The effect of repeated PGF$_{2\alpha}$-induced antiluteogenesis in the interovulatory interval of mares

K.K. DiMiceli,a J.C. Ferreira,b F.F.P.C. Barros,a M. Leuvrais,a,c C.S. Whisnant,d C.R. Pintoa

aDepartment of Veterinary Clinical Science, School of Veterinary Medicine and bSchool of Animal Sciences, Louisiana State University, Baton Rouge, LA; cÉcole Nationale Vétérinaire de Toulouse, France; dDepartment of Animal Science, North Carolina State University, Raleigh, NC

Serial administration of prostaglandin F2alpha (PGF$_{2\alpha}$) in the early post-ovulatory period has been recently shown to prevent the formation of the corpus luteum.1 In the present study, we proposed to assess the effects of PGF2$_{\alpha}$-induced antiluteogenesis on follicular dynamics and luteal function of cycling mares treated during two consecutive cycles. We hypothesized that: 1) serial administration of multiple doses of PGF$_{2\alpha}$ to mares during early diestrus would prevent luteal function (antiluteogenesis) and induce return to estrus and normal ovulation; 2) the interovulatory interval (IOI) between ovulations following antiluteogenic treatments would be shorter than the IOI of control cycles. Palpations per rectum and transrectal ultrasonography were used to examine four cycling mixed light breed mares (9-16 years old) during the months of June, July and August in the Northern hemisphere housed at Louisiana State University. On cycle 1, within 12 hours from detection of ovulation, mares were treated with 10 mg PGF$_{2\alpha}$ (dinoprost) twice daily on days 0, 1, and 2 and then once daily on days 3 and 4; this treatment was repeated when mares ovulated again in the post-treatment cycle following the initial antiluteogenic protocol (cycle 2). Plasma samples were obtained daily for progesterone RIA analyses. Interovulatory intervals (days) and concentrations of plasma progesterone (ng/mL) were analyzed by ANOVA repeated measures with significance set at P $\leq$ 0.05. Administration of exogenous PGF$_{2\alpha}$ successfully prevented formation of the corpus luteum in all mares as mean concentrations of plasma progesterone remained below 1.0 ng/mL during all IOI. Mean (±SD) days for IOI following for both antiluteogenesis treatment periods were significantly reduced (11.5±2.6 and 13.2±2.6) when compared with the IOI for control cycles (21±1.4; P < 0.05). Ovulations in mares in the post-treatment cycles (cycle 3) following two periods of antiluteogenic treatments were followed by normal luteal development and function. Antiluteogenesis can be reliably applied with serial PGF$_{2\alpha}$ administrations that result in the induction of apparently normal ovulatory cycles. Repeated antiluteogenic protocol may provide a novel approach to manipulate the equine estrous cycle.

Keywords: antiluteogenesis, dinoprost, horses, ovulation, PGF$_{2\alpha}$, luteal function

Reference