

# ABNORMAL THICKENING IN THE LINING OF THE UTERUS, WITH THE PRESENCE OF FLUID-FILLED SACS (CYSTIC ENDOMETRIAL HYPERPLASIA) AND PUS IN THE UTERUS (PYOMETRA)

## 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; develops when bacteria invade the abnormally thickened lining of the uterus (endometrium) and pus accumulates in the uterus
- The female dog is a “bitch;” the female cat is a “queen”

### SIGNALMENT/DESCRIPTION of ANIMAL

#### *Species*

- Dogs and cats

#### *Mean Age and Range*

- Usually greater than 6 years of age
- Young animals—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 to 12 weeks after “heat” or “estrus”
- Cats—onset relative to “heat” or “estrus” more variable
- Accumulation of pus in the uterine stump (known as “pyometra of the uterine stump”) in spayed animals—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 ANIMAL

- 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—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
- Uterus—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])
- Discharge from the vulva (external genitalia)—depends if cervix is open or closed; discharge may be bloody or may contain mucus and pus
- Depression and sluggishness (lethargy)
- Lack of appetite (known as “anorexia”)
- Increased urination (known as “polyuria”) and increased thirst (known as “polydipsia”)
- Vomiting
- Abdominal distension

### CAUSES

- Dogs—repeated exposure of the lining of the uterus (endometrium) to estrogen followed by exposure to progesterone with each “heat” or “estrus” (whether or not the bitch becomes pregnant); this hormonal pattern is unique to the bitch
- Cats—may be the result of estrogen at “heat” or “estrus,” followed by a progestational phase, caused by induction of release of eggs from the ovaries (ovulation) through breeding, spontaneous ovulation, or other (as yet undefined) stimuli

### RISK FACTORS

- Old, intact females that have never given birth may be susceptible
- 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)

## 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

- Accumulation of pus in the uterus (pyometra), open and closed cervix—surgical removal of the ovaries and uterus (spay or ovariectomy) preferred treatment; long-term (chronic) progressive disease
- Accumulation of pus in the uterus (pyometra), with a closed cervix (where pus or discharge cannot drain from the uterus)—caution should be used during surgical removal of the ovaries and uterus (spay or ovariectomy); the enlarged uterus may be very fragile
- Uterine rupture or leakage of pus from the uterine stump—repeated flushing (lavage) of the abdominal cavity with sterile saline

## 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

- Empirical, pending results of bacterial culture and sensitivity test
- Should be administered to all patients with inflammation characterized by accumulation of pus in the uterus (pyometra)
- Common choices—[ampicillin](#); [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<sub>2α</sub> (PGF<sub>2α</sub>)*

- Prostaglandins cause smooth muscle contractions and subsequent emptying of the uterus and decrease in serum progesterone concentration, based on dosage
- Dogs—for 2 to 7 days, until the uterus nears normal size as determined by feeling the abdomen, X-rays, or ultrasound examination or until no fluid is visible within the uterus as seen by ultrasound examination
- Cats—for 2 to 5 days, until the uterus nears normal size
- Re-evaluate patient 2 to 4 weeks after discontinuation of prostaglandins; if the uterus has increased in size or the patient still has marked discharge from the vulva (external genitalia), medical treatment protocol can be repeated
- Surgical removal of the ovaries and uterus (spay or ovariectomy)—performed in patients 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 two courses of medical treatment)

#### *Cloprostenol*

- Dogs—injection under the skin (subcutaneous or SC injection) daily for 7 to 14 days

### Miscellaneous

- [Aglepristone](#)—effectiveness improved with prostaglandin treatment at the same time; not readily available in the United States
- [Cabergoline](#)—for 7 to 14 days with prostaglandin treatment
- Drugs that enhance the immune response (such as estrogens) or certain agents (such as oxytocin and ergot), which induce contraction of the muscles of the uterus are unreliable; “oxytocin” is a female hormone that causes uterine contractions and promotes milk release during lactation

## FOLLOW-UP CARE

### PATIENT MONITORING

- Release from the hospital when the uterus is of near normal size or when no fluid is visible within the uterus by ultrasound examination, and clinical signs have lessened in severity or disappeared; re-evaluate in 2 to 4 weeks
- Antibiotics—administration should be continued for 3 to 4 weeks

- Discharge from the vulva (external genitalia)—may persist for up to 4 weeks
- Serial complete blood counts (CBCs)—the white-blood cell count rises rapidly after surgical removal of the ovaries and uterus (spay or ovariectomy), 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

#### **PREVENTIONS AND AVOIDANCE**

- Next proestrus (time from beginning of vaginal bleeding of “heat” until the bitch allows male to mount and breed)—obtain a specimen of the anterior vagina for bacterial culture, using a guarded culture swab
- Treat bitch with an appropriate antibiotic for 3 weeks
- Breed during the “heat” or “estrus” immediately following medical treatment—the pregnant uterus may be less susceptible to re-infection; bitch with underlying cystic endometrial hyperplasia has limited breeding life (best to get desired number of puppies as soon as possible); bitch not more likely to clear the disease spontaneously if allowed to cycle without being bred

#### **POSSIBLE COMPLICATIONS**

- Bitch may enter “heat” or “estrus” sooner after medical treatment than anticipated

#### **EXPECTED COURSE AND PROGNOSIS**

- Dogs—underlying cystic endometrial hyperplasia (thickening of the uterine lining with the presence of fluid-filled sacs or cysts) still exists; predisposed to recurrence
- Breed patient to desired stud dogs in a timely manner; use of subfertile stud dogs is not recommended
- Recommend surgical removal of ovaries and uterus (spay or ovariectomy) as soon as breeding life is over
- Closed-cervix (where pus or discharge cannot drain from the uterus) inflammation of the uterus with accumulation of pus (pyometra) can be associated with uterine rupture and inflammation of the lining of the abdomen (known as “peritonitis”)

#### **KEY POINTS**

- Surgical removal of ovaries and uterus (spay or ovariectomy) is the preferred treatment
- Medical treatment should be considered only for a valuable breeding animal that has an open cervix (where pus or discharge can drain from the uterus) and does not have excess levels of urea and other nitrogenous waste products in the blood (known as “uremia” or “azotemia”); except when breeding is planned, non-progestational, estrus-suppressing drugs must be given for life
- Medical treatment of closed-cervix (where pus or discharge cannot drain from the uterus) inflammation of the uterus with accumulation of pus (pyometra) can be associated with uterine rupture and inflammation of the lining of the abdomen (peritonitis)
- Medical treatment probably does not cure underlying cystic endometrial hyperplasia (thickening of the uterine lining with the presence of fluid-filled sacs or cysts) in patients with either open- or closed-cervix pyometra, but may enable some affected bitches to reproduce

