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Case Report

Amputation of the mare's cervix for the treatment of pyometra

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Abstract

Pyometra in the mare is commonly accompanied by or results from occlusion of the lumen of the cervix. Formation of excessive transluminal adhesions, cicatrices, and tortuosity not only inhibits natural evacuation of uterine contents, but often impedes or even prevents attempts to establish therapeutic drainage. This paper describes a simple, efficient technique to facilitate access to the uterus and establish drainage. It can be used prior to cervical wedge resection for removal of excessive distorted tissue or as a stand-alone procedure.

Keywords: Mare, cervix, amputation, pyometra

Introduction

The cervix of the mare is very susceptible to damage and the formation of adhesions. Common traumatic events resulting in adhesions include lacerations sustained during parturition, and dystocia, or repeated efforts at cervical manipulation that occur with intrauterine therapy, artificial insemination or embryo transfer.[1] Pyometra is defined as the accumulation of mucopurulent material within the uterus.[2] Mares with distorted cervical anatomy or transluminal cervical adhesions are at risk for the development of pyometra due to mechanical impairment of uterine clearance mechanisms. Dilating the cervix to enable uterine lavage and intra-uterine therapy is essential in the treatment of pyometra.[3]

Until the cervical wedge resection (Figure 1) described by Arnold et al.,[4] ovariohysterectomy had been the only reported option for treatment of pyometra cases resulting from severe intra-luminal cervical adhesions where patency could not be maintained and pyometra continued to recur.[5-7] For mares with pyometra secondary to transluminal cervical adhesions, cervical wedge resection enables treatment of pyometra and has allowed for production of foals via embryo transfer in at least one mare.[4] It is important to note that when performing cervical wedge resections which extend cranially to the internal cervical os, inadvertent penetration of the anterior vagina can result in communication with the abdominal cavity, creating the potential for contamination of the peritoneal cavity with uterine contents.[4] Because of this potential for contamination of the abdomen with uterine contents during surgery, uterine lavage is recommended to be performed prior to surgery. Unfortunately, due to their status as embryo donors and repeated manipulation of the cervix during diestrus, cervical adhesions commonly develop in these mares, and their cervices can be significantly distorted by fibrosis and the formation of diverticulae. In mares with such a tortuous cervix, it can be much more difficult to identify the cervical lumen and the location of the internal os. This makes the manual breakdown of cervical adhesions, the dilation and canulation of the cervix to facilitate uterine lavage, and the subsequent wedge resection of the cervix much more difficult.

This manuscript describes a simple and effective procedure for amputation of the mare's cervix that removes abnormal and redundant cervical tissue to enable further treatment of pyometra. This technique can be used to facilitate uterine lavage and cervical wedge resection or as a stand-alone procedure.

Materials and methods

Prior to surgery, the mare is restrained in a set of stocks. Flunixin meglumine (1.1 mg/kg [0.5 mg/lb], IV; Banamine®, Merk Animal Health, Madison, NJ) is administered, and sedation is provided with detomidine hydrochloride (0.01 mg/kg [0.0045 mg/lb], IV; Dormosedan®, Zoetis, Parsipanny, NJ) and butorphanol tartrate (0.01 mg/kg [0.0045 mg/lb], IV; Torbugesic®; Fort Dodge Animal Health, Ft. Dodge, IA). Caudal epidural may be administered if desired but, generally, is not necessary. The mare's tail is wrapped, reflected toward the side or dorsally, and the perineum is aseptically prepared. Stay sutures or Vulsellum-type forceps are placed caudally near the

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Citation line: Clinical Theriogenology 2023, 15, 9625, http://dx.doi.org/10.58292/CT.v15.9625

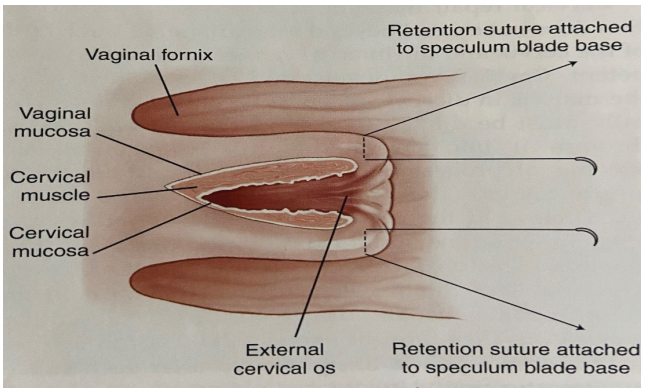

Figure 1. Cervical wedge resection. (Modified from Brinsko SP, et al.: Manual of Equine Reproduction, Third Edition, Maryland Heights, MO, Mosby, Inc/Elsevier, 2010).

Figure 2. "Cervitomes" used for amputation of the mare's cervix. The instrument above the ruler is a pair of stainless-steel tubes that were taped together for the first application of this procedure. The instrument below the ruler used for subsequent procedures was fabricated with a hardened head to mimic the Utrecht model fetotome.

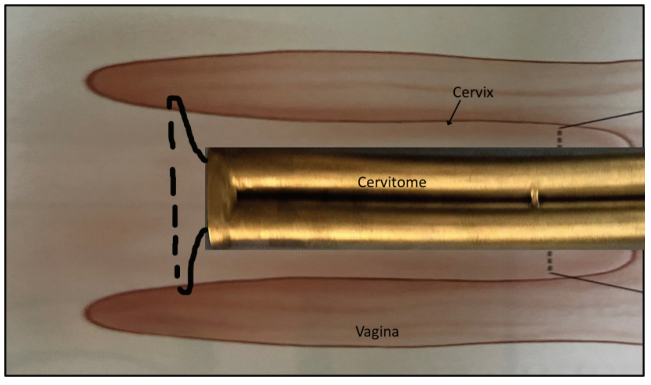

Figure 3. Placement of "cervitome" firmly against the mare's cervix with wire looped around the cervix for amputation. (Modified from Brinsko SP, et al.: Manual of Equine Reproduction, Third Edition, Maryland Heights, MO, Mosby, Inc/Elsevier, 2010).

external os and the cervix is retracted caudally. A 1.5 – 2.0 meter length of fetotomy wire (Jorgenson Labs, Loveland, Colorado) is threaded through a double tubed instrument, 50

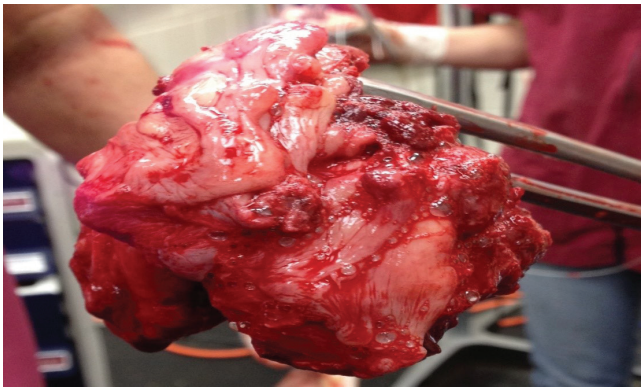

Figure 4. Grossly abnormal cervical tissue removed with Vulsellum forceps after amputation.

Figure 5. View of cervical stump, immediately after amputation. Note that there is minimal hemorrhage.

cm in length (cervitome), modeled after the Utrecht fetotome (Figure 2). The loop of fetotomy wire is passed over the retraction implement(s) and around the cervix. While an assistant holds mild tension on the fetotomy wire via the wire handles and maintains traction on the cervix, the operator advances the wire loop and the head of the instrument to the desired point of amputation (Figure 3). The assistant is then instructed to gently increase tension on the wire and the operator ensures that the head of the cervitome is snug against the cervix at the amputation site, caudal to the internal cervical os. (Note that if the amputation is performed at or anterior to the internal cervical os, as can occur with excessive traction and tenting of the vaginal fornix, there is a risk of entering the peritoneal cavity.) The cervix is then amputated using the sawing motion of the wire, mimicking decapitation during fetotomy. Once the wire and instrument are placed properly, the amputation procedure takes less than a minute to perform. The cervical tissue is then removed via the stay sutures or forceps (Figure 4).

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a

b

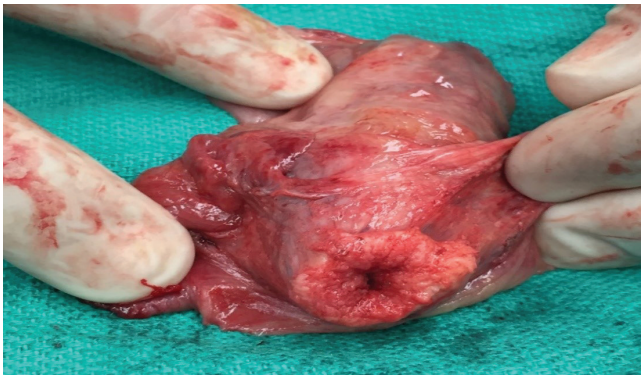

Figure 6. Relatively normal externally appearing, amputated cervix (a). Internally, there was significant mural scarring and luminal cicatrix formation (b).

As with cervical wedge resection, post-operative management of mares following cervical amputation is important in maintaining cervical patency. Daily application of a compounded ointment consisting of dexamethasone (27 mg), oxytetracycline (3.6 grams) in 151 g of lanolin or Vitamin A&D ointment for 7–14 days in and around the cervical stump helps promote re-epithelialization and minimize adhesion formation. Additionally, manual palpation of the defect and dilation of the lumen during application of the ointment help ensure the cervix heals and remains patent. A Foley- or Bivona-type catheter with an inflatable cuff and a Heimlich valve attached distally can also be used to help maintain luminal patency.

Results

There is minimal transient hemorrhage associated with the procedure and the provision of hemostasis is unnecessary (Figure 5). The procedure has been performed on five mares that were not intended to be future breeding prospects. The establishment of a patent cervical lumen or spontaneous uterine drainage was obtained in all cases, and the results reported from the referring veterinarians and owners were very satisfactory. In all cases, sufficient uterine drainage was established, which either resolved or prevented further recurrence of pyometra.

Discussion

The cervical wedge resection procedure is an effective method of treating pyometra in the mare. Prior to surgery, it is important to achieve temporary patency of the cervix in order to remove the mucopurulent contents of the uterus.[4] However, in many cases, significant cervical abnormalities such as extensive luminal adhesions, redundant tissue, luminal tortuosity and/or diverticulae make canulation of the cervix to establish uterine drainage extremely difficult if not impossible. Because the mare's cervix is so susceptible to trauma, repeated aggressive attempts to establish cervical patency often results in additional edema and adhesion formation, thus perpetuating the problem.

In some cases, even when luminal patency can be established, the amount of abnormal tissue present makes the wedge resection tedious and time consuming. Since this tissue is neither functional nor needed, it makes sense to remove it either as an adjunct to, or as an alternative to the wedge resection procedure. In addition to facilitating the wedge resection procedure, removal of this excess tissue enables more efficient canulation of the cervix to establish uterine drainage and can in some cases, obviate the need for the wedge resection. The excised cervical tissue can at times appear grossly normal while having mural and luminal pathology (Figure 6a,b) or grossly abnormal as seen in Figure 4. Since the internal cervical os remains intact and varying amounts of normal cervical tissue can be preserved, mares undergoing this procedure could retain the potential to be embryo donors. If at least 1/3 to 2/3 the length of normal cervix can be preserved and the uterus/endometrium has not been irreparably damaged due to a long-standing pyometra or other pathology, it may even be possible for such mares to carry a foal to term.

The cervical amputation procedure described here is a rapid, simple technique that can be performed by most practitioners having basic surgical training, and without the need for expensive instrumentation.

Acknowledgements

The author has adhered to the Principles of Veterinary Medical Ethics of the AVMA.

Conflict of interest

The author has no conflicts of interest.

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Citation line: Clinical Theriogenology 2023, 15, 9625, http://dx.doi.org/10.58292/CT.v15.9625