

# Unlocking Mare Infertility: A Systematic Approach to Diagnosis and Treatment

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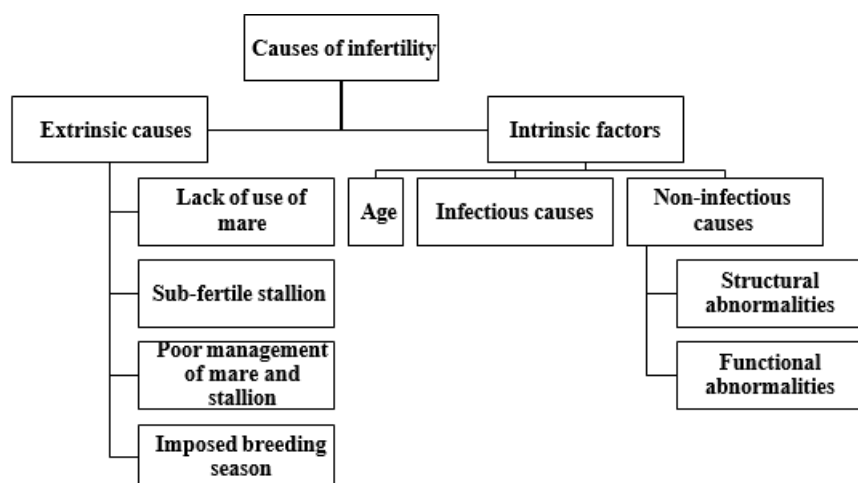
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## 1. Introduction

Infertility is the most common reproductive complaint of horse owners. It can be a perplexing problem for the veterinarian as identification of the cause is frequently difficult. Owners may not keep accurate records, the mare may change owners often, the stallion may be infertile, or reproductive management may be poor. Decreased pregnancy rates may be due to logistical problems such as an inappropriate breeding to ovulation interval because of limited stallion (Thoroughbred-natural mating) or semen availability (cooled shipped semen limited to 3 days/week). Infertility may seem to be an irresolvable problem, however, if one approaches each mare in a systematic manner the majority of infertile mares can be diagnosed.

## 2. Infertility And It's Classification



## 3. Functional Abnormalities

#### ❖ **Aged Mares**

Reasons that older mares can be more challenging include: failure to cycle (in mares  $\geq 20$  years); a prolonged transition phase; longer oestrous cycles with greater propensity to fail to respond to ovulating agents; oocyte degeneration; failure of fertilization; increased early embryonic death; oviductal abnormalities; failure of cervical dilatation, endometrial degeneration (characterized by fibrosis, glandular dilation and gland nesting); fluid accumulation; increased rate of abortion; and poor vulval conformation resulting in contamination of the caudal reproductive tract.

#### ❖ **Prolonged Luteal Activity**

It is one of the major causes of sub-fertility. Prolonged diestrus which is about more than 17 days but may extend more than 60 days. Reasons that cause prolongation of luteal activity includes Diestrus ovulations, Luteinized hematoma, severely damaged endometrium, Idiopathic maintenance of CL etc.

#### ❖ **Pseudopregnancy**

The corpus luteum of a non-pregnant mare can continue to produce progesterone beyond the normal two-week lifespan and an affected mare will fail to return to estrus. The term for persistence of progesterone production by a CL is “pseudopregnancy” or “false pregnancy”. Causes of false pregnancy include embryonic loss after the time of maternal recognition of pregnancy, diestrus ovulations, severe uterine pathology, and potentially inadequate prostaglandin release.

### **4. Structural Abnormalities**

#### ❖ **Pneumovagina and urovagina**

#### ❖ **Persistent hymen**

The hymen may be a complete or partial tissue wall separating the vagina and vestibule. The hymen is usually ruptured at breeding or disrupted manually during artificial insemination

#### ❖ **Endometrial Cyst in Mare**

Uterine cysts are fluid-filled structures that can occur in the normal or chronically inflamed endometrium, typically projecting outward from its surface. In mares, both lymphatic and glandular cysts can form. Differentiating them from early embryos and determining their association with pregnancy loss and infertility are primary concerns. Treatments include endometrial curettage, puncture using a uterine biopsy punch, puncture or aspiration during hysteroscopic examination, snare electrocoagulation via hysteroscopy, repeated lavage with warm saline, or manual ablation.

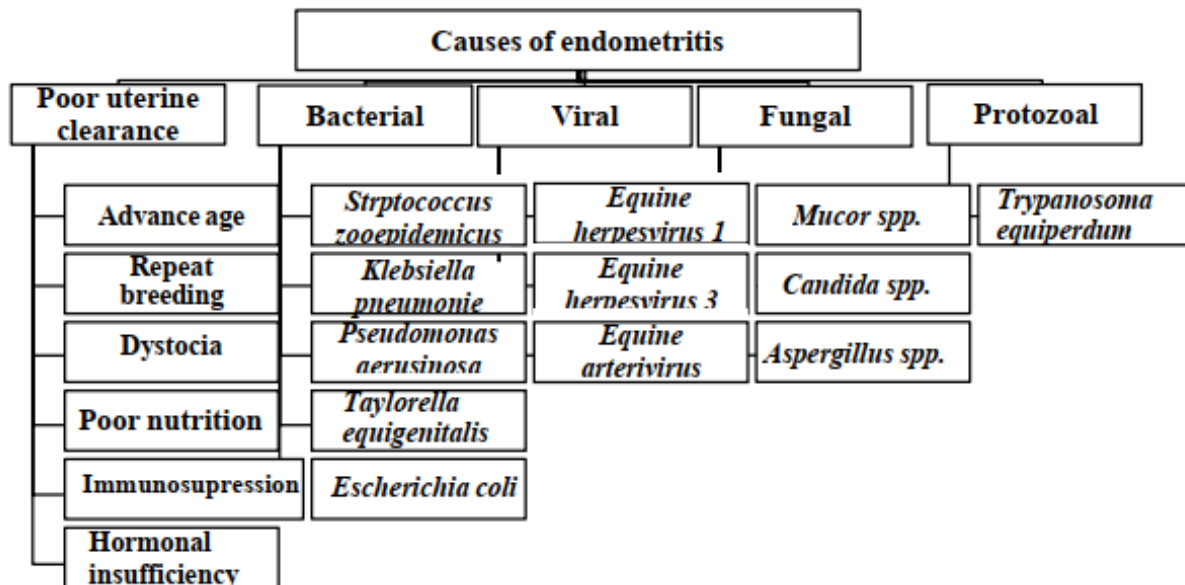


### 5. Inflammatory Causes of Infertility

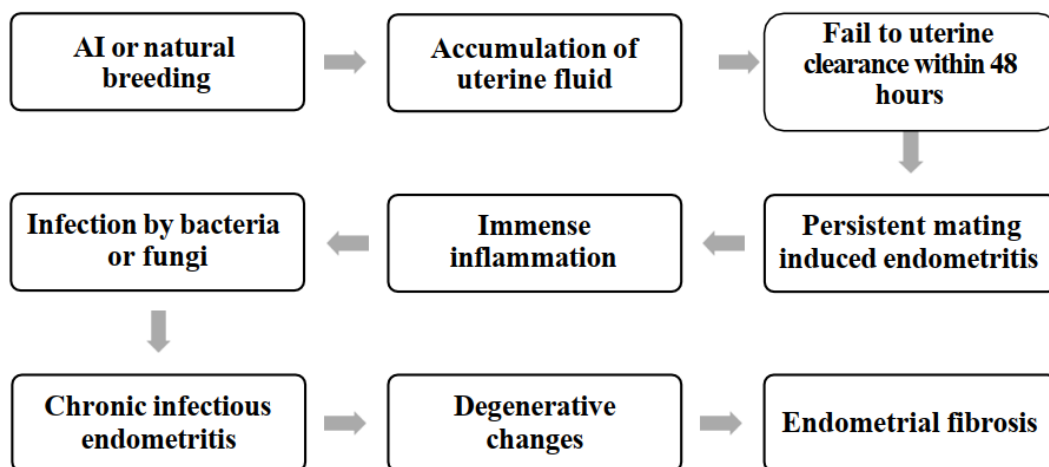
- ❖ Vulvitis vaginitis and cervicitis
- ❖ Oophoritis and salpingitis
- ❖ Endometritis
- ❖ Infectious endometritis

Every time a mare is mated or inseminated her natural physical barriers to infection, the vulval opening, vagino-vestibular junction and cervix, are breached and bacteria are introduced.

#### ❖ Fungal endometritis



- Pathophysiology of persistent breeding-induced endometritis (PBIE)



## 6. Diagnosis

Owing to the gravity of economic toll that the uterine diseases amount to, it is imperative to diagnose them as early as possible, so that proper therapeutic and managerial measures are directed to treat and control them.

### ❖ **Transrectal palpation**

The reproductive tract is palpated per rectum, so as to identify its significant features, determination of stage of oestrous cycle and identify potential problems. Palpation is often performed in conjunction with Ultrasonography (USG), however manual palpation can often identify features of the tract that can't be detected by USG, e.g., uterine tone, consistency of ovarian follicles, sensitivity of ovary to touch etc.

### ❖ **Vaginoscopy**

Vaginoscopy is a rapid and simple technique, where a speculum is used for examination of vaginal vault, OS externus of cervix and detects pathological conditions.

### ❖ **Uterine cytology**

Delayed or impaired PMN function is responsible factor for mares unable to eliminate uterine infections. Polymorphonuclear Neutrophils (PMNs) seem to be of major importance for uterine function.

### ❖ **Uterine culture**

Uterine culture/microbiological investigations are of diagnostic value in detection of acute and chronic equine endometritis.

### ❖ **Endometrial biopsy**

Endometrial biopsy is most definitive diagnostic tool for diagnosis of endometritis.

### ❖ **Ultrasonography**

### ❖ **Uterine endoscopy/hysteroscopy**

## 7. Treatment

The treatment protocol aims to prepare the endometrium for embryo descent, typically occurring about 6 days after mating. The exact management varies based on the specific diagnosis. The main goal is to resolve endometrial inflammation by limiting bacterial contamination and improving uterine clearance. Corrective surgery, such as Caslick's valvuloplasty or urethral extension, should be considered for any anatomical defects contributing to infections or impairing post-insemination fluid drainage.

### ❖ **Ecboic agents**

In oestrous mares, uterine clearance is improved by the administration of ecboic drugs,



such as oxytocin and prostaglandin (PG) F2 $\alpha$ .

#### ❖ Uterine lavage

The physical removal of fluids and inflammatory debris by uterine lavage after insemination underpins the prevention and treatment strategy for Persistent breeding induced endometritis (PBIE). Uterine lavage in susceptible mares is indicated when there is hyperechoic intrauterine fluid accumulation or if free intrauterine fluid exceeds two cm in diameter. Sterile saline or lactated Ringer's solution is commonly used for this purpose.

#### ❖ Antibiotics

There has been a preference for intrauterine antibiotic treatment of endometritis rather than a systemic parenteral approach, in part due to the small risk of side effects of antibiotic treatment on intestinal flora in the horse. Intrauterine infusions produce high local concentrations of antibiotic in the uterine lumen. Performing antimicrobial sensitivity testing is a key diagnostic step in uterine infections which ensures that the bacteria are susceptible in vitro to the antibiotic is selected.

#### ❖ Antifungal

Therapy for fungal endometritis is directed towards correcting a combination of predisposing factors such as uterine infusions with non-antibiotic agents, uterine lavage and systemic and/or intrauterine administration of anti-fungal agents. It may also be beneficial to apply topical antifungal medication to the vagina and clitoris as these areas may act as a reservoir or nidus for reinfection.

#### ❖ Alternative non-antibiotic therapies for endometritis

To address the challenge and reduce our reliance upon routine antibiotic treatments for PBIE and infectious endometritis, non-antibiotic alternatives are being used.

- **DMSO (Dimethyl sulfoxide):** DMSO is well known for its anti-inflammatory actions. DMSO is capable of disrupting biofilm and acts as a synergistic agent in conjunction with some antibiotics.
- **N-acetylcysteine:** N-acetylcysteine is a powerful antioxidant and decreases biofilm biomass.
- **Hydrogen peroxide:** Hydrogen peroxide produces oxidants such as singlet oxygen, superoxide radicals and hydroxyl radical which can be cytotoxic at high levels. Hydrogen peroxide inhibits the growth of *E. coli* by inducing the formation of highly toxic hydroxyl radicals.
- **Tris-EDTA:** Metal chelating agents such as Tris-EDTA may be useful for disrupting biofilm forming agents, such as *P. aeruginosa* or fungal infections.



- **Kerosene:** Kerosene is used as an intrauterine treatment to purge the uterine lymphatic glands during chronic bacterial endometritis. Inflammatory changes in the uterus resolve sufficiently within 21 days of treatment.

## 8. Conclusion

The causes of infertility in the mare are many and varied, and resulted in considerable economic loss for the breeder.

- Correction of anatomical defects.
- Early and proper diagnosis.
- Use of advanced diagnostic tools.
- Identification, characterization and elimination of causes.
- Judicious use of antimicrobials

