Effects of lactoferrin on post-breeding uterine inflammation in the mare
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Post-breeding endometritis is a normal inflammatory reaction of the uterus to sperm that usually subsides within 48 h. However, in some mares, post-breeding inflammation persists for >48 h and negatively affects fertility. Lactoferrin has been shown to play a key role in modulating the inflammatory process in other species. Our objective was to determine the effects of lactoferrin on the post-breeding inflammatory process of the endometrium. Our hypothesis was that lactoferrin would modulate the inflammatory process post-breeding by altering expression of pro-inflammatory cytokines in the endometrium. Six cycling mares were randomly allotted to receive either the control treatment (semen only) or lactoferrin (semen + 1 g lactoferrin) in a cross-over design. When in estrus, mares were inseminated with 1 x 10^9 dead sperm diluted in 50 mL of skim milk based extender with or without 1 g of lactoferrin, and received 2500 IU of human chorionic gonadotropin (hCG) to induce ovulation. Mares were then evaluated daily to determine the time of ovulation and the amount of intrauterine fluid (0 = none; 4 = large). Endometrial culture, cytology, and biopsy were collected approximately at 24 h post-insemination. An endometrial swab was submitted for aerobic culture and the amount of bacterial growth was determined (0 = no growth; 4 = heavy growth). Endometrial cytology was stained with modified Wright Giemsa stain and evaluated to determine the percentage of white blood cells (WBC) in the smear. Endometrial biopsies were immediately frozen and then evaluated by RT-PCR to determine expression of the following genes: IL-1β, IL-6, IL-8, IL-10, and TNF-α. Data were analyzed by Wilcoxon Rank Sum test and significance was set at P<0.05. Ovulation was detected in all mares within 48 h of hCG administration. Twenty four hours after insemination, there were no significant differences between control and lactoferrin groups for intrauterine fluid (2.2 vs. 1.7), bacterial growth (1.2 vs. 0.8), and percentage of WBCs (37.3 vs. 21%). However, there was a decrease in the expression of the pro-inflammatory cytokines IL-1 (P<0.05) and IL-8 (P<0.07). These results are supportive of our hypothesis that lactoferrin modulates the uterine inflammation post-breeding by potentially altering the expression of pro-inflammatory cytokines. Overall, post-breeding inflammatory reaction in the uterus of mares receiving lactoferrin was milder than in control mares. Results from this pilot study are encouraging and warrant further investigation using a larger number of animals.

Keywords: Lactoferrin, endometritis, inflammation, equine, mare

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