

Canine pyometra

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Abstract

Pyometra, literally meaning pus in the uterus, is a common disease entity of intact bitches. Similar conditions occur, including hydrometra and mucometra [De Bosschere H, Ducatelle R, Vermeirsch H, Van Den Broeck W, Coryn M. Cystic endometrial hyperplasia–pyometra complex in the bitch: should the two entities be disconnected? *Theriogenology* 2001;55:1509–19]. The exact etiology is unknown; however the repeated and prolonged response to estrogen followed by long intervals of progesterone dominance in the intact bitch leads to hormonally mediated changes in the endometrium. The endometrium changes when impacted by bacterial infiltration; changes in endometrial steroid receptors can result in the clinical syndrome described as pyometra. This paper will describe the signalment, risk factors, prevalence, proposed etiologic events, and both medical and surgical therapies. In addition, the prognosis for successful outcome and effects on future reproduction will also be described.

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1. Introduction

Canine pyometra is a disease of the uterus in intact, sexually mature bitches usually diagnosed from 4 weeks to 4 months after estrus. The disease often causes subtle changes in the early stages; therefore, the diagnosis is often made late in the disease process. Many studies indicate an increased incidence of pyometra in nulliparous bitches and in bitches >4 years of age [2]. Pyometra should be included in the differential diagnosis for any intact bitch, regardless of the presenting signs. Bitches with pyometra may present either with a vaginal discharge present (open-cervix pyometra) or without a vaginal discharge (closed-cervix pyometra). Closed-cervix pyometra is a medical emergency that requires rapid intervention to prevent overwhelming sepsis and the potential of patient death.

2. Signalment and incidence

Pyometra occurs in intact bitches from 4 weeks to 4 months after estrus. Clinically, the bitch may present with inappetence, depression, polydipsia, lethargy, and abdominal distension, with or without vaginal discharge. Typically, the bitch is afebrile, and will often have an elevated white blood cell count. Prerenal azotemia commonly accompanies the dehydration present (with hyperproteinemia and hyperglobulinemia). Occasionally a previously ovariohysterectomized bitch will present with a stump pyometra resulting from a uterine remnant. There is no apparent association between clinical signs of pseudocyesis and pyometra. Vaginal discharge, when present, may be purulent, sanguinopurulent (e.g. similar to tomato soup), mucoid, or severe frank hemorrhage. In a group of colony-raised Beagles, the incidence of pyometra was 15.2% of bitches >4 years of age [3]; the average age of onset was 9.36 ± 0.35 y. In Sweden, where ovariohysterectomy is only allowed for health reasons, the incidence of

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pyometra over a 2 year period from 1995 to 1996 was 2% in a group of insured bitches greater than 10 years of age [4]. There is an increased risk for pyometra in some breeds, including the following: Golden Retriever, Miniature Schnauzer, Irish Terrier, Saint Bernard, Airedale Terrier, Cavalier King Charles Spaniel, Rough Collie, Rottweiler, and Bernese Mountain Dogs. Dow [5] described four stages of canine pyometra: Stage I, uncomplicated cystic endometrial hyperplasia; Stage II, cystic endometrial hyperplasia with plasma cell infiltrate; Stage III, cystic endometrial hyperplasia with acute endometritis; Stage IV, cystic endometrial hyperplasia with chronic endometritis. De Cock et al. [6] hypothesized that high concentrations of insulin-like growth factor I located in and around the epithelial cells of the endometrium in dogs with cystic endometrial hyperplasia may play an important role in the development of cystic endometrial hyperplasia.

3. Pathogenesis

The pathogenesis of pyometra in the bitch involves estrogen stimulation of the uterus, followed by prolonged intervals of progesterone dominance. Progesterone results in endometrial proliferation and uterine glandular secretions and decreased myometrial contractions. Leukocyte inhibition in the progesterone-primed uterus often supports bacterial growth. These effects are cumulative, with each estrous cycle exacerbating the uterine pathology. Thus, in the first half of diestrus, the suppressed activity of cellular immunity results from increasing progesterone concentration and minimal estrogen release [7]. Recent research involving the induction of canine pyometra by inoculating *Escherichia coli* into the uterus demonstrated that, on days 11–20 and 21–30 after the LH peak, the uterus was most susceptible to infection. The *E. coli* present in naturally occurring cases are also found in the urine and feces of affected bitches [8]. It appears that sub-clinical urinary tract infection is associated with pyometra where adherence via K-antigen seems to be important for colonization of the bacteria in the uterus [9]. Exogenous estrogen therapy for mismating and progesterone therapy for estrus suppression have been associated with increased risk for pyometra.

4. Diagnosis

Most bitches with pyometra will be presented to the clinician from 4 weeks to 4 months after estrus. The owners of older bitches may not report any recent estrus activity, assuming that their bitch has undergone

“menopause”. The diagnosis of canine pyometra is best made with ultrasonography and radiology [10]. Ultrasonographically, a fluid filled organ with variable wall thickness and proliferative changes can be visualized. A lateral abdominal radiograph can be utilized to identify a sausage-like fluid filled tubular organ located between the descending colon and the urinary bladder. Vaginal discharge may or may not be present. If a vaginal discharge is present, other etiologies of vaginal discharge including immune-mediated thrombocytopenia, metritis, vaginitis, and estrus should be considered [11]. Some authors believe that the cystic endometrial pyometra complex should be viewed separately from the condition described as pyometra [1]. The bitch will usually have an elevated WBC count, prerenal azoemia, hyperproteinemia, and hyperglobulinemia.

5. Treatment

The treatment of choice for any older, systemically ill bitch, or one with closed-cervix pyometra, is complete ovariectomy [12]. Bitches that are seriously ill should be medically stabilized with appropriate intravenous fluid therapy and broad-spectrum antibiotics prior to surgery. The surgical team should be prepared to deal with bacteremia and endotoxemia. Disseminated intravascular coagulation is an infrequent but possible complication of pyometra. Attempted medical management of bitches with closed-cervix pyometra may result in uterine rupture, with seepage of uterine contents into the abdomen. This author believes that medical management of closed-cervix pyometra is contraindicated due to the potential for life-threatening complications.

Young bitches that present with an open-cervix pyometra, normal organ function, and a compliant, reasonable owner may be treated with prostaglandins in an attempt to preserve their breeding value [13]. Prostaglandins increase myometrial contractility, encourage cervical relaxation, and allow expulsion of the uterine content; repeated doses cause lysis of the corpus luteum. Serum progesterone concentrations should be determined prior to and at the conclusion of, prostaglandin therapy.

Prostaglandin F2 alpha (PGF2 α) at a dose of 250 μ g/kg is given subcutaneously every 12 h [14] until the uterus approaches its normal size. Therapy normally is needed for 3–5 days. Therapy that requires longer treatment, or a recurrence of fluid in the uterus, indicates a poor prognosis for prostaglandin treatment success. A vaginal culture with a guarded swab should

be obtained prior to therapy and appropriate antibiotics should be started and continued for 3–4 weeks following PGF2 alpha therapy. Since, prostaglandins are not approved for use in small animals in the USA, prior to initiating therapy, it is prudent to have the owner sign an informed consent form (which outlines the risks and prognosis). Many other protocols have been published, including starting with doses of PGF2 alpha as low as 50 µg/kg and gradually increasing to 250 µg/kg over the treatment period in an attempt to decrease the side effects of prostaglandins therapy (including panting, nausea, vomiting, diarrhea, and salivation). These side effects are seen 15–45 min after injection and decrease in severity with each subsequent dose. Other clinicians have used cloprostenol, a prostaglandin analog, for the treatment of open-cervix pyometra. Intravaginal prostaglandin F2 alpha has also been used for the treatment of both metritis and pyometra in the bitch, with results similar to those using subcutaneous prostaglandin therapy [15]. Gobello et al. described two protocols combining aglepristone and cloprostenol to treat open-cervix pyometra in the bitch [16]. The antiprogesterin aglepristone, when used as a sole agent for uterine evacuation, was successfully used in a German study [17]. However, these antiprogesterins are not available in the USA. In this author's opinion, prostaglandins should NEVER be dispensed for client administration due to the narrow safety index and the potential for triggering asthmatic events and pregnancy loss in humans.

6. Prognosis

Bitches that have been treated with prostaglandins may experience a shortened interestrus interval to the next cycle. The bitch should have a vaginal culture taken during the first 5 days of proestrus, be treated with appropriate antibiotics and bred to a fertile stud dog at her next estrous cycle to maximize her chances for pregnancy. Success is relative, with expected conception rates of 50–65%. Fertility of recovered bitches is decreased when compared with that of normal, untreated bitches [18]. Recovered bitches that fail to conceive or complete a subsequent cycle without being bred can have a high incidence of recurrence of pyometra. This author has observed pyometra at young ages in subsequent generations of Chow Chows and English Setters, suggesting that there may be a familial tendency toward early development of cystic endometrial hyperplasia in these animals.

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