



Pyometra and Cystic Endometrial Hyperplasia

(Abnormal Thickening in the Lining of the Uterus, with the Presence of Fluid-Filled Sacs and Pus in the Uterus)

Basics

OVERVIEW

- Cystic endometrial hyperplasia—hormonally mediated, progressive, abnormal thickening in the lining of the uterus (known as the “endometrium”), characterized by the presence of fluid-filled sacs or cysts
- Pyometra—develops secondary to cystic endometrial hyperplasia or inflammation of the lining of the uterus (known as “endometritis”); develops when bacteria invade the abnormally thickened lining of the uterus (lining of the uterus known as the “endometrium”) and pus accumulates in the uterus
- The female dog is a “bitch”; the female cat is a “queen”

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs—genetic predisposition in some related lines, suggested for Bernese mountain dogs, rottweiler, rough-coated collie
- Cats

Mean Age and Range

- Usually greater than 6 years of age (range 4 months to 16 years of age in dogs)
- Young pets—especially if treated with female hormones (estrogen) or progestogen (any substance capable of producing the effects of the female hormone, progesterone)
- Dogs—usually diagnosed 1–12 weeks after “heat” or “estrus”
- Cats—onset relative to “heat” or “estrus” more variable, usually within the 4 weeks following heat
- Accumulation of pus in the uterine stump (known as “pyometra of the uterine stump”) in spayed pets—may develop any time after surgical removal of the ovaries and uterus (known as a “spay” or “ovariohysterectomy”)

Predominant Sex

- Female only

SIGNS/OBSERVED CHANGES IN THE PET

- Closed cervix (the “cervix” is the lower part of the uterus that extends into the vagina [the tubular passageway or birth canal, leading from the opening of the vulva to the cervix]; a “closed cervix” is one in which the muscles



surrounding the cervix are contracted and the opening into the uterus is “shut” so no pus or discharge can drain from the uterus; uterus is enlarged with closed cervix (where the pus or discharge cannot drain from the uterus); may not be enlarged with open cervix (where the muscles surrounding the cervix are relaxed, allowing the opening into the uterus to expand and pus or discharge to drain from the uterus, through the vagina and vulva [external genitalia])

- Closed pyometra signs include: depression and sluggishness (lethargy), lack of appetite (known as “anorexia”), increased urination (known as “polyuria”) and increased thirst (known as “polydipsia”), vomiting, abdominal distension; signs of generalized (systemic) illness, progressing to signs of generalized disease caused by the spread of bacteria in the blood (known as “septicemia” or “blood poisoning”) and shock
- Discharge from the vulva—if cervix is open, discharge may be bloody and/or may contain pus
- May or may not have fever

CAUSES

- Dogs—repeated exposure of the lining of the uterus (endometrium) to estrogen followed by exposure to progesterone with each “heat” or “estrus” without pregnancy; this hormonal pattern is unique to the bitch
- Cats—may be the result of estrogen at “heat” or “estrus,” followed by a progestational phase (pseudopregnancy), caused by induction of release of eggs from the ovaries (known as “ovulation”) through breeding, spontaneous ovulation, or other hormonal stimuli (hCG, GnRH)

RISK FACTORS

- Old, ovary-intact females that have never given birth may be predisposed; an “intact female” has her reproductive organs and is capable of reproduction
- Pharmacologic use of estrogen (“mismatch”) shots during particular times of the “heat” or “estrous” cycle
- No correlation with “false pregnancy” or “pseudopregnancy” in dogs (in other words, a bitch with a history of false pregnancy is not at greater risk of developing cystic endometrial hyperplasia and/or pyometra than a bitch that has not had a false pregnancy)
- Use of progestogen medicine in queens and bitches

Treatment

HEALTH CARE

- Inpatient
- Accumulation of pus in the uterus (pyometra)—life-threatening condition if the cervix is closed (where pus or discharge cannot drain from the uterus)
- Supportive care—immediate intravenous fluid administration and antibiotics

SURGERY

- Spay is the preferred treatment for all non-breeding females, those greater than 4 years of age, and those with system-wide illness signs
- For pyometra, whether open or closed cervix—surgical removal of the ovaries and whole uterus (spay or ovariectomy) including the cervix will be recommended as soon as the pet is stable
- Accumulation of pus in the uterus (pyometra), with a closed cervix (where pus or discharge cannot drain from the uterus)—caution will be used during surgical removal of the ovaries and uterus (spay or ovariectomy); the enlarged uterus may be very fragile

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

ANTIBIOTICS

- Initial antibiotic selected by your pet's veterinarian based on experience, pending results of bacterial culture and sensitivity test
- Will be administered to all pets with inflammation/infection characterized by accumulation of pus in the uterus

(pyometra)

- Common choices—ampicillin; cefazolin; if stable with normal organ function, and past the growth phase, may consider enrofloxacin (Baytril®)
- Antibiotics—not effective as the sole treatment, unless the uterus is of normal size and the serum progesterone level is less than 2 ng/ml on blood tests

PROSTAGLANDINS

Prostaglandin F_{2α} (PGF_{2α})

- Prostaglandins cause smooth muscle contractions and subsequent emptying of the uterus and decrease in serum progesterone concentration, based on dosage; start with low dose in new protocol to minimize side effects
- Dogs and cats—for 1 day, then a bit higher dose for 1-2 days, then one more step-up in dose given for 3-4 days
- Surgical removal of the ovaries and uterus (spay or ovariohysterectomy)—performed in pets that do not respond to treatment with prostaglandin (lack of response indicated by continued enlargement of the uterus or presence of fluid in the uterus, or discharge from the vulva is still present after 5 days of medical treatment)

CLOPROSTENOL

- Dogs—injection under the skin (subcutaneous or SC injection) daily for 7–14 days; greater side effects compared to natural form of the hormone

MISCELLANEOUS

- Using a scope to enter the cervix for open and closed pyometra cases; a recently described technique—flush the uterus with warm saline and the PGF_{2α}; resolution in 3-5 days; patient selection important
- PGF_{2α} is used extra-label—your veterinarian will discuss this further
- Aglepristone—effectiveness improved with prostaglandin treatment at the same time; not readily available in the United States; minimal side effects; slow acting
- Cabergoline—for 7–14 days with prostaglandin treatment or bromocryptine, given with food, best used in combination with PGF_{2α}; cervix should open in 24-48 hours

Follow-Up Care

PATIENT MONITORING

- Improvement in signs is expected within 24 hours of start of PGF_{2α} treatment, within 3 days, ultrasound will show the uterus shrinking—no discharge and no fluid in the uterus on ultrasound is expected within 7 days; serum progesterone hormone levels should normalize in 5-7 days
- Antibiotics—administration will be continued for at least 2 weeks after discharge is resolved and ultrasound confirms the uterus is clear of fluid
- Serial complete blood counts (CBCs)—the white blood cell (WBC) count rises rapidly after surgical removal of the ovaries and uterus (spay or ovariohysterectomy), because the bone marrow continues to release neutrophils (a type of white blood cell) into the bloodstream, from which they can no longer enter the uterus but should normalize in 10-15 days
- Follow-up ultrasound of the uterus 4 weeks after discontinuation of treatment to ensure no fluid

PREVENTIONS AND AVOIDANCE

- If not used for breeding, the animal should be spayed; spay breeding bitches as soon as their desired number of litters has been obtained
- First breeding/litters before 4 years of age
- Breed during the “heat” or “estrus” immediately following medical treatment—the pregnant uterus may be less susceptible to reinfection; do vaginal cytology to monitor for neutrophils and treat with broad-spectrum antibiotics until early ultrasound at 28 days if signs of infection possible
- Bitch with underlying cystic endometrial hyperplasia has limited breeding life (best to get desired number of puppies as soon as possible)
- Ultrasound 28 days after LH surge can help identify possible recurrent pyometra

POSSIBLE COMPLICATIONS

- Bitch may enter “heat” or “estrus” sooner after medical treatment than anticipated; mibolerone may be necessary to allow time for the system to heal, to ensure a minimum of 6 months from the last heat
- Accumulation of pus in the uterus (pyometra)—recurrence possible at subsequent heats in spite of medical treatment; rate of recurrence depends on age, how many previous litters, and pre-existing problems of the uterus
- Possible stump pyometra, in spayed animals, may be associated with ovarian remnants; the stump is the area of the reproductive tract that is left behind during the spay (removal of uterus and ovaries)—rare

EXPECTED COURSE AND PROGNOSIS

- Dogs with underlying cystic endometrial hyperplasia (thickening of the uterine lining with the presence of fluid-filled sacs or cysts); predisposed to pyometra
- Breed bitch to desired stud dogs in a timely manner; use of proven young stud dogs or high quality AI technique is recommended to help ensure pregnancy at the first post-treatment heat; pregnancy rates of 50-90% following medical treatment of pyometra
- Closed-cervix pyometra can be associated with uterine rupture and inflammation of the lining of the abdomen (known as “peritonitis”), and septic shock
- Prognosis for both closed and open pyometra is good if uterus rupture does not occur; mortality rate is 4% in bitches and 8% in queens

Key Points

- Surgical removal of ovaries and uterus (spay or ovariohysterectomy) is the preferred treatment
- Medical treatment should be considered only for a valuable breeding animal; the bitch should be bred on the first heat following the treatment to ensure prompt pregnancy, as this reduces the chance of repeat pyometra
- Medical treatment of closed-cervix pyometra can be associated with uterine rupture and inflammation of the lining of the abdomen (peritonitis)