

This guideline will help to identify the sensitivity of specific bacteria and/or yeast infections that infiltrate the internal and external reproductive tract of both stallion and mares. From this initial information, a window of procedural rational will allow the categorization of a stallions or mare's potential for reproductive competence. When assessing the reproductive competency of a mare or stallion, a complete examination should take place with the following key points.

For mares: A uterine biopsy and culture with sensitivities & cytology should be performed when in estrus and/or prior to insemination of the repeat insemination of a barren mare; A complete endocrine evaluation for multiple year barren mares should be considered.

For stallions: A culture of the urethra before and after ejaculation and a semen culture where by evaluation for a potential growth at 24, 36, 48 & 72 hours should be conducted twice monthly.

Commonly Used Intrauterine Drugs

Guidelines for Specific Use & Administration in Large Volume Lavages

Antibiotics for Gram Positive Bacteria

Penicillin (Na⁺ or K⁺ Salt K-Penn)

5 million units

Very effective for streptococci; economical and commonly used

Ampicillin

1-3 g

Use at high dilutions because it can be irritating; NA⁺ salt leaves precipitate on endometrium that remains in uterus for prolonged period

Carbenicillin

2-5 g

Reserved for persistent *Pseudomonas* (synergistic efficacy with amino-glycosides); usually given on alternate days with amino-glycosides; slightly irritating

Antibiotics for Gram Negative Bacteria

Gentamicin Sulfate

500-1000 mg

Highly effective; generally nonirritating when mixed with an equal volume of NaHCO₃ and diluted in saline

Amikacin Sulfate

2 g

Use for *Pseudomonas*, *Klebsiella*, and persistent gram-negative organisms

Kanamycin Sulfate

1 g

Toxic to spermatozoa; do not use close to breeding

Polymyxin B

1 million units

Gram-negative infections, particularly *Pseudomonas*

Neomycin Sulfate

3-4 g

Use for sensitive *E. Coli*; can be irritating; post breeding use of oral preparations containing neomycin mixed with other antimicrobials has lowered pregnancy rates in mares

Nitrofurazones

50-60 ml

Highly questionable effectiveness

Antibiotics for Gram Positive & Negative Bacteria

Cephazolin Sodium

1 g

First-generation cephalosporin; has been used empirically once daily intramuscularly for 2-3 weeks; broad spectrum effectiveness against Gram-positive and Gram-negative bacteria

Ticarcillin

1-3 g

Use for *Pseudomonas*; do not use for *Klebsiella*

Naxcel (Ceftiofur Sodium)

1 g

Third-generation cephalosporin; has been used empirically once daily either intramuscularly or by intrauterine infusion; broad-spectrum effectiveness against Gram-positive and Gram-negative bacteria

Povidone-Iodine

(1%-4% of stock solution of Betadine, which is 0.5% Povidone iodine)

1 liter (lavage solution)

If solutions are too concentrated (e.g., >5% Betadine v/v), severe endometritis results and/or neutrophil function is impaired; in vitro bactericidal activity is maintained at concentrations as low as 0.01%-0.005%; indicated for lavage of uteri with nonspecific inflammation or fungal/yeast infections; should not be left in uterus

Yeast Specific Drugs

Nystatin

500,000 units

Primarily for yeast (e.g., *Candida albicans*) in the growing phase; dilute in 100 to 250 ml sterile water--makes an insoluble suspension that must be vigorously mixed immediately prior to infusion

Amphotericin B

200 mg

For infections with *Aspergillus*, *Candida*, *Mucor*, or *Histoplasma*; dilute in 100 to 250 ml sterile water--makes a relatively insoluble suspension

Clotrimazole

700 mg

For yeast infections (*Candida* spp.); available as cream, tablets, or suppositories; preferable treatment is with tablets crushed and mixed with 40 ml sterile water; generally infused after uterine lavage

Miconazole

200 mg

Most efficacious for yeast infections (*Candida* spp.), but has been used by some practitioners for resistant fungal infections in mares by infusing once daily for up to 10 days; dilute in 40-60 ml sterile saline prior to infusion

Drugs for Aggressive Reproductive Management

Dimethylsulfoxide (DMSO)

(5% of stock solution)

50-100 ml

Used as penetrating agent to carry drugs; effectiveness and safety unknown

EDTA-TRIS (1.2 g NaEDTA + 6.05 g TRIS/L of H₂O, titrated to pH 8.0 with glacial acetic acid)

250 ml, then infuse antibiotic 3 hours later

EDTA theoretically binds Ca⁺⁺ in bacterial cell walls, making cell wall permeable to antibiotic and thus more susceptible; use confined to persistent *Pseudomonas* infections

Commonly Used Drugs In Semen Extenders

Gram Positive Activity

Penicillin (Na⁺ or K⁺ Salt) (K-Penn) +

1 million units per 100ml of final semen extender solution.

Very effective for streptococci; economical and commonly used

Gram Negative Activity

Amikacin Sulfate -

1 mg per 1ml of semen extender solution.

Use for *Pseudomonas*, *Klebsiella*, and persistent gram-negative organisms

Gentamicin Sulfate -

1 mg per 1ml of semen extender solution.

Highly effective; generally nonirritating when mixed with an equal volume of NaHCO₃ and diluted in saline

Polymyxin B -

1 million units per 100ml of final semen extender solution.

Gram-negative infections, particularly *Pseudomonas*

Gram Positive or Negative Activity

Ticarcillin + -

1 mg per 1ml of semen extender solution.

Use for *Pseudomonas*; do not use for *Klebsiella*

Naxcel (Ceftiofur Sodium) + -

1 mg per 1ml of extender solution

Third-generation cephalosporin; has been used empirically once daily either intramuscularly or by intrauterine infusion; broad-spectrum effectiveness against Gram-positive and Gram-negative bacteria