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Induction of Parturition in Beef Cattle With Dexamethasone

D. G. Levis, A. L. Slyter and S. Cotton

Introduction

In recent years many reports have shown that synthetic glucocorticoids such as dexamethasone (DXMS) and flumethasone will induce parturition in cattle when injected intramuscularly during various stages of gestation.

A study was conducted at South Dakota State University to determine, under field conditions, the effectiveness of DXMS coupled with estradiol on the precision of parturition induction, the incidence of retained placentas and subsequent reproductive performance of beef cows.

Experimental Procedure

Forty-eight cows with known breeding dates from a cooperative producer's commercial Angus herd were assigned at random to one of three treatment groups. The three treatments consisted of (1) control, (2) 20 mg DXMS plus 5 mg estradiol and (3) 20 mg DXMS plus 10 mg estradiol. All cows were weighed on the day they were placed on their respective treatments. The cows in group 1 were weighed and received no further treatment. Group 2 and 3 cows were weighed and injected with their respective hormones intramuscularly at 8:00 a.m. on Monday, Wednesday or Friday. The time of DXMS injection in relation to the stage of gestation varied from 273 to 276 days post-conception. All group 2 and 3 cows received 20 cc of combiotic within 24 hours post calving. No further treatment was provided to cows with retained fetal membranes.

Results

In this study a successful induction was defined as one in which parturition had been accomplished within 72 hours after treatment. The effect of DXMS on the mean interval from injection to parturition is shown in table 1. Ninety-four percent of the cows in treatments 2 and 3 calved within 72 hours after treatment. Thirty-one percent of the control cows calved in the designated 72-hour period. The average number of hours from injection to calving for treatment 2 cows (31.1 hours) and treatment 3 cows (38.8 hours) was significantly reduced from the control cows (95.8 hours). There was no significant difference in the average number of hours from injection to parturition between the two DXMS treatment groups.

The major disadvantage to early induction of parturition in cattle reported in the literature is the retention of fetal membranes. In this study a retained placenta was classified as one in which visible signs of fetal membranes were

evident after 12 hours. One, two and four retained placentas were recorded in treatments 1, 2 and 3, respectively (table 1). The percentage of treated cows having retained placentas reported in this study is lower than that reported by several other workers. Four of the 6 cows with retained placentas on the two DXMS treatments conceived on the first service and the other two cows conceived on the second service. Therefore, cows with retained placentas appeared to rebreed as quickly as those not retaining fetal membranes.

Table 2 shows the effect of day of injection on interval from treatment to parturition. The mean interval from treatment to parturition decreased when the cows were treated later in gestation.

Calf birth weight, actual calf weaning weight and adjusted calf weaning weight are shown in table 3. There were no significant differences between treatment means for the three traits measured. However, calf birth weight and adjusted calf weaning weight tended to be slightly heavier for control calves than either treatment 2 or treatment 3 calves.

Cow fertility following induced parturition was not affected statistically by either of the two DXMS treatments (table 4).

Summary

A study utilizing 48 Angus cows with known breeding dates was conducted to investigate the effectiveness of dexamethasone (DXMS) plus estradiol on the precision of parturition induction, the incidence of retained placentas and subsequent reproductive performance. Ninety-four percent of the DXMS plus estrogen-treated cows calved within 72 hours following treatment compared to 31% of the controls. No statistical differences were found between treatments for number of retained placentas, calf birth weight, calf weaning weight or subsequent breeding performance of the cow.

Table 1. Effect of Dexamethasone on the Mean Interval From Injection to Parturition, Percent Calving and Retained Placentas

Item	Treatment 1 Control	Treatment 2 20 mg DXMS + 5 mg estradiol	Treatment 3 20 mg DXMS + 10 mg estradiol
No. cows	16	16	16
No. cows calving within 72 hours	5	15	15
Percent calving within 72 hours	31	94	94
Hours from injection to parturition ^a			
Mean	95.8 ^b	31.1 ^c	38.8 ^c
S.E.	14.9	3.3	3.8
Range	8.0-295.0	7.5-49.5	2.5-63.0
No. retained placentas	1	2	4

^aCalculations for T2 and T3 are only for those cows calving within 72 hours.

^{b,c}Averages on the same line not having the same superscript differ significantly (P<.01).

Table 2. Effect of Day of Injection on Interval From Treatment to Parturition

Day of gestation at injection	No. animals (T2 + T3)	Induced		
		No. animals	Mean (hr)	S.E.
273	6	5	40.3	3.21
274	11	11	36.5	4.58
275	10	9	34.9	1.49
276	5	5	26.0	11.36

Table 3. Effect of Induced Parturition on Calf Birth Weight, Actual Calf Weaning Weight and Adjusted Calf Weaning Weight

Item	Treatment 1	Treatment 2	Treatment 3
	Control	20 mg DXMS + 5 mg estradiol	20 mg DXMS + 10 mg estradiol
Calf birth weight (lb)	67.9 (16) ^a	64.8 (15)	65.5 (15)
Actual calf weaning weight (lb)	477.1 (15)	449.1 (15)	483.9 (14)
Adjusted calf weaning weight (lb)	501.9 (15)	477.9 (15)	494.9 (14)

^aNumber of animals are in parentheses.

Table 4. Cow Fertility Following Induced Parturition

Item	Treatment 1	Treatment 2	Treatment 3
	Control	20 mg DXMS + 5 mg estradiol	20 mg DXMS + 10 mg estradiol
First service conception (%)	73 (11 of 15) ^a	56 (9 of 16)	47 (7 of 16)
Services per conception	1.35 (14)	1.42 (14)	1.71 (14)
Conceptions per estrous cycle exposed	0.86 (14)	0.80 (14)	0.71 (14)
Days to conception	91.9 (14)	98.9 (14)	108.9 (14)
Calving interval (days)	368.8 (13)	371.3 (13)	380.6 (10)

^aNumber of animals are in parentheses.