How to Perform Uterine Lavage: Indications and Practical Techniques

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Uterine lavage can be used for the treatment and prevention of uterine infections as well as an adjunctive therapy for retained fetal membranes in the broodmare. This article describes applications of this technique for the practitioner. Author’s address: Department of Large Animal Medicine & Surgery, College of Veterinary Medicine, Texas A&M University, College Station, TX 77843-4475. © 2001 AAEP.

1. Introduction

Virtually every reproductive event in the life of a broodmare results in some degree of contamination of her reproductive tract. The acts of breeding and parturition allow entry of bacteria and other irritants into the mare’s uterus. Mares with normal uterine defense mechanisms usually are able to overcome this contamination and return their uterus to a healthy state without outside intervention. Mares with compromised uterine defense mechanisms, however, are unable to overcome this uterine contamination and uterine infection results.

Intrauterine infusion of antibiotics is a common method of treatment for endometritis. Despite the development and use of a variety of antimicrobial agents, little progress has been made in reducing the percentage of mares that remain barren due to endometritis. This may be due, in part, to the fact that the antimicrobials are being used in a manner that tends to reduce their efficacy. One of the major defects described in mares susceptible to endometritis is impaired uterine clearance. Therefore, cellular debris and fluid, as well other inflammatory products, accumulate in the uterine lumen of susceptible mares due to the mare’s inability to expel them. Placing antibiotics directly into such an environment is likely to reduce their antimicrobial activity due to binding of the antimicrobials to cellular debris, dilution in uterine exudate, and diminished contact with the endometrium. Uterine lavage may improve the efficacy of intrauterine antibiotic treatment by reducing foreign material within the uterine lumen. This is especially true for antibiotics of the aminoglycoside and polymixin groups which bind to purulent material.

Uterine lavage, used alone or in conjunction with antibiotic therapy, is believed to be beneficial in the treatment and prevention of infectious endometritis. The rationale for using uterine lavage in the treatment of uterine infections is based upon: 1) reduction of bacterial numbers and removal of exudate from the uterine lumen, 2) enhanced physical clearance of uterine contents by stimulation of uterine contractions, and 3) recruitment of neutrophils and possibly opsonins by inducing transient irritation of the endometrium. When possible, I prefer to use warm (42°C) isotonic saline, however, other balanced salt solutions such as lactated Ringer’s can...
be used and the lavage media does not have to be heated. The purpose of this article is to describe the indications and techniques for uterine lavage found to be beneficial in clinical practice.

2. Indications, Techniques, and Materials

Treatment of Endometritis

As mentioned, performing uterine lavage prior to administering intrauterine antimicrobials is likely to improve response to treatment. After evacuation of the rectum and cleansing of the mare's external genitalia, a sterile, balloon-cuffed catheter is placed through the cervix into the uterus, and the cuff is inflated. One of the keys to successful uterine lavage is to maintain gentle caudal tension on the tube so that the inflated cuff is in contact with the internal os of the cervix. Once the catheter is in place, uterine lavage is typically performed by instilling 1–1.5 l of a balanced salt solution by gravity-flow through the balloon-cuffed catheter. Higher volumes can be infused into mares with large, pendulous uteri. I prefer to distend the uterus with enough fluid so that the mare just begins to show signs of discomfort. Distending the uterus as much as possible helps ensure distribution of the fluid throughout the uterus and enhances more complete fluid return by encouraging uterine contraction. Large Foley catheters can be used, but I have found their short length and smaller diameters to be much less efficient than the larger bore (8-mm inner diameter) catheters commonly used for equine embryo transfer. These catheters come in standard lengths of 65, 80, and 150 cm, and tubes of different sizes and lengths are available by special order. A 160-cm long fluid delivery tube with a bell-shaped end can also be purchased from the same company. The IV bell or flared end of the delivery tube is aseptically placed over or inserted into the neck (Fig. 1) of a clear glass or preferably, plastic bottle containing the flushing medium and manually held in place. The bottle is then inverted and held as high as possible to allow the fluid to enter the uterus by gravity-flow (Fig. 2). Once the desired volume is infused, the uterus can be massaged per rectum to help distribute the solution throughout the uterine lumen. The effluent is collected to assess volume and clarity by simply returning the bottle to an upright position and placing the bottle on the ground or at least below the level of the distended uterus, depending on the length of tubing (Fig. 3). An alternative method of delivery is to place several liters of fluid into a clean rectal sleeve and insert the end of the catheter into the open end of the sleeve. The sleeve is grasped tightly around the tube, and then lifted and inverted as described above when using a bottle (Fig. 4). This process may be repeated several times depending on the character of the effluent. An appropriate antibiotic can be infused daily after uterine lavage, once the effluent is relatively clear.

Uterine lavage is commonly performed with isotonic saline, however, any balanced, physiologic salt solution can be used. I frequently use dilute (0.05%) povidone-iodine solutions as my lavage medium. This strength of povidone-iodine does not result in damage to the endometrium and is easily made by adding 5 ml of a stock 10% povidone-iodine solution to each liter of balanced salt solution. Note that some povidone-iodine solutions are 5% povidone-iodine (0.5% available iodine) and therefore will require 10 ml of stock solution per liter of balanced salt solution to yield a 0.05% povidone-iodine lavage medium. Bactericidal activity of povidone-iodine is enhanced when it is diluted, and has been shown to be maintained at concentrations as low as 0.01–0.005%. Therefore, except for treatment of fungal infections, concentrations stronger than 0.05% are not needed. Most adverse reactions occur when using povidone-iodine solutions concentrations >1–2% which may induce severe inflammatory responses in the equine endometrium.

Prevention of Endometritis

For mares suffering from chronic postbreeding endometritis despite the use of minimal contamination
techniques, I have found postbreeding uterine lavage to be particularly rewarding. A primary concern is the minimum time interval between breeding and uterine lavage that will not adversely affect fertility. Initial reports of successful post-breeding therapy combining uterine lavage followed by plasma infusion delayed treatment until ovulation had occurred. However, provided that ample time is given for a fertilizable population of spermatozoa to enter the oviducts (4 hours), performing uterine lavage as soon as possible after breeding will minimize the time available for microbial contaminants to multiply and become established. Uterine lavage performed within two hours of insemination reduces pregnancy rate in normal mares, while uterine lavage at 4 hours post-insemination has no detrimental effect on fertility. The lavage procedure is the same as that used for treating uterine infections with the exception that I do not infuse antibiotics into the uterus after breeding. Almost thirty years ago, data from a study presented to the AAEP showed that postbreeding infusion of some antibiotics had no beneficial effect on live foaling rate while others were actually detrimental. Overzealous use of antibiotics can also lead to fungal or yeast infections, which are much more difficult to eliminate.

Postpartum Mare
The primary indications for uterine lavage in the postpartum mare are for the treatment of retained fetal membranes, delayed uterine involution, and metritis. When the membranes are intact, the lavage fluid is actually instilled into the chorioallantoic space rather than the uterine lumen, as described by Burns et al. at the AAEP convention in 1977 (Fig. 5). Uterine lavage is also useful for cleansing the uterus of debris immediately after lengthy obstetrical manipulations and fetotomy. Distending the uterus in such facilitates palpation of the endometrium for lacerations and abrasions by smoothing out the prominent endometrial folds. In the postpartum mare, much larger volumes (up to 12 l) of fluid are used and the cervix is too dilated for most ballooned cuffed catheters to be useful in sealing the cervical os. Therefore, a clean stomach tube is inserted through the cervix, and rather than gravity flow, a bucket and stomach pump—which have
been cleared of all mineral oil or other potentially noxious substances—are used to instill the fluid of choice. When tap water is used, I often add 5 ml of 10% povidone-iodine solution per liter of fluid and 8.5 grams of table salt per liter of fluid. When large volumes of fluid are used, as in the postpartum mare, 34 grams of table salt per gallon of distilled water will yield a 0.9% NaCl solution. An easy way to approximate 34 grams of salt in the field is to measure out 25 cc of salt using a syringe barrel, making sure to completely empty the syringe after the salt is poured into the water. Alternatively, one could fill the cap of a 60 cc syringe case to within 5 mm (~3/16 in.) of the top of the cap.

When the mare is presented with fetal membranes that have not been completely expelled and placental tags remain in the uterus distending the affected horn(s) helps in identifying the size of the placental tag and the degree of adherence. Lavaging the uterus also helps loosen the tags and stimulates uterine contractions to aid in the expulsion of the remaining membrane fragments. Cupping the hand over the end of the tube helps prevent the endometrium and tags of placenta from being siphoned onto the end of the tube and preventing...
outflow. In refractory cases, the lavage can be repeated daily followed by oxytocin (10–20 IU, IM or IV) or prostaglandin (cloprostenol\(^b\), 250 \(\mu\)g, IM) administration. I prefer cloprostenol (Estrumate\(^c\)) to Lutalyse\(^d\), as I have not observed the profound signs of colic associated with the latter product, which can be quite disconcerting in the postpartum mare. The mares are also administered appropriate doses of systemic antibiotics and flunixin meglumine\(^f\), which are continued for several days after the passage of the membranes. After the membranes have passed, I usually lavage the uterus at least one more time the following day, depending on the presence and nature of uterine discharge or the presence and character of intrauterine fluid as detected by transrectal ultrasonography. Routine use of uterine lavage in normal foaling mares does not appear to enhance uterine involution\(^g\) or foal heat pregnancy rates,\(^7\) therefore, I do not advocate its use.

3. Results

In more than ten years of using large volume uterine lavage for the treatment and prevention of endometritis as well as an aid in the expulsion of retained fetal membranes, I have been extremely satisfied with the results. This has been most gratifying when a valuable mare, which has been barren for a number of years, despite the repeated use of more common therapies, becomes pregnant after a single breeding on one cycle when postbreeding uterine lavage is employed. I have also seen a number of mares become pregnant after a single insemination followed by uterine lavage four hours later, even when frank pus has been lavaged from their uteri after breeding or when urine has had to be manually evacuated from the vaginal vault. This is certainly not to say that every mare that has chronic recurrent endometritis will become pregnant using uterine lavage. I strongly believe however, that using uterine lavage will greatly enhance chances of susceptible mares becoming pregnant compared to antibiotic treatment alone, especially when the number of breedings per cycle are limited and minimum contamination techniques are employed.

4. Discussion

Over the years intra-uterine infusion with a variety of antibiotic and antiseptic solutions has been used in an attempt to eliminate infectious endometritis in mares. These substances have ranged from agents such as kerosene, floor cleaners, chlorine, and iodine solutions to potent antibiotics. Unfortunately, many of these treatments were instituted without knowledge of their efficacy or potential detrimental effects. Uterine lavage using a balanced salt solution, with or without dilute (0.05%) povidone-iodine solution, has repeatedly been shown to be a safe and effective therapeutic technique for the treatment of endometritis, yet it is still underutilized by many practitioners.

Many practitioners feel that uterine lavage is too time-consuming or the technique is too cumbersome to perform in a busy practice setting. However, using the techniques I have described, the large-bore balloon cuffed catheter and irrigation saline in plastic bottles or a rectal sleeve, uterine lavage takes only 5–10 minutes longer to perform compared with other intrauterine therapies and yields worthwhile results for you, your clients, and your patients. A few extra minutes spent performing uterine lavage will save time in the long run throughout the breeding season when compared to the repeated treatments and breedings that many problem mares might otherwise require.

Uterine lavage is an extremely useful therapeutic technique that can be applied to a number of reproductive problems in the mare. The enhancement of the mare’s own uterine defenses and the mechanical removal of uterine contaminants is its major therapeutic advantages over other techniques, including ecbolic agents such as oxytocin or prostaglandins. When performing uterine lavage or any other procedure, in which the cervix of the problem mare is violated, employing meticulous aseptic technique is imperative to minimize contamination and optimize the chances of a successful outcome.

References and Footnotes


\(^{a}\) Equine Uterine Flushing Catheter, Bivona, Inc., Gary, IN 46406.

\(^{b}\) Equine Fluid Delivery System, Bivona, Inc., Gary, IN 46406.

\(^{c}\) Betadine, Purdue Frederick Co., Norwalk, CT 06850.

\(^{d}\) Estrumate, Bayer, Shawnee Mission, KS 66201.

\(^{e}\) Lutalyse, Upjohn, Kalamazoo, MI 49001.

\(^{f}\) Banamine, Schering Animal Health, Kenilworth, NJ 07033.