

Pyometra in the Mare

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Introduction

Pyometra is defined as the accumulation of large quantities of inflammatory exudate within the uterus. This accumulation of fluid in turn causes a distention of the uterus and subsequently infertility in the mare [5]. Any free fluid within the uterine lumen during diestrus should be considered abnormal and is associated with reduced pregnancy rates and increased early embryonic losses [4]. Infertility in mares is defined as the absence of the ability to conceive a pregnancy, which leads to great economic loss in the equine industry each year [7]. When viewing mares coming into the breeding season, they are general divided into one of the three following categories: Barren, Foaling, and Maiden mares [5]. A barren mare is a non-pregnant mare coming into the breeding season of interest that has been previously bred. Several reasons why these mares might be barren include not being breed the previous season, abortion, or the most common subfertility [5]. A foaling mare has produced a foal within the current breeding season and will be rebred. The maiden mare is a mare that has never been bred. These mares are typically young; however older mares that have continued performance careers are commonly seen [3,4,5].

Similar disease processes affecting the uterus are termed as endometritis and mucometra. Endometritis can be distinguished from pyometra as it is the small, intermittent accumulation of fluid detected via ultrasound [3,4]. Mucometra is simply the accumulation of sterile-mucoid fluid within the uterus.

Pathophysiology

Breeding or inseminating a mare induces an immediate inflammatory response in the uterus. This is a physiological reaction against foreign material. In most mares this inflammation

clears within 1 or 2 days [3]. Mares susceptible to mating-induced endometritis, mucometra, or pyometra are known to accumulate fluid in the uterus as a result of impaired clearance of inflammatory products [4]. Reduced myometrial contractions, poor lymphatic drainage, a large overstretched uterus, and cervical dysfunction are predisposing factors for persistent-mating induced endometritis and subsequently pyometra or mucometra [3].

Reported common factors found in mares with pyometra are, poor anus-vulvar conformation, cervical adhesion, and cervical irregularities [3]. When viewing pyometra, infection initiates because the uterus cannot expel the fluid and subsequently fills with purulent fluid. Outside of the immune system, there are 3 important mechanisms to prevent uterine contamination in mares. These are the vulvar seal, vestibulovaginal seal, and the cervix, therefore disruption in any of these barriers can lead contamination of the reproductive tract [1]. The inability to evacuate the uterus of inflammatory debris and contamination due to cervical closure is thought to be the primary cause of pyometra in the mare. In cases in which fluid accumulates without any cervical impairment, chronic or persistent infections with *P. aeruginosa* or fungi should be top differentials [5]. In many cases endometrial cultures reveal a mixed growth or sometimes even no bacterial growth at all, however the most common organism isolated from the uterus is *Str. zooepidemicus* [5].

One of the most common characteristics seen in breeding older maiden mares is uterine fluid. Often an older maiden mare has an abnormally tight cervix or cervical adhesions which fail to relax properly during estrus so that fluid is unable to drain and accumulates in the uterine lumen [3,4]. Other causes of cervical adhesions may include trauma from either previous breeding's or from foaling. Cervical fibrosis in older maiden mares increases the likelihood of uterine fluid accumulation. This accumulation of exudate within the uterine lumen may cause

the corpus luteum to persist beyond its normal life span [5]. Some Mares with pyometra have normal cyclic ovarian activity, but the persistence of the corpus luteum is likely due to the failure of prostaglandin synthesis or release from the uterus [4]. Mares with prolonged luteal activity have the greatest endometrial damage [4]. It is particularly important to recognize and manage appropriately the older maiden mare as these mares are the most at risk for developing post-breeding pyometra. [4]

Differential Diagnoses

Signalment and presentation play an important role on how your differential diagnoses are ranked when present with a fluid filled uterus on ultrasound. When presented with a maiden mare after recent insemination, and considering the volume of fluid, pyometra was ranked higher on our rule out, however other rule outs to include and differentiate between include:

- Pyometra - accumulation of large quantities of inflammatory exudate within the uterus. [5]
- Pregnancy [4]
- Mucometra – defined as an accumulation of sterile intraluminal mucoid fluid [4,5]
- Endometritis – inflammation of the endometrium [3,4,5]
- Hematometra – defined as an accumulation of bloody fluid [4]
- Pneumouterus – defined as an accumulation of air within the uterus [4]

Diagnostic Approach

Diagnosis of pyometra is based on rectal palpation, ultrasound examination of an enlarged fluid-filled uterus, and analysis of the uterine fluid [4,5]. This disease is usually

diagnosed in the chronic disease stage due to the lack of systemic illness [4]. In contrast to the mare, the bitch will present with clinical signs which include malaise to severe life threatening septicemia [8]. This being said, in the absence of systemic illness or vulvar discharge, treatment of chronic pyometra may not be indicated in the mare. The most common sign seen in a mare with chronic pyometra is abdominal discomfort during rigorous exercise [5]. More recent research has investigated the possible detection of new biomarkers from blood samples. Arabian mares with pyometra tested for acute-phase proteins, Cardiac Troponin I, and proinflammatory cytokines were found to all be positive, but these markers are non-specific and can be elevated by other inflammatory conditions [1].

Treatment

Early post-breeding lavage supported by oxytocin has proven to be an effective management strategy for mares susceptible to mating-induced endometritis [2]. Uterine lavage as early as 4 hours post breeding will not adversely affect fertility [2]. In mares of genetic worth in which owners seek to obtain a future foal, treatment of the pyometra is indicated. Many cases will improve by repeated large volume lavage with several liters of warm saline with povidone-iodine solution via a Bivona catheter [5]. If a corpus luteum is present, PGF_{2a} can be used to induce luteolysis [5]. Estradiol has been used in the past to promote cervical relaxation [5]. Misoprostol, a prostaglandin analogue, binds to myometrial cells to cause strong myometrial contractions leading to expulsion of fluid or tissues. Misoprostol also causes cervical ripening, which allows for softening and dilation of the cervix. Cervical infusion of misoprostol combined with manual dilation can be used to widen the diameter of the cervical lumen [3,4,5].

The Caslicks procedure is commonly used to improve the vulvar seal of mares with poor perineal conformation. This procedure is performed by placing the mare in a stock, wrapping her tail to the level of the tail head, and tying the tail away. The vulva is then scrubbed with disinfectant soap, rinsed, and allowed to dry. A local anesthetic, such as lidocaine, is injected just beneath the skin of the vulva at the mucocutaneous junction [4]. The lidocaine block is placed from the dorsal commissure of the vulva to the level of the ischium, which can be identified by placing digital pressure firmly on either side of the labia [4]. A thin strip of tissue at the mucocutaneous junction is removed with a surgical blade or scissors from the dorsal commissure to the level of the ischium [4]. Lastly the labia are apposed with a simple continuous, horizontal mattress, or continuous interlocking suture pattern [4]. Furthermore, the use of a Caslick as an adjunctive therapy would be considered in a mare with poor perineal conformation.

Surgical techniques have been described for treatment of equine pyometra. Cervical wedge resection is a newer method of treatment in which the cervical adhesions are manually broken down to provide a patent cervical lumen and allow the passage of a uterine lavage catheter [6]. A sample of the uterine content should be obtained for culture and antimicrobial susceptibility testing. The uterus is then lavaged with 0.05% of povidone-iodine solution to remove the mucopurulent exudate. Once the uterus is completely evacuated, the wedge resection is performed on standing mares following sedation and caudal epidural [6]. A full-thickness wedge-shape cervical defect is made, usually on the dorsolateral aspect of the cervix [6]. The goal of this procedure is to create a permanent opening. Another less common surgical intervention is a hysterectomy [5]. In this method the exudate is aspirated from the uterus and

the uterus is removed. This procedure is not commonly practiced due to the risk of post-operative peritonitis [5].

Conclusion

A problem mare, once inseminated or mated should not only be checked for ovulation but also intrauterine fluid accumulation, which is one of the most reliable indicators of susceptibility to postbreeding, endometritis, mucometra, and pyometra [3]. If a mare is recognized as being susceptible to persistent mating-induced endometritis, mucometra, or pyometra, intensive postbreeding monitoring and early therapeutic intervention can improve the chances of conception [3].

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