Prolonged use of a progesterone-releasing intravaginal device (CIDR®) for induction of persistent follicles in bovine embryo recipients

A.P. Mantovani¹, E.L. Reis¹, G. Gacek¹,², G.A. Bô³, M. Binelli¹, P.S. Baruselli¹,⁴

¹Departmento de Reprodução Animal, FMVZ-USP, CEP 05508-000 São Paulo, Brasil
²Universidade Santo Amaro/UNISA, São Paulo, Brasil
³Instituto de Reproducción Animal, J.L. de Cabrera 106, X5000GVD Córdoba, Argentina

Abstract

Embryonic mortality after embryo transfer causes substantial economic losses in the cattle industry. This has been related to the inability of the corpus luteum (CL) to secrete enough progesterone (P₄) to prepare the endometrium for embryo implantation and maintain pregnancy. Thus, the objective of this experiment was to evaluate the effects of treatments that induce ovulation of a persistent follicle and formation of a larger CL that secretes more P₄ on the conception rate (number pregnant/number that received an embryo) of recipients following embryo transfer. Two hundred seventy-eight crossbred Bos taurus x Bos indicus heifers were randomly allocated to one of four groups. Group 1 (G1, n = 70) received 2 mg estradiol benzoate (EB) + 50 mg of P₄ at the time a progesterone-releasing intravaginal device (CIDR®) was inserted (Day 0), 0.53 mg of cloprostenol (PGF₂α; prostaglandin F₂α analogue) at the time of CIDR® removal (Day 8), and 0.5 mg EB on Day 9. Group 2 (G2, n = 71) received a CIDR® and 2 mg of EB + 50 mg of P₄ at CIDR insertion (Day 0) and a PGF₂α treatment on Day 0 and Day 5. The CIDR® was removed on Day 14, and 0.5 mg of EB was given on Day 15. Group 3 (G3, n = 67) was similar to G2, except that an injection of PGF₂α was given on Day 5. Group 4 (n = 70) was similar to G2, however, these heifers received PGF₂α both at the time of CIDR® insertion and removal. Eight days after the second EB administration, heifers of all groups were selected to receive a frozen-thawed in vivo produced embryo by direct transfer. Mean (± SEM) diameter (mm) of the dominant follicle one day after CIDR® removal was larger in heifers in G2 (11.1 ± 0.3), G3 (10.6 ± 0.4), and G4 (10.6 ± 0.3) than in G1 (7.8 ± 0.4). The mean CL area (cm²), plasma P₄ concentrations (ng/ml), and recipient selection rate (number that received an embryo/number in treatment group) was greater in G2 (2.3 ± 0.1; 3.8 ± 0.2; 77.4%) and G3 (2.4 ± 0.1; 3.8 ± 0.3; 74.6%) than in G1 (1.9 ± 0.1; 2.3 ± 0.2; 51.4%), but mean values in G4 (2.2 ± 0.1; 3.1 ± 0.3; 68.6%) were not different from those of other groups. Conception rate was lower in G2 (38.9%; 21/55) and G3 (37.1%; 19/50) than in G1 (59.1%; 21/36), but conception rate in G4 (50.0%; 21/36) was not different from that of the other groups. Pregnancy rate (number pregnant/number in treatment group) was not different among groups. These results showed that a long-term CIDR® treatment with PGF₂α administered at the beginning of the treatment effectively caused the formation and ovulation of a persistent follicle and resulted in a larger CL that provided a higher P₄ concentration. However, the induction of a persistent follicle reduced conception rates following embryo transfer.

Keywords: persistent follicle; progesterone; corpus luteum; embryo transfer