

Reproductive hormones of pregnant mares in early aluteal cycles and reproductive parameters of cycles following treatment

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An aluteal cycle, a progesterone-deprived environment, can be induced in mares by serial administration of prostaglandin F_{2α} (PGF_{2α}) after ovulation. We determined reproductive hormone profiles of pregnant mares in first 7 days of aluteal cycles and reproductive parameters of cycles after treatment. We hypothesized that: 1) pregnant mares sustain concentrations of plasma luteinizing hormone (LH) in early aluteal cycles; 2) occurrence of multiple ovulations are greater in post treatment cycles of aluteal cycle mares compared to control cycle mares; 3) interovulatory interval (IOI) of aluteal cycle mares is shorter than the IOI of control cycle mares. After ovulation, 8 light breed cycling mares were randomly assigned to 1 of the following 3 treatment cycles; control: serial treatment of saline solution; aluteal: serial treatment of PGF_{2α}; aluteal supplemented: serial treatment of PGF_{2α} + a single injection of long-acting altrenogest. Each mare was subjected to all 3 treatment cycles in a randomized order. Embryos were collected on day 7 via uterine lavage to confirm pregnancy. The dosage of serial treatment of PGF_{2α} has been described.¹ A single long acting injection of 225 mg of altrenogest (BioRelease Altrenogest LA 150, BET Pharm, Lexington, KY) was given IM to mares on day 0 (i.e. day of ovulation) in aluteal-supplemented cycles. All mares received 10 mg of PGF_{2α} IM immediately after embryo collection. Daily blood samples from all mares were collected from days 0 to 7. Plasma concentrations of progesterone, LH, and follicle stimulating hormone (FSH) were measured by radioimmunoassays in samples collected daily from days 0 to 7. Hormone concentrations, number of multiple ovulations, and IOI were analyzed using ANOVA or Chi square, as appropriate. The overall p value was set to d 0.05 for statistical significance. The IOI is reported as mean ± SEM. Mean concentrations of plasma progesterone remained below 1.0 ng/ml for the first 7 days in aluteal cycles and aluteal supplemented cycles; both were lower than control cycles starting from days 3 to 7. Mean concentrations of plasma LH were greater in aluteal cycles than the other 2 cycles from days 1 to 7, but plasma FSH concentrations were not significantly different among treatment cycles. Multiple ovulations were more common in aluteal cycles (63%; 10/16) compared to aluteal supplemented cycles (13%, 2/15), but not control cycles (34%, 14/41). Mean IOIs after aluteal cycles (12.7 ± 0.7 days) were shorter than control (17.0 ± 0.4 days) and aluteal supplemented cycles (15.9 ± 0.6 days). In conclusion, mares with aluteal cycles had a characteristic hormonal profile of low plasma progesterone and persistently elevated plasma LH concentrations. Occurrence of multiple ovulations in aluteal cycle mares was greater than aluteal supplemented cycle mares and the following IOI in aluteal cycle mares was shortened. These results may lead to novel strategies to manipulate the reproductive cycle of mares.

Keywords: Aluteal, equine, LH, PGF_{2α}, progesterone

Reference

1. Coffman EA, Pinto CRF, Snyder HK, et al: Antiluteogenic effects of serial prostaglandin F_{2α} administration in cycling mares. *Theriogenology* 2014;82:1241-1245.

