

Table 7. Influence of parturition nutrition on pregnancy rate of range cows

Level of nutrition	No. pregnant/No. exposed	(% pregnant)
Moderate	11/12	(92)
Low-Low	13/17	(76)
Low-Moderate	18/19	(95)
Low-High	15/19	(79)

This study, when complete, will provide much information on the relationships between winter supplemental feeding programs, body weight loss, body condition score, blood metabolites and reproductive performance of range cows. These data should allow us to determine desirable winter feeding programs and assist in the elucidation of causes of extended intervals from calving to first estrus.

Effect of Dexamethasone on Gonadotropin Secretion in Postpartum Anestrous Range Cows

R.P. Wettemann, T.W. Beck,
E.J. Turman and B. Pratt

Story in Brief

An extended interval from calving to first estrus in beef cattle may be associated with environmental stress and, suckling which increase the secretion of adrenocorticotrophic hormone (ACTH) by the pituitary gland. Increased secretion of ACTH causes greater amounts of corticoids to be secreted by the adrenal gland. This experiment was designed to determine if treatment of anestrous cows with dexamethasone, a synthetic corticoid, would inhibit the release of ACTH by the pituitary and, as a result, alter secretion of the luteinizing hormone (LH) and alter the interval from calving to estrus. Treatment with dexamethasone did not influence the percentage of cows in estrus by 85 days after calving, however, it tended to lengthen the interval from calving to first estrus in those cows that exhibited estrus. The pattern of LH secretion was altered for several days after treatment.

Introduction

Studies with laboratory animals suggest that exposure to stressful conditions alters secretion of pituitary hormones. Stresses imposed before breeding have

been found to influence different stages of the reproductive process in many species, presumably by acting through the nerve pathways which stimulate secretion of ACTH from the pituitary. When rats are adrenalectomized and ovariectomized, the secretion of ACTH increases, and the increase in gonadotropins normally occurring after castration is not observed. This would suggest that the pituitary cannot react to ovariectomy by increasing pituitary output of gonadotropins when it needs to secrete increased amounts of ACTH in an attempt to increase the output of corticoids from the adrenal gland to combat the stress. A similar situation may exist in postpartum cattle. Environmental stress and the suckling stimulus cause release of ACTH, which could cause gonadotropin secretion to be inhibited and could result in abnormally long postpartum intervals from calving to first estrus.

Treatment of cycling heifers with synthetic corticoids will decrease serum concentrations of endogenous corticoids by decreasing ACTH secretion, but luteal function is maintained, and estrous cycle lengths are increased (Kanchev et al., 1979). These data and work by others suggest that corticoids may be involved in the regulation of gonadotropin secretion. Therefore, treatment of postpartum cows with dexamethasone (a synthetic corticoid) should inhibit ACTH, which is normally released due to stress and suckling, and may enhance gonadotropin secretion, thus stimulating ovarian activity.

Materials and Methods

Fall calving Angus and Hereford cows were maintained on tall grass native range with a sterile bull wearing a chinball marker to detect estrus. At 35 to 41 days postpartum, 11 Angus and 6 Hereford anestrous cows were randomly assigned by breed to receive injections of dexamethasone ($n=8$) or saline ($n=9$). Three days before treatment, cows were transported 12 kilometers from the range and confined in a barn.

On day 0, cows were treated intramuscularly with 20 mg of dexamethasone or saline (control). On day 1, a cannula was inserted in a jugular vein, and blood samples were collected at 10-minute intervals for 3 hours. On day 2 cows were retreated with 20 mg of dexamethasone or saline, and on day 3 blood samples were obtained at 10-minute intervals for 3 hours. On day 4, cows were treated with 5 mg of dexamethasone or saline, returned to the range and run with bulls wearing chinball markers. Serum LH was quantified in samples obtained at the frequent bleeding period on days 1 and 3 to determine gonadotropin secretion.

Results and Discussion

Five of eight cows treated with dexamethasone and six of nine control cows exhibited estrus by 85 days postpartum. Treatment of cows with dexamethasone tended ($P<.10$) to lengthen the interval from calving to first estrus compared to control treatment in those cows that were in estrus (69 ± 5 vs 58 ± 6 days, respectively).

Serum LH concentrations were similar for Angus and Hereford cows. Serum LH averaged 1.85 ng/ml and was not affected by dexamethasone treatment. However, there were significant interactions between sampling day, sampling time and dexamethasone treatment (Figure 1). This suggests that serum LH concentrations were affected differently by dexamethasone treatment on the two sampling days. The number of increases in LH that were more than one standard deviation greater than the average, during a sampling day, were not influenced by treatment.

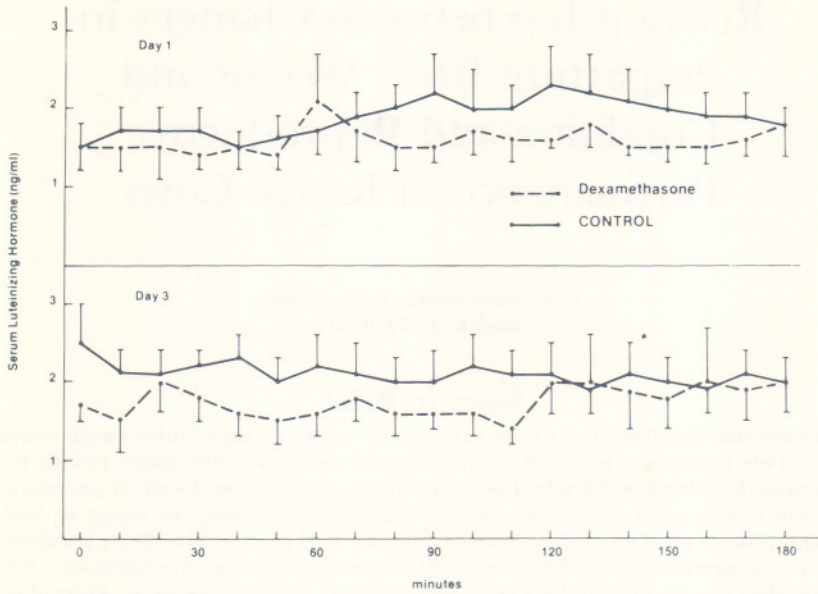


Figure 1. Serum luteinizing hormone concentrations after treatment with dexamethasone

In contrast to the original hypothesis, this experiment suggests that treatment of anestrus beef cows with dexamethasone may delay the onset of the first postpartum estrus. In addition, concentration of serum LH may be altered for several days after treatment.

Literature Cited

Kanchev et al, 1979. J. of Reprod. and Fert. 48:341.