

Pyometra in Small Animals



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KEYWORDS

- Endometritis • Cystic endometrial hyperplasia • *Escherichia coli* • Endotoxemia
- Aglepristone • Prostaglandin • Cabergoline • Bromocriptine

KEY POINTS

- Pyometra foremost affects middle-aged to older intact bitches and queens, usually within 4 months after estrus.
- Hormonal and bacterial factors are involved in the pathogenesis, and progesterone plays a key role.
- Cystic endometrial hyperplasia (CEH) is a predisposing factor, but pyometra and CEH can develop independently.
- Pyometra induces endotoxemia and sepsis, and early diagnosis and treatment increase the chances of survival.
- Diagnosis is based on clinical signs and findings on physical examination, hematology and biochemistry laboratory tests, and diagnostic imaging identifying intrauterine fluid.
- Surgical ovariohysterectomy is the safest and most effective treatment, as the source of infection is removed and recurrence prevented. Medical treatment can be an alternative in young and otherwise healthy breeding animals with open cervix and without other uterine or ovarian pathologies.

 Video content accompanies this article at <http://www.vetsmall.theclinics.com>.

INTRODUCTION

Pyometra, literally meaning “pus-filled uterus,” is a common illness in adult intact female dogs and cats and a less frequent diagnosis in other small animal species.^{1,2} The disease is characterized by an acute or chronic suppurative bacterial infection of the uterus post estrum with accumulation of inflammatory exudate in the uterine lumen and a variety of clinical and pathologic manifestations, locally and systemically.³ The disease develops during the luteal phase, and progesterone plays a key role for the establishment of infection with ascending opportunistic bacteria. The pathogen most often isolated from pyometra uteri is *Escherichia coli*.^{4–6} A wide range of clinical signs are associated with the disease, which can be life-threatening in severe cases. It is important to seek

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immediate veterinary care when pyometra is suspected because a patient's status may deteriorate rapidly and early intervention increases chances of survival. The diagnosis is generally straightforward but can be challenging when there is no vaginal discharge and obscure clinical signs. Surgical ovariohysterectomy (OHE) is the safest and most efficient treatment, but purely medical alternatives may be an option in some cases.

EPIDEMIOLOGY AND RISK FACTORS

Pyometra is an important disease, particularly in countries where elective neutering of healthy dogs and cats is not generally performed.^{1,2,7} In Sweden, in average 20% of all bitches are diagnosed before 10 years of age and more than 50% in certain high-risk breeds. The disease generally affects middle-aged to older bitches, with a mean age at diagnosis of 7 years, and has been reported in dogs from 4 months to 18 years of age. The overall incidence rate is 199 per 10,000 dog-years at risk.⁷ In cats, pyometra is not as common, which is believed to depend on less progesterone dominance due to seasonality and induced ovulation. In queens, 2.2% are diagnosed with the disease before 13 years of age, with an incidence rate of 17 cats per 10,000 cat-years at risk.² The mean age at diagnosis is 5.6 years, with an age range of 10 months to 20 years, and the incidence increases with age and markedly over 7 years of age.^{2,8–10} A higher incidence in some dog and cat breeds indicates that they may have a genetic predisposition.^{1,2,7,9} Exogenous treatment with steroid hormones, such as progestogens, or estrogen compounds that increase the response to progesterone, are associated with increased risk of the disease.^{11,12} Pregnancy is slightly protective in dogs, an effect that is also influenced by breed.¹³ Cystic endometrial hyperplasia (CEH) is believed to increase the uterine susceptibility for infection.^{14,15} In cats, little is known about risk factors and protective factors but previous hormone therapy (ie, exogenous progesterone) is associated with an increased risk.¹⁶

ETIOLOGY AND PATHOGENESIS

The complex pathogenesis of pyometra is not yet completely understood but involves both hormonal and bacterial factors. Although most studies have been done in dogs, the development is believed similar in cats. The uterine environment during the luteal phase is suitable for pregnancy but also for microbial growth. Progesterone stimulates growth and proliferation of endometrial glands, increased secretion, cervical closure, and suppression of myometrial contractions.¹⁴ The local leukocyte response and uterine resistance to bacterial infection also become decreased.^{17–19} Circulating concentrations of estrogen and progesterone are not usually abnormally elevated in pyometra, and increased numbers and sensitivity of hormone receptors are believed to initiate an amplified response.^{20,21} Simultaneous corpora lutea and follicular cysts are more often found in bitches with pyometra, supporting a synergistic hormonal effect.²²

Progesterone-mediated pathologic proliferation and growth of endometrial glands and formation of cysts (ie, cystic endometrial hyperplasia [CEH]) is believed to predispose for pyometra but the 2 disorders can develop independently (**Fig. 1**).²³ Sterile fluid may accumulate in the uterine lumen, with or without CEH, which is defined as hydrometra or mucometra or, more rarely, hemometra, depending on the type of fluid and its mucin content. Clinical signs are generally subclinical or mild when there is no bacterial infection of the uterus.^{3,24,25}

E coli is the predominant pathogen isolated from pyometra uteri, but other species may also occur (**Table 1**).^{4,26–29} More than 1 bacterial species can be involved, and cultures are sometimes negative.^{28,29} Emphysematous pyometra is caused by gas-producing bacteria.³⁰ A healthy uterus eliminates bacteria that have entered during

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