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Evaluation of two prostaglandin products in pregnant sows for initiation of luteolysis

Abstract

We used 66 pregnant sows to compare serum progesterone concentrations following a single injection of either saline or one of two prostaglandin F2a products approved for use in swine. Pregnant sows in a commercial swine farm were assigned to one of the three groups in a completely randomized design balanced across treatment for parity and day of gestation. Each sow received a single intramuscular dose (2 mL) on d 111, 112, or 113 of gestation. Mean serum progesterone concentrations were decreased significantly at 6 and 12 hours after dose administration of both prostaglandin products. However, these effects did not differ. Serum progesterone concentrations did not decrease significantly at any time in the control group. This indicates that regression of corpora lutea was initiated at the same time by both prostaglandin products.; Swine Day, Manhattan, KS, November 16, 2000

Keywords

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EVALUATION OF TWO PROSTAGLANDIN PRODUCTS IN PREGNANT SOWS FOR INITIATION OF LUTEOLYSIS[1]

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Summary

We used 66 pregnant sows to compare serum progesterone concentrations following a single injection of either saline or one of two prostaglandin F2α products approved for use in swine. Pregnant sows in a commercial swine farm were assigned to one of the three groups in a completely randomized design balanced across treatment for parity and day of gestation. Each sow received a single intramuscular dose (2 mL) on d 111, 112, or 113 of gestation. Mean serum progesterone concentrations were decreased significantly at 6 and 12 hours after dose administration of both prostaglandin products. However, these effects did not differ. Serum progesterone concentrations did not decrease significantly at any time in the control group. This indicates that regression of corpora lutea was initiated at the same time by both prostaglandin products.

(Key Words: Pregnant Sows, Prostaglandins, Luteolysis.)

Introduction

This study was conducted to compare progesterone blood levels in pregnant sows following a single injection of either a generic (Prostamate™, Phoenix Scientific, Inc.) or originally marketed (Lutalyse®, Pharmacia & Upjohn Company) prostaglandin product (dinoprost tromethamine) approved for use in swine. This prostaglandin is used commonly on swine farms to induce farrowing.

Procedures

The study was conducted on a commercial swine operation (Global Ventures, Inc.) in Pipestone, Minnesota. Sows were housed individually in environmentally controlled farrowing facilities. Water was provided ad libitum, and feed was offered at least three times daily according to the farm's standard procedures. On the day prior to dosing, animal identification, farrowing date, and parity were confirmed, and animals were assigned randomly to treatment groups balanced across day of gestation and parity. Sows that had already farrowed or were off feed were excluded from the study. Sixty-six pregnant sows were assigned randomly to one of three dose groups. Identity of the test materials (saline, ProstaMate™ and Lutalyse®) was not revealed to KSU personnel or farm staff until after the trial had concluded. Each sow received a single intramuscular dose (2 mL) of her assigned product on d 111, 112, or 113 (Day 0 was onset of estrus) of gestation. The KSU staff administering the injections knew only the group designation (1, 2, or 3). The farrowing supervisor observed all gilts and sows at least once daily for general health

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and appearance from 2 days before to 5 days after administration of the test materials.

Blood samples were collected from each animal via the anterior vena cava or jugular vein prior to dosing and at approximately 6 and 12 hours after dose administration. Concentrations of serum progesterone were analyzed using a radioimmunoassay technique. The data were analyzed using a repeated measures mixed effects model in SAS® The fixed effects included treatment (1, 2, or 3); time period after treatment administration (0, 6, or 12 hours); and the interaction between treatment and time period. The sow within treatment term was specified as a random effect. The means were reported as least square means using a Satterthwaite correction for the degrees of freedom.

Results and Discussion

The farrowing supervisor noted no abnormal behavior in any of the study animals. She noted that animals in Groups 2 and 3 showed more agitation along with chewing and nesting behaviors prior to farrowing, although she did not document any differences between those two groups. Two days after dosing, she accurately guessed that animals in Group 1 received the saline, because they did not exhibit these behaviors and many had not yet farrowed.

Mean serum progesterone concentrations were decreased significantly at 6 and 12 hours after administration of both prostaglandin products (Table 1). However, no statistically significant differences occurred between the effects of the two products. Mean serum progesterone concentrations did not decrease significantly at any time in the control (saline) group. The serum concentrations of progesterone in this study indicate that luteolysis or regression of the copora lutea of pregnancy was initiated at the same time for both products. Because this is the initial mechanism leading to farrowing after prostaglandin injection, the two products should be equally efficacious for induction of farrowing.

Table 1. Effects of Prostaglandin Products on Serum Progesterone Concentrations in Pregnant Sows (ng/mL)[a]

Time (hr)	Group 1 (saline)	Group 2 (Prostamate™)	Group 3 (Lutalyse®)
0	479	4.58^{x}	4.46^{x}
6	451	4.01^{y}	3.92^{y}
12	4.51^{b}	2.96^{c,z}	2.46^{c,z}
SEM	±0.21	±0.21	±0.22
N	22	23	21

[a]Time by treatment interaction (P<0.001).

[b,c]Means within rows with unlike superscripts are significantly different (P<0.05).

[x,y,z]Means within columns with unlike superscripts are significantly different (P<0.05).

N=number of sows dosed.