Decreased competence of uterine response to uterine lavage with lactated Ringer’s solution in diestrus and clenbuterol treated mares
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Uterine lavage with various solutions causes acute endometritis in the mare varying in duration and severity. The objective of this study was to assess the influence of estrous cycle stages and uterine motility on the uterine response after a uterine lavage (UL) with 2 L of lactated Ringer’s solution. It was hypothesized that such a UL induces a transient acute endometritis with a greater intensity in diestrus, which could be partly explained by decreased uterine motility. Each of the same five mares (mean age 11 y, SD=1.9) received three successive ULs at four month intervals: the first was performed 7 d after ovulation (dierstrus group or D), the second and third during estrus with a 35 mm follicle after hCG injection, with tocolytic treatment (1.5 mg IV; Ventipulmin, Boehringer Ingelheim, Burlington, ON, Canada) 40 h after the third UL (estrus group or E and estrus treated group or ETx). Just before each UL (day 0) and on days 1, 2, and 4, a standard uterine culture was taken, mean of neutrophils from the cytobrush-collected specimens (Fisher Scientific, Whitby, ON, Canada) were counted microscopically in 10 fields (400 x magnification). From day 0 to day 4, blood was also taken for progesterone assay and complete genital examination was performed including cervical flaccidity scoring, ultrasound grading or measures of endometrial edema, diameters of uterine body and horns, intraluminal fluid and air (Aloka 500, Imago, Vaudreuil, QC, Canada). Means of log of neutrophil counts, means of uterine diameters, cervical flaccidity, presence of fluid and progesterone concentrations were analyzed using a linear regression model with repeated measures; and the effects of the day and of the group on bacteriological and edema scores, and presence of air were analyzed with the Cochran-Mantel-Haensel test (SAS 9.1 software, Cary, NC).

Cervical flaccidity, endometrial edema and uterine diameters were significantly different between groups D and E at day 0, no significant difference between these parameters was observed by day 2. Prevalence of air within the uterus increased (p=0.008) earlier in group D (at day 1) versus E (day 2), and by day 2 did not differ significantly between the three groups. Progesterone profiles were significantly higher in group D versus E until day 3. Bacterial growth scores (from 0 to 5, positive by 2) increased at day 2 (p=0.04) in group D (mean=3.4, SD=1.8) versus E (mean=1, SD=0.7). Neutrophil counts were higher (p=0.0002) at day 2 in group D (mean=58.4, SD=90.8) versus E (mean=1.8, SD=1.6). The uteri of ETx mares presented an intermediate response when compared to group D: no significant difference of neutrophil counts and bacterial scores at day 2, of progesterone concentrations by day 3, increase in cervix flaccidity (p=0.04) and decrease in endometrial edema (p=0.03) at day 4. Depressed diestral mechanical uterine clearance, caused by a closed cervix and decreased uterine contractions, very probably plays a role in neutrophil and bacteria clearing from the lumen. Exfoliative endometrial cytology indicates not only the inflammatory intensity but also the uterine clearance function.

Keywords: Equine endometritis, exfoliative cytology, uterine lavage, uterine clearance, clenbuterol