

INDUCTION OF PARTURITION IN THE EWE¹

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SUMMARY

One-hundred and seventeen ewes were used in a study of induction of parturition. Ewes were treated with either 2 mg flumethasone (FLU), 15 mg prostaglandin F₂α-THAM salt (PGF) or physiological saline (control) on day 141 of gestation, as determined by dates of marking by rams. Eighty-nine percent of the ewes treated with FLU and 33% of the ewes treated with PGF lambd within 72 hr post-treatment. More (P<.01) ewes treated with PGF or FLU lambd within 72 hr than did control ewes. The interval from treatment to parturition was shorter in FLU (P<.01) and PGF (P<.05) treated ewes than in ewes given saline.

(Key Words: Parturition, Prostaglandin F₂α, Flumethasone, Sheep.)

INTRODUCTION

The ability of producers to control the time of parturition in domestic animals would be a valuable management tool. Increased utilization of facilities, reduced production costs and (or) reduced perinatal lamb losses are potential benefits of timed parturition.

Since 1969, numerous papers have appeared in the literature concerning the use of exogenous corticosteroids to induce parturition in sheep (Skinner *et al.*, 1970; Adams and Wagner, 1970; Bosc, 1971, 1972; Fylling, 1971; Emady *et al.*, 1974; Bosc *et al.*, 1977). However, results from these studies are in conflict over the

efficacy of compounds administered.

Liggins and Grieves (1971) first implicated prostaglandin F₂α (PGF) as a factor in normal parturition in the ewe. Although there is a large increase in PGF in maternal utero-ovarian venous plasma of the ewe during the last 24 hr of gestation (Challis *et al.*, 1976), PGF is ineffective in inducing delivery before day 140 of gestation (Oakes *et al.*, 1973).

Practical application of these compounds to control lambing requires further definition of day of gestation-dosage-response interval relationships. The objective of this study was to assess the efficacy of exogenous PGF and FLU to induce parturition when administered on day 141 of gestation in the ewe.

MATERIALS AND METHODS

Breeding dates were obtained for both purebred and crossbred ewes at the university sheep unit, Brookings, SD, during August through October, 1973, by use of marker rams with dye-painted briskets. Ewes were checked twice a day for "raddle marks" and their date of marking recorded. Dye colors used on marker rams were changed every 17 days, and the last marking date recorded for a particular ewe was considered to be day 1 of gestation.

On day 141 post-breeding, ewes were examined visually and those determined to be pregnant were allotted randomly within day of breeding to three treatment groups. Treatments consisted of 2 mg FLU³, 15 mg PGF⁴ and physiological saline, all administered intramuscularly (IM) in a 4-cc volume. Immediately following allotment, ewes were weighed and treated. Only ewes lambing by day 16 post-treatment were included in data reported, as it was assumed that ewes lambing after this period conceived at an estrus after the last observed breeding date. Each treatment group contained 39 animals.

Data recorded were prelambing ewe weight, total weight of lambs born, lambing difficulty score (1 = normal, . . . , 4 = extremely difficult),

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³ Flucort: .5 mg flumethasone/ml in a vehicle of polyethylene glycol and benzyl alcohol, Diamond Laboratories, Inc., Des Moines, IA.

⁴ Prostaglandin F₂α-THAM salt supplied courtesy of Dr. J. W. Lauderdale, The Upjohn Co., Kalamazoo, MI.

TABLE 1. PERCENTAGE EWES LAMBING WITHIN 72 HR POST-TREATMENT AND THE AVERAGE INTERVAL FROM TREATMENT TO LAMBING^a

Treatment	No.	Lambd within 72 hr		Mean hours	SE
		%	No.		
Flumethasone	39	89 ^a	35 ^a	50.9	2.3
PGF	39	33 ^a	13 ^a	41.7	5.9
Saline	39	8	3	38.5	10.0

^aData within columns with superscripts differ significantly from those without superscripts ($P < .01$).

evidence of retained placenta, time of lambing, sex of lambs and number of lambs per birth. Hours from treatment to parturition were then calculated.

Statistical analyses of discrete variables were performed by the method of least squares. Continuous variables were analyzed by the method of multiple regression and (or) least squares. Chi-square analysis was performed on dichotomous data.

RESULTS AND DISCUSSION

The percentage of ewes lambing within 72 hr post-treatment and their average interval from treatment to lambing are shown in table 1. Eighty-nine percent of ewes treated with FLU and 33% of the PGF-treated ewes lambd within 72 hr of treatment compared to 8% of the control ewes. The percentage of ewes treated with PGF or FLU lambing within 72 hr was greater ($P < .01$) than the percentage of control ewes lambing within the same time period. The mean interval from treatment to lambing for those ewes lambing during the 72-hr period following treatment was 50.0 ± 2.3 hr for ewes treated with FLU and 41.7 ± 5.9 hr for ewes treated with PGF. The results for the ewes treated with FLU are in agreement with the findings of Bosc (1972) and Adams and Wagner (1970), who were able to induce parturition within 72 hr in approximately 90% of ewes treated with dexamethasone during the last week of gestation. The PGF results demonstrate that, even though PGF will induce parturition in the ewe, additional studies will be required to establish adequate treatment regimens.

Analysis of variance for all ewes, whether they lambd within 72 hr of treatment or not,

indicated a difference ($P < .01$) among treatments. FLU treatment resulted in a shorter ($P < .01$) mean interval from treatment to lambing than that observed for the control treatment (67.72 *vs* 152.43 hr, respectively). PGF treatment also resulted in a shorter ($P < .05$) average time from treatment to parturition than that observed for control ewes (115.86 *vs* 152.43 hr, respectively). Hours from time of treatment to time of lambing were not affected ($P > .05$) by breed of ewe, sex of lambs or number of lambs per birth. No significant ($P > .05$) effects were found for pooled three- to five-way interactions. Lambing difficulty score was not affected by treatment ($P > .05$).

Multiple regression analysis of hours from treatment to lambing was evaluated. Weight of lamb and sex accounted for 7.0 and 3.6% ($P < .05$) of the variation in hours from treatment to parturition, respectively. However, these variables are not known prior to lambing, so they have little practical importance to the producer when selecting an induction treatment in the ewe. Age of ewe, weight of ewe and number of lambs per birth did not contribute significantly ($P > .05$) to R^2 for hours from treatment to lambing.

Based on the data reported, treatment with FLU or PGF results in premature induction of parturition in the ewe when given on day 141 of gestation. However, the percentage of ewes lambing within 72 hr of treatment was only 33% for PGF treatment, which would appear insufficient for practical producer application.

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