than that for nonsuckled cows. Energy intake of the cows before and after calving and intensity of suckling of the calf also influence the length of this inactive period.

The ovary is usually nonfunctional during the postpartum period. Since treatment of cows with gonadotropic hormones will initiate ovarian function, this indicates the endogenous hormones are not being secreted. The objectives of this experiment were to determine the influence of progesterone treatment, gonadotropin releasing hormone (GnRH) and short term calf separation on ovarian function and the interval from calving to first estrus in range cows.

Experimental Procedure

Hereford cows were maintained under range conditions at the Lake Carl Blackwell Range Area and supplemented so winter weight loss, including calving loss, was between 15 and 20 percent of the November weight. The cows calved between February 25 and April 21. At 35 ± 2 days after calving, 67 anestrous cows were allotted to one of the following treatments: control, insertion of a progesterone releasing intravaginal device (PRID), injection of gonadotropin releasing hormone (GnRH) or insertion of a PRID and injection with GnRH. Half of the cows on each treatment were separated from their calves for 48 hr at 45 days postpartum and the other half were not separated (Table 1). PRID's were inserted into the vagina on about day 35 postpartum and removed after 10 days. GnRH (200 μ g) was given intramuscularly at about 47 days postpartum.

Cows were eliminated from the study and not placed on treatment if greater than 1 ng/ml progesterone was found in one of the three blood samples collected at weekly intervals before treatment or if the cows were detected in estrus before treatment. Blood

samples were obtained every other day for 40 days after treatment and progesterone concentrations were assayed as a measure of ovarian function. Bulls with chin-ball markers were used to detect estrus.

Calf separation was accomplished by trucking the cows to an isolated dry lot about one mile from their calves. The calves were maintained in an open-sided barn and were given free choice water, alfalfa hay and creep feed.

Results and Discussion

Plasma progesterone concentrations after treatment were used to determine when ovarian activity was initiated. Treatment of cows with PRID's, either alone or in combination with GnRH, decreased the interval from calving until the onset of ovarian activity ($P < .05$; Table 2). The other treatments (GnRH alone and calf separation) did not significantly influence the interval. In those cows given PRID's alone, ovarian activity had commenced by 65.2 days after calving and when cows were given PRID's and GnRH, the ovary was active by 58.9 days. However, control cows lacked ovarian activity until 70 days postpartum.

Several studies have demonstrated that plasma progesterone concentrations usually increase in postpartum anestrous cows for several days before the onset of normal cyclic ovarian activity. It is believed that this short duration of increased plasma progesterone may stimulate the hypothalamus and/or pituitary and result in gonadotropic hormone secretion. These gonadotropic hormones then stimulate the ovary to initiate ovarian function. It is possible that the progesterone released by PRID's for 10 days may mimic the increase in progesterone that usually occurs.

The interval from parturition until the first estrus was not significantly influenced by PRID or GnRH treatments (Table 3). However, there was a tendency ($P = .13$) for calf separation to decrease the anestrous interval. The first estrus occurred at 72 days after parturition in those cows that had been separated from their calves for 48 hr but it did not occur until 81.9 days in those cows that had their calves present continuously.

Table 1. Number of anestrous Hereford cows per treatment.

	Calf separation	
	None	48 hours
Control	9	8
PRID	8	8
GnRH	8	9
PRID + GnRH	8	9

PRID inserted on day 35 PP and removed on day 45. GnRH (200 μ g) injected on day 47 PP. Calves were separated from cows on day 45 PP for 48 hr.

Table 2. Days from calving to onset of ovarian activity in postpartum anestrous cows.

Treatment	Calves		Average
	Present	Separated	
Control	72.8	67.0	70.0
PRID	67.5	63.0	65.2
GnRH	70.0	71.3	70.7
PRID & GnRH	55.0	62.3	58.9
Average	66.5	66.0	66.2

Table 3. Days from calving to estrus in postpartum anestrous cows.

Treatment	Calves		Average
	Present	Separated	
Control	88.4	67.6	78.6
PRID	75.2	75.6	75.4
GnRH	85.0	69.4	76.8
PRID & GnRH	78.0	75.3	76.6
Average	81.9	72.0	76.9

The mechanism for the inhibition of estrus by suckling is not known. If calves are weaned, the interval from calving to estrus is usually decreased. Therefore, it appears that suckling blocks the secretion of gonadotropic hormones that stimulate the ovary. Calf separation may cause an increase in the secretion of gonadotropic hormones which stimulate growth and maturation of ovarian follicles. The follicles secrete estrogen and cause the onset of estrus.

Results of this experiment suggest that treatment of anestrous beef cows with progesterone and 48-hr calf separation may initiate ovarian function and decrease the postpartum anestrous interval.