Use of the prostaglandin E1 analog misoprostol to hasten oviductal transport of equine embryos
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Non-surgical collection of small equine embryos for cryopreservation is recommended at day 6.5 to 7 after ovulation. Collection at day 7 or later will yield large embryos which are not suitable for standard cryopreservation techniques; however, embryo recovery rates are lower for day 6.5 to 7 than for day 7 and later. In horses, the embryo secretes prostaglandin E2 (PGE2) around day 5 after ovulation. This embryonic hormone acts locally into the oviduct, stimulating rapid movement of the embryo and its entry into the uterus some 24 h later. Local administration of PGE2 hastens oviductal transport of equine embryos, but involves abdominal surgery and is unpractical for the sole purpose of recovering small embryos for cryopreservation. Misoprostol is a potent synthetic prostaglandin E analog and can be administered orally, but may affect progesterone production by the corpus luteum as PGE is involved in several luteal pathways.

Hypotheses: We propose that the treatment of early pregnant mares with oral misoprostol on day 5 after ovulation will hasten oviductal transport of equine embryos thus increasing recovery rates at day 6; and will also affect progesterone levels.

Objective: To compare the time of embryo recovery (day 6 vs. day 6.5 after ovulation) and progesterone levels for mares treated with two doses of oral misoprostol versus untreated controls.

Materials and methods: Fifteen cycling mares of mixed light breeds, 3 to 17 year-old, were used. Following detection of endometrial edema and a preovulatory (>35 mm) follicle, ovarian activity was monitored twice daily and mares were artificially inseminated with ≥ 0.5 x 10^9 motile spermatozoa every other day until ovulation was detected (ovulation day = day 0). Bred mares were randomly assigned to the untreated control group or misoprostol group. Misoprostol was given orally at 0.009 mg/kg BW, on days 5 and 5.5 after ovulation. On day 6 after ovulation, standard non-surgical embryo recovery was attempted; if an embryo was not recovered, a second attempt was carried out on day 6.5 after ovulation. The time at which the embryo was obtained in each group for each mare (paired samples) was the end point for the statistical analysis; therefore, only mares that yielded an embryo in both groups were included in the analysis. After the initial randomized assignment, mares alternated experimental groups until an embryo was recovered, then she was assigned to the other group until the second embryo was recovered. Cycles with unilateral double ovulation were excluded. Blood samples were taken from the jugular vein at 12 h intervals from day 5 to day 6.5, progesterone concentrations were determined by RIA, and results were analyzed as repeated measures and compared as LSM.

Results: eight mares yielded an embryo in both experimental groups; 7 out of the 8 embryos were recovered on day 6 and the remaining embryo was recovered on day 6.5 in each group (different mares). Progesterone concentrations were not significantly different (p > 0.05) for control vs. misoprostol groups (12.5 ± 1.3 ng/ml vs. 11.8 ± 1.2 ng/ml, LSM ± SEM). In conclusion, we were not able to accept or reject the hypothesis that misoprostol hastens oviductal transport of equine embryos; however, we showed that oral misoprostol at the given dose does not affect progesterone concentration. In this experiment, the recovery rate at day 6 did not significantly improve by waiting 12 more hours in contradiction with traditional literature; further research is needed in this area.

Keywords: Equine, PGE, misoprostol, embryo recovery, oviductal transport