Treatment of Anestrous Gilts With Estradiol Valerate to Induce Estrus

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Story in Brief

A group of 24 anestrous gilts were injected with either 0.25 or 1.0 mg. of estradiol valerate in an attempt to initiate estrus and ovulation. Fourteen (87.5 percent) of the 16 treated gilts exhibited estrus within eight days after treatment, whereas only two of the eight control gilts (25 percent) were in estrus during that period.

Gilts given the high dose of estradiol tended to exhibit estrus sooner and remain in estrus longer than gilts on the low dose. Prior to treatment, plasma progesterone averaged less than 0.5 ng/ml and increased to greater than 10 ng/ml by 14 days after treatment in 10 of the 14 gilts in which estrus was induced. These data suggest that ovulation occurred at the induced estrus.

Introduction

Although some gilts are of breeding size and age, they do not exhibit estrus. This anestrous condition may be caused by a lack of ovarian follicular growth so estrogen is not synthesized and ovulating hormone is not released from the anterior pituitary. Studies with cattle and sheep suggest that injection of estrogen will cause release of ovulating hormone as well as the induction of estrus.

The purpose of this study was to determine if injection of estradiol valerate would induce estrus in anestrous gilts and to determine if ovulation occurs at the induced estrus.

Materials and Methods

A group of 24 gilts of Duroc, Hampshire and Yorkshire breeding in the Fort Reno swine breeding herd were used in this study. The gilts averaged 270 lbs. and were at least 8.5 months of age. These gilts had not exhibited estrus prior to being allotted to this study. Gilts were randomly divided into three treatment groups and injected subcutaneously with 1 ml of corn oil (control), 0.25 mg of estradiol valerate in 1 ml of corn oil or 1.0 mg of estradiol valerate in 1 ml of corn oil.

Blood samples were collected from all gilts just prior to treatment and at 14 days after treatment by puncture of the anterior vena cava and plasma progesterone was quantified by radioimmunoassay. Gilts

were checked for estrus daily and were inseminated at the second estrus after treatment. The gilts were slaughtered 57 days after treatment and ovarian activity and pregnancy were determined.

Results and Discussion

Injection of either the low (0.25 mg) or high (1.0 mg) dose of estradiol valerate induced estrus in 7 of the 8 gilts within 8 days (Table 1). During the same period only 2 of the control gilts exhibited estrus. Gilts given the high dose of estradiol were in estrus sooner (2.6 vs. 4.1 days after treatment) and remained in estrus longer (3.4 vs. 2.6 days) than gilts on the low dose.

Five of the gilts in the low group returned to estrus within 18 to 24 days after the first estrus but only two gilts on the high group returned during this period. It appears the injection of 0.25 mg. of estradiol initiated normal estrous cycles. All gilts bred at the second estrus after treatment conceived so the percentage of the treated gilts pregnant was slightly greater for those given the low level of estradiol.

Prior to treatment, all gilts had less than 0.5 ng of progesterone per ml. of blood (Table 2). These results suggest that the ovaries were inactive. It is assumed that if corpora lutea (CL) were present, they would secrete greater than 1 ng/ml of progesterone during at least 70 percent of the estrus cycle. At 14 days after treatment, plasma progesterone was greater than 10 ng/ml in 10 of the 14 gilts in which estrus was induced. This suggests that ovulation occurred in 71 percent of the induced estrus.

When slaughtered at 57 days after treatment, 62, 37 and 62 percent of the gilts on control, 0.25 mg of estradiol and 1.0 mg of estradiol,

Table 1. Reproductive Performance of Gilts After Treatment with Estradiol Valerate

Criteria	Treatment		
	Control	0.25 mg E.V.[1]	1.0 mg E.V.
No. gilts per treatment	8	8	8
No. gilts in estrus by 8 days after treatment	2	7	7
Duration of first estrus, days	2.0	2.6	3.4
No. gilts in estrus on days 18 to 24 after first estrus	2	5	2
No. gilts bred at second normal estrus	3	5	3
No. gilts pregnant	3	5	3
Percent of treated gilts pregnant at slaughter	38	62	38

[1] Estradiol valerate (0.25 or 1.0 mg) was injected subcutaneously in one ml of corn oil.

Table 2. Endocrine and Ovarian Activity of Anestrous Gilts Before and After Treatment with Estradiol Valerate

Criteria	Treatment		
	Control	0.25 mg E.V.[1]	1.0 mg E.V.
No. gilts per treatment	8	8	8
Plasma progesterone before treatment, ng/ml	0.5	0.5	0.5
No. gilts with 10 ng/ml progesterone at 14 days after treatment	3	5	5
Mean plasma progesterone in gilts that had functional CL, ng/ml	28.5	24.8	16.6
Gilts with inactive ovaries at 57 days after treatment, %	62	38	62

[1] Estradiol valerate (0.25 or 1.0 mg) was injected subcutaneously in one ml of corn oil.

respectively, had inactive ovaries. None of the ovaries appeared pathologic. All gilts on the low dose of estradiol that ovulated at the induced estrus started to cycle and were pregnant at slaughter, but few of the ovulating gilts on the high dose continued to cycle. There appears to be a difference in the duration of estrus and the ovulatory response due to dose of estradiol.