Effect of Pre-Insemination Uterine Lavage on Fertility in a Population of Subfertile Mares

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Uterine lavage is commonly used in the peri-ovulatory period to improve pregnancy rates in mares with reduced fertility. Previous work has shown that uterine lavage with lactated Ringer’s solution performed immediately before insemination does not affect the fertility in reproductively healthy mares. In the present field study, uterine lavage using lactated Ringer’s solution was performed on a population of barren mares (n = 97) immediately before insemination with fresh, cooled, or frozen semen. Sixty-four (64/97, 68%) mares delivered live foals after this treatment. These data suggest that uterine lavage immediately before breeding is not detrimental to fertility and can improve pregnancy rates in previously barren mares. Authors’ addresses: Veterinari Associati Ippovet, Cascina Longora, Carpiano (Milano) Italy 20080 (Livini, Zamboni); Selectet Breeders Services, Europe via Argine Capoluogo 39 San Daniele Po, Cremona 26046 Italy (Necchi); e-mail: marcolivini@libero.it. *Corresponding and presenting author. © 2013 AAEP.

1. Introduction

Uterine lavage with the use of lactated Ringer’s solution or saline (0.9% NaCl), is a well-documented therapy for mares with post–mating-induced endometritis. Uterine lavage is often combined with administration of oxytocin or cloprostenol in the peri-ovulatory period1–4 to improve physical clearance of uterine fluid in susceptible mares that are unable to resolve the physiological inflammation that occurs after breeding. Uterine lavage in normal or susceptible mares 4 to 6 hours after insemination3 did not show negative effects on fertility rates, and this practice is frequently used. More recently, Vanderwall and Woods5 demonstrated that uterine lavage with lactated Ringer’s solution performed immediately before insemination with cooled semen did not affect fertility in reproductively normal mares. The objective of this study was to determine the usefulness of flushing before insemination (FPI) in mares with known fertility problems. We hypothesized that in mares with fertility problems, a uterine lavage with lactated Ringer’s solution performed immediately before the insemination (FPI) would improve the uterine environment for survival and ascent of the spermatozoa to the oviducts, in particular when there is the presence of fluid in the uterus at the time of insemination. Flushing can also remove biofilms, which can act as a substrate for pathogenic organisms introduced at the time of insemination. Uterine lavage before breeding might also aid in removal of excess mucus on the surface of the endometrium that may interfere with the motility of the spermatozoa and mucociliary function.

2. Materials and Methods

A total of 97 mares from various breeds (32 Standardbred, 43 Warmblood, 17 Quarter Horses, 1 Haflinger), from ages 4 to 23 years, were used in the
study during the breeding seasons 2009 to 2011. Ninety-one mares were inseminated with fresh or cooled semen; six of the mares were inseminated with frozen semen. Good-quality semen from known stallions was used.

Mares included in the study were classified in the following categories:

- Barren in the previous year (inseminated at least for two cycles)
- Barren for the present breeding season after being inseminated at least once (not at the first cycle of the season)
- Barren for two or more cycles in the current breeding season

All mares treated with FPI were managed similarly to previous cycles with the only addition being lavage immediately before insemination. Furthermore, all mares were inseminated with semen from the same stallion that was used in previous cycles that did not result in pregnancy. Therefore, mares served as their own controls.

The perineal area of all mares was prepared by securing the tail away from the perineal area and washing the vulva with soap, rinsing with water, and drying with a paper towel. Immediately before insemination, the uterus was flushed with 2 L of lactated Ringer’s solution maintained at room temperature with the use of a Foley catheter. Fluid was recovered using gravity flow. At least 90% of the lactated Ringer’s solution was recovered from all mares. If the effluent fluid was cloudy, extra flushes were performed until the fluid recovered was clear. Immediately after the lavage, the mare was inseminated following the same criteria of the previous cycles. All the mares inseminated with fresh or cooled semen ovulated within 48 hours of semen collection, whereas the mares inseminated with frozen semen ovulated 6 hours before or after the insemination. The mares were checked by transrectal ultrasound examination at 14 days after ovulation to detect the pregnancy. Mares determined to be pregnant at 14 days were rechecked at 21, 30, and 45 days of pregnancy and periodically during the fall months. Live foal delivery rate was recorded.

3. Results

Seventy of 97 (72%) mares treated with FPI were diagnosed as pregnant at 14 days after ovulation.

Three of the pregnant mares were diagnosed with twins. All mares with twins successfully underwent manual reduction of one embryonic vesicle.

One mare lost her pregnancy at 21 days, three mares reabsorbed at 30 days of pregnancy, one mare died, and two mares aborted in autumn; 64 (66%) mares foaled. Twenty-six mares submitted to FPI had fluid in the uterus before the treatment and four of those mares did not become pregnant.

Seven mares had cloudy return fluid, and two of these mares received an extra flush. Two of the seven mares did not become pregnant, one of which had received an extra flush.

4. Discussion

Previous work by Vanderwall and Woods has shown that uterine lavage with lactated Ringer’s solution performed immediately before insemination does not adversely affect fertility in reproducitively healthy mares. This study also showed that pregnancy rates were not affected by remaining fluid in the uterus after lavage. In our study, pre-insemination lavage also showed a positive effect on pregnancy (72.2%) and foaling (66%) rates in previously barren mares. All mares included in this study were not pregnant for two or more previous cycles, with the use of similar breeding management and semen from the same stallion as prior cycles. A lack of untreated control mares was a flaw of this trial but was unavoidable, given the field conditions. As such, the previous poor pregnancy rates in this population of mares provide a solid comparison to very good pregnancy and live foal rates achieved in this study. Improvement in pregnancy rates after FPI in subfertile mares could be related to the clearance of inflammatory cells, cellular debris, and excess mucus, thus providing a more suitable environment for sperm transport to the oviducts. It is possible that pre-insemination uterine lavage might also make mucociliary clearance more effective. Uterine lavage is primarily used early in the post-insemination period to modulate the effects of post-breeding-induced endometritis by clearing the uterus of inflammatory byproducts after breeding.

The goal of post-mating uterine lavage is to improve the uterine environment for eventual embryo entry. Flushing mares immediately before insemination with lactated Ringer’s solution optimizes the uterine environment for the sperm, thus improving survival and ultimately fertility. Both techniques can be useful for improving pregnancy rates in barren mares.

This technique can be very useful in routine stud practice when fluid is detected at the planned time of insemination. Generally, insemination cannot be delayed under these conditions. However, most veterinary practitioners are reluctant to put semen into an inflamed environment, as would be assumed if the uterus contained fluid at the time of breeding. In this study, pre-insemination uterine lavage positively affected pregnancy and live foal delivery rates in mares with known history of reproductive failure. Further studies would be useful to investigate if FPI may positively affect pregnancy rates after natural cover and in mares inseminated at foal heat.

References and Footnotes

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