The effect of intravaginal application of estradiol and progesterone on porcine embryo development

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Abstract

This study was designed to check whether intravaginal application of estradiol and progesterone on chosen days of early pregnancy affects the development and survival of porcine embryos. Cross-bred gilts were assigned to control (C-1 and C-2) or experimental (T-1 and T-2) groups. Systemic blood samples were collected in groups C-1 and T-1 on days 3-18 of pregnancy. Gilts of control groups were supplied on days 2-6 and 12-17 of pregnancy with intravaginal cocoa butter suppositories. Gilts of experimental groups were intravaginally supplied on days 2-6 of pregnancy with estradiol (0.2 mg) to improve uterine blood supply and on days 12-17 of pregnancy with progesterone (0.25 mg) to stimulate the secretory function of the endometrium during the periimplantation period. Systemic concentration of progesterone was elevated on days 3-6 and of estradiol on days 4, 5 and 10 of pregnancy in the experimental groups in comparison with the control gilts. The weight of the ovary and number of corpora lutea were similar in the control and experimental groups, but the number of follicles over 3 mm in diameter was higher in the experimental groups than in control (P < 0.01) on day 30 of pregnancy. The mean ovulation rate, total number of embryos and rate of embryo survival on day 30 of pregnancy were similar in the control and experimental groups. However, the weight, crown-rump length and width of embryos were greater in the experimental groups than in control (P < 0.001). The results demonstrated that the intravaginal application of estradiol and progesterone on precisely chosen days of early pregnancy stimulated embryo development. This study demonstrated that the timing of hormone administration must comply with the physiological effect of estradiol and progesterone on uterine blood supply to ensure embryo development and survival.

Key words: gilts, early pregnancy, embryo, local transfer, steroid hormones

Introduction

Embryonal losses in the pig are estimated to be about 10-40% (Lambert 1991, Gordon et al. 1997). Embryonal mortality occurs during the first days after fertilization and during implantation (Wathes 1992). It has been demonstrated that non-infectious causes account for 70% or even more of porcine embryo death (Christianson 1992, Vanroose 2000). Due to the key role of progesterone in the maintenance of preg-