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Ministry of Higher Education  
& Scientific Research  
University of Al-Qadisiyah  
College of Veterinary Medicine



## Pyometra in cat

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requirements for the Degree of Bachelor of Science in Veterinary  
Medicine and Surgery.

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1441 A.H.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

فَنَعَلَى اللَّهِ الْمَلِكُ الْحَقُّ وَلَا تَعْجَلْ بِالْقُرْآنِ مِنْ قَبْلِ أَنْ يُقْضَىٰ  
إِلَيْكَ وَحْيُهُ، وَقُلْ رَبِّ زِدْنِي عِلْمًا ﴿١١٤﴾

صَدَقَ اللَّهُ الْعَظِيمُ،

من سورة طه

## Certificate of Supervisor

I certify that the project entitled (-----  
-----) was prepared by -----  
-- under my supervision at the College of Veterinary Medicine / University of Al-  
Qadisiyah.

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-- / -- / 2020

## Certificate of Department

We certify that ----- has finished his/her  
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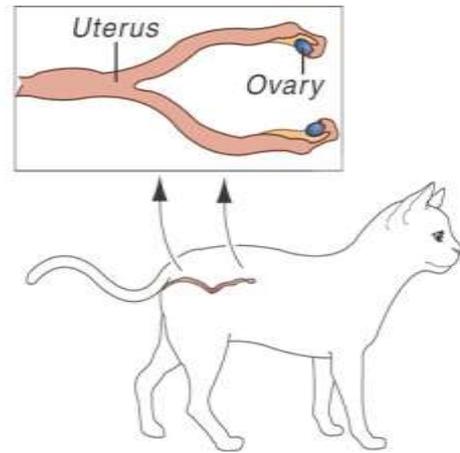
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## Introduction

Endometrial polyps are quite uncommon in cats. Endometrial polyps are one of several benign growths in the endometrium that consist of a focal proliferation of both glandular and stromal elements. Occasionally, these larger polyps become well-developed and can be easily confused with uterine tumors. Pyometra is a uterine infection that is commonly seen in bitches and queens. The action of sex hormones on the endometrium causes cystic endometrial hyperplasia, which is characterized by cystic endometrial hyperplasia. Because ovulation in cats is caused by coitus and the uterus is less exposed to sex hormones, unsprayed female dogs are more prone to cystic endometrial hyperplasia-pyometra than cats, who have a lower risk for the disease.( Pettersson, 2012, p.347).



Endometrial polyps and an open cervix in cats, infection in the uterine lining develops as a result of hormonal changes. Progesterone levels stay increased for eight to nine weeks after estrus or "heat," prompting the uterine lining to thicken in preparation for pregnancy. If no pregnancy occurs after numerous estrus cycles, the uterine lining thickens to the point where cysts form in the uterus. The cystic lining secretes fluids that provide an excellent habitat for bacteria to thrive. Furthermore, high progesterone levels make it difficult for the muscles in the uterine wall to contract. Another issue is that white blood cells are eliminated from the uterus during estrus to allow sperm to get through safely. (Pettersson, 2012, p.348)

Infection is common as a result of this breakdown in protection. The usage of progesterone-based medications can raise the incidence of pyometra in cats. Progesterone's effects on the uterus will be amplified by estrogen.

Certain reproductive system problems are treated with drugs that include both hormones. The goal of this study was to describe the incidence and chance of developing pyometra in cats' dependent on age and breed. From 1999 to 2006, the researchers used reimbursed claims for veterinary care insurance, life insurance claims, or both in cats insured in a Swedish insurance database. Pyometra had a mean incidence rate (IR) of roughly 17 cats per 10,000 cat years at risk (CYAR). A significant breed effect was seen in cats with pyometra, which were identified at a median age of 4 years. The Sphynx had the greatest IR (433 cats per 10,000 CYAR), and the Siberian cat, Ocicat, Korat, Siamese, Ragdoll, Maine coon, and Bengal had IRs of over 60 cats per 10,000 CYAR. Pyometra became more common as cats got older, with a significant increase in cats over the age of seven. The overall case mortality rate in cats was 5.7 percent, which is slightly higher than the 3 percent to 4 percent reported in dogs. The chance of contracting the disease was unaffected by where you lived (urban or rural). Based on age, breed, and urban or rural geographic area, the study provides information on the incidence and probability of getting pyometra. These findings could aid in the development of cat breeding programs in high-risk breeds, as well as future research into the disease's genetic background. (Bradley RL, P, 1987, p. 2)

### **Types and the clinical signs of pyometra**

Pyometrae are divided into two types: open and closed. If the cat has open pyometra, there will be vaginal discharge, which will aid the veterinarian in making a speedy diagnosis. Closed pyometra cats, on the other hand, do not have discharge because the uterus is maintained closed by the cervix. If it's open, pus will leak from the uterus to the outside via the vaginal canal. This discharge can be seen on the skin or hair under the cat's tail, as well as on the bedding and furniture where the cat has slept. The cat's meticulous nature often drives her to clean up the discharge before it becomes visible. Fever, lethargy, anorexia, and

sadness may or may not be present with an open pyometra. The pus that forms is impossible to drain to the outside if the cervix is closed. It gathers in the uterus, causing abdominal distention. Toxins are released by the bacteria, which are taken into the bloodstream. Affected cats frequently become gravely ill in a short period of time. They're anorexic, sedentary, and depressed. There may be vomiting or diarrhea.

The ability of the kidneys to retain fluid is harmed by toxins produced by bacteria. Urine production increases, and the cat drinks an excessive amount of water. Pyometra with an open or closed cervix might cause this. And there are a lot of them:

### **Signs of Pyometra in Cats**

- + *Vaginal discharge that is bloody or purulent.***
- + *Urinating outside of the litterbox is not a good idea.***
- + *The abdomen is bloated. Laziness. I'm throwing up.***
- + *Appetite decreases.***
- + *Urine with blood in it. Urination has increased.***
- + *Thirst has increased.***
- + *The vaginal entrance is licked excessively.***

### **The Reasoned:**

Endometriosis is an inflammatory condition that affects both the uterus and the appendages in cats. Pathogenic microorganisms trapped in the uterine cavity and fixed on the endometrium, or intrauterine mucosa, cause this condition. These organisms become active and spread rapidly, exacerbating the sickness. Endometriosis in cats comes in a variety of forms, each with its own set of symptoms. If therapy is not started in a timely manner, or if disease develops, the animal's capacity to breed will be destroyed, and the pet's life will be jeopardized. (Fransson BA, P, 2006, p. 198)

### **How is pyometra diagnosed:**

Early in the condition, cats may have a small vaginal discharge but show no other signs of sickness. Most cats with pyometra, on the other hand, are not diagnosed until later in the illness. Pyometra is usually suspected in any severely unwell female cat who is not spayed and is consuming an excessive amount of water. This is especially true if there is a vaginal discharge or if the abdomen is uncomfortable and swollen. The white blood cell count in cats with advanced pyometra is significantly higher, and globulins, a kind of protein generated by the immune system, are frequently elevated in the blood. Because of the bacteria's harmful effects on the kidneys, the specific gravity of the urine is extremely low. All of these anomalies, on the other hand, could be present in any cat suffering from a serious bacterial infection in another organ. The enlarged uterus can often be seen on radiographs (x-rays) of the abdomen if the cervix is closed. If the cervix is open, the uterine growth will typically be so little that the radiograph will be inconclusive. An ultrasound examination can help to detect an enlarged uterus and distinguish it from a normal pregnancy. Veterinarians use a standardized hierarchical diagnostic registry to classify medical conditions and diseases, which includes both particular and general codes (Swedish Animal Hospital Association, diagnostic registry for the horse, the dog, and the cat, Taberg, 1993, in Swedish). The diagnosis code chosen was pyometra, which excludes cases of hydrometra or mucometra. (pyometra, P, 1959, p,50)

### **How is pyometra treated?**

The uterus and ovaries are surgically removed as the preferred treatment. The procedure is known as an ovariectomy or "spay" surgery. Cats who are diagnosed early in the condition are excellent surgical candidates. Pyometra

surgery is only little more difficult than a standard spay. Most cats, on the other hand, are detected after they are already fairly sick, increasing the danger of surgery. Before and after surgery, intravenous fluids are frequently required. Antibiotics are routinely prescribed for two weeks after surgery.

### **Case:**

A 15-year-old 3.1-kg Chinchilla Persian cat was referred to Chonnam National University's Veterinary Teaching Hospital owing to a lump in the endometrium and hypoechoic fluid accumulation in the lumen as seen on ultrasonography. Clinical indications of an open-cervix pyometra, consisting of grayish purulent vaginal shaped cells with varying levels of collagen fiber, were seen in the cat. The glands' lining was made up of simple cuboidal to columnar epithelium. (Dow C, P, 1962, p. 141)

### **Endometrial Polyps with Open-Cervix Pyometra in a Cat:**

With the owner's permission, an ovariohysterectomy (OHE) was conducted. The presence of a swollen uterus was discovered during a median ventral laparotomy. The uterine wall appeared thinner on the surface, and the uterine lumen had a significant amount of yellowish purulent discharge. The tumor was spherical and edematous, with multiple large cystic formations originating from the endometrial gland. A pedunculated polypoid mass of around 3 cm 2 cm in diameter protruded into the uterine cavity from the excised polyp from the left uterine horn. The ovaries, uterus, and endometrial tumor were all routinely removed and sent for histological evaluation. The polypoid mass was extruded into the uterine canal microscopically, with multiple large cystic forms generated from the endometrial gland. The queen was given antibiotics and antiphlogistics for several days after surgery. After ten days, the sutures were removed, and the patient was recovering well. The mass was mostly made up of hyperplastic endometrial glands embedded in stroma made up of spindle flattened by fluid

pressure within the cysts. There was moderate to severe connective tissue proliferation in the stroma, with admixed tiny blood vessels and occasionally compactly packed spindle shaped cells surrounding the thick-walled blood vessels (perivasucular whorled arrangement) . A physical examination of numerous endometrial polyps was obtained based on gross and histological evidence. Four weeks after the surgery, a follow-up treatment was administered, and no clinical complications were discovered.

### **EPIDEMIOLOGY AND RISK FACTORS:**

Pyometra is a serious disease, especially in nations where healthy dogs and cats are not neutered on a regular basis. In Sweden, 20% of all bitches are diagnosed before they reach the age of ten, and up to 50% in some high-risk breeds. The condition primarily affects middle-aged to older dogs, with a mean age of 7 years upon diagnosis, and has been reported in dogs ranging in age from 4 months to 18 years. The overall risk rate is 199 people per 10,000 years. Pyometra is less common in cats, which is thought to be owing to lower progesterone dominance due to seasonality and forced ovulation. Before the age of 13, 2.2 percent of queens are diagnosed with the condition, with an incidence rate of 17 cats per 10,000 cat-years at risk. 2 The average age at diagnosis is 5.6 years, with a range of 10 months to 20 years, and the incidence rises with age, peaking around the age of 7. 2.8%–10.5% Some dog and cat breeds have a greater prevalence, indicating that they may have a genetic tendency. Exogenous steroid hormone treatment, such as progestogens or estrogen drugs that boost progesterone responsiveness, has been linked to an increased risk of the condition. In dogs, pregnancy has a small protective effect, which is modified by breed. The uterine susceptibility to infection is thought to be increased by cystic endometrial hyperplasia (CEH). Except for past hormone therapy, little is known regarding risk and protective variables in cats.

## **ETIOLOGY AND PATHOGENESIS:**



Pyometra's complicated pathophysiology is still unknown, however it involves both hormonal and bacterial components. Although the majority of studies have been conducted on dogs, the development of cats is thought to be similar. During the luteal phase, the uterine environment is conducive to both pregnancy and microbial development. Progesterone promotes endometrial gland development and proliferation, enhanced secretion, cervical closure, and the suppression of myometrial contractions. In addition, the local leukocyte response and uterine resistance to bacterial infection are reduced. In pyometra, estrogen and progesterone concentrations in the blood are usually not unusually high, and increased numbers and sensitivity of hormone receptors are thought to trigger an amplified reaction. Bitches with pyometra have higher simultaneous corpora lutea and follicular cysts, indicating a synergistic hormonal action. Cystic endometrial hyperplasia is thought to predispose for pyometra, but it can develop independently. Progesterone-mediated pathologic proliferation and growth of endometrial glands and formation of cysts cystic endometrial hyperplasia is thought to predispose for pyometra, but it can develop independently. Depending on the kind of fluid and its mucin content, sterile fluid may build in the uterine lumen with or without CEH, which is characterized as hydrometra, mucometra, or, more rarely, hemometra. When there is no bacterial infection of the uterus, clinical indications are usually subclinical or minor. (Fertil Suppl 1993, p. 57)

The most common pathogen isolated from pyometra uteri is E coli, though other species may also be present. It's possible that more than one bacterial species is involved, and cultures are occasionally negative. Gas-producing microorganisms induce emphysematous pyometra. Bacteria that enter the uterus after cervical opening are eliminated by a healthy uterus, although the clearance capability varies depending on the stage of the estrus cycle. When compared to other estrus cycle stages, experimental E coli infection during the luteal phase causes greater CEH/pyometra. Because the same strains are present in the gastrointestinal system, the infection is most likely ascending, but hematogenic transmission is still a possibility. In a progesterone-stimulated endometrium, coli are natural inhabitants of the vaginal flora and have a greater ability to adhere to certain receptors. Certain E coli serotypes are more frequent, and they share many of the same virulence characteristics as isolates from urinary tract infections. In pyometra, the same bacterial clone is commonly recovered from the uterine and urine bladder. Bacteria and their compounds can cause both local and systemic inflammation. Fever, lethargy, tachycardia, and tachypnea are caused by endotoxin, which is a lipopolysaccharide component of Gram-negative bacteria like E coli that is released into the bloodstream during bacterial disintegration. Higher endotoxin levels can lead to severe shock, disseminated intravascular coagulation, and organ failure. Endotoxemia and bacteremia have been linked to Pyometra, and a widespread infection can impact multiple organs. Sepsis affects 60 percent of pyometra-infected bitches and 86 percent of pyometra-infected queens (ie, life-threatening organ dysfunction caused by a dysregulated host response to an infectious process). Because a patient's health status may rapidly deteriorate, the sickness is considered a medical emergency, and it is critical to seek immediate veterinary care. (Intern Med ,200, p. 530).

## **CLINICAL PRESENTATION:**

Typically, middle-aged to older animals with a history of varied genital tract and systemic diseases are presented up to 4 months following estrus. When the cervix is closed, a constant or intermittent mucopurulent to hemorrhagic vaginal discharge is common, but it can also be absent.

<b>Case History and Clinical Signs</b>	<b>In Percentage (%)</b>
Vaginal discharge	<b>57–88</b>
Lethargy/depression	<b>63–100</b>
Inappetence/anorexia	<b>42–87</b>
Polydipsia	<b>28–89</b>
Polyuria	<b>34–73</b>
Vomiting	<b>13–38</b>
Diarrhea	<b>0–27</b>
Abnormal mucous membranes	<b>16–76</b>
Dehydration	<b>15–94</b>
Palpable enlarged uterus	<b>19–40</b>
Pain on abdominal palpation	<b>23–80</b>
Lameness	<b>16</b>
Distended abdomen	<b>5</b>
Fever	<b>32–50</b>
Hypothermia	<b>3–10</b>

Tachycardia	<b>23–28</b>
Tachypnea	<b>32–40</b>
Systemic inflammatory response syndrome	<b>57–61</b>

If the cervix is closed, the systemic sickness is often more severe, and the uterus may become extremely swollen. 48 Anorexia, depression/lethargy, polydipsia, polyuria, tachycardia, tachypnea, weak pulse quality, and anomalous visible mucous membranes are all classic systemic symptoms. Fever, dehydration, vomiting, palpable stomach pain, anorexia, gait problems, and diarrhea are all present in 15 to 30 percent of bitches with the condition. Vaginal discharge, lethargy, and gastrointestinal disorders such as anorexia, vomiting, and diarrhea are the most common clinical symptoms in queens. In up to 40% of affected women, vaginal discharge may be nonexistent or disguised by meticulous cleaning habits. 9 Other symptoms of feline pyometra include weight loss, dehydration, polydipsia/polyuria, tachycardia, tachypnea, stomach pain on probing, atypical mucous membranes (pale, hyperemic, or toxic), and an untidy look. (Intern Med, 2001, p. 8)

## **CLINICOPATHOLOGIC PARAMETERS**

## **TESTING—LABORATORY**

Abnormalities in hematology and biochemistry parameters are typically explored, with further tests carried out depending on the patient's health situation. Pyometra is characterized by leukocytosis with neutrophilia and left shift, as well as monocytosis and normocytic, normochromic regenerative anemia. Endotoxemia, glomerular dysfunction, renal tubular injury, and a reduced sensitivity to antidiuretic hormone all contribute to renal failure. Concomitant cystitis and proteinuria normally go away after the pyometra is treated, but

persistent severe proteinuria can put you at risk for kidney failure. Inflammatory mediators and acute phase proteins in the blood are generally higher. In most cases, a hypercoagulable condition is present.

### **TREATMENT ALTERNATIVES:**

Because the source of illness and bacterial products are eliminated and recurrence is prevented, surgical treatment, OHE, is the safest and most effective option. Although laparoscopically assisted procedures have been developed, they are only employed in minor situations. 58 In young and otherwise healthy breeding animals, or in a patient for whom anesthesia and surgery are dangerous, medical managements (solely pharmacologic) may be possible. Medical treatment is not suggested in individuals with major illnesses or problems such as peritonitis or organ dysfunctions, or when the cervix is closed, and surgery is the preferred option. Medical treatment candidates must be carefully chosen in order to have the best chance of recovery and subsequent fertility. Microbiological culturing and sensitivity testing are required for the best antimicrobial therapy selection, and samples are taken from the cranial vagina or the uterus postoperatively. (Hagman R, P, 2011, p. 1251)

### **SURGICAL TREATMENT:**

To treat hypotension, hypoperfusion, shock, dehydration, acid-base balance and electrolyte abnormalities, coagulation disturbances, and organ dysfunctions, the patient is stabilized with appropriate intravenous fluid therapy prior to surgery. It is advised that severely ill patients be monitored and treated according to the "rule of 20" guidelines. 61 Intravenous broad-spectrum bactericidal antimicrobials are given to moderately and seriously unwell patients, or if sepsis

or significant consequences are suspected, to prevent systemic effects of bacteremia and sepsis. The initial antimicrobial treatment should be effective against the most prevalent infection, *E. coli*, and then switched to a narrow-spectrum alternative after culture and sensitivity results. The medicine should not be nephrotoxic, and the dosage, method, and frequency of administration should all be changed to achieve the best results. In one investigation, 90% of *E. coli* pyometra isolates were ampicillin-resistant. However, the prevalence of antimicrobial resistance varies by geographic region, which must be taken into account, and national restrictions limiting antibiotic treatment in pets must be obeyed. A combination of antimicrobials is frequently suggested in life-threatening peritonitis, severe sepsis, or septic shock to cover a wider variety of microorganisms. OHE is curative for pyometra per se, and antimicrobials not included in the perioperative supportive care, if the health state is close to normal or just mildly depressed, and there are no complications or concurrent disorders. The infection must be removed, and surgery should not be postponed needlessly due to the risk of endotoxemia and sepsis if the uterus remains in place.

Hemodynamic function, gastrointestinal function and protection, pain management, cellular oxygenation, nourishment, and nursing care are all priorities in anesthesia and perioperative treatment. Certain medications may help to reduce the inflammatory response. With some adjustments, a conventional OHE is done. Because the uterus can be huge, fragile, and prone to rupture, it's crucial to handle the tissues with care.

By packing off the uterus with moistened laparotomy swabs, the abdominal cavity can be protected from unintentional pus leaking from uterine laceration or the fallopian tubes/ovarian bursa opening. The broad ligament's vessels are frequently ligated. The residual cervical tissue stump is not oversewn, and the purulent debris is thoroughly eliminated.

When the bladder is accessible, cystocentesis can be used to retrieve urine for bacterial culture. If the abdomen is contaminated with pus, it should be evacuated and cleaned with several liters of warmed physiologic saline solution, with closed suction (or open) drainage being explored. If necessary, 63,65 samples for bacterial culture are obtained prior to abdominal closure. The uterus and ovaries are examined macroscopically and histopathologically to confirm the diagnosis. Intensive postoperative monitoring is required, but in most situations, a day or two of postoperative hospitalization is sufficient. On a case-by-case basis, the necessity for continuous supportive care and antimicrobial therapy is assessed multiple times daily. Antibiotic treatment is stopped as soon as possible.

After surgery, most test abnormalities and overall health improve quickly and frequently return to normal within two weeks.

#### **MEDICAL (NONSURGICAL) TREATMENT:**

To guarantee the greatest potential outcome in solely medical treatments, thorough patient selection is critical (ie, resolution of clinical illness and maintained fertility). Young, otherwise healthy breeding heifers and queens with an open cervix and no ovarian cysts are ideal candidates. It's vital that the patients are stable and not dangerously ill, because certain medications can take up to 48 hours to take action. Systemic disease, fever or hypothermia, intrauterine fetal remnants, organ dysfunctions, or complications such as peritonitis or sepsis are all contraindications. Endotoxemia and sepsis can swiftly turn a clinically stable pyometra into an emergency, as can adverse medication effects. As a result, hospitalization is required ( J Feline 2010, p. 948) Close monitoring, supportive therapies, and rapid intervention are indicated to allow for close monitoring, supportive treatments, and rapid intervention. In 1 to 3 weeks, clinical symptoms, vaginal discharge reduction and clearing, uterine size, and test abnormalities return to normal. If complications emerge or the overall health status deteriorates, as well as in resistant situations, OHE may be required immediately. Antimicrobials alone may slow or stop the progression of pyometra, but they do not heal the uterus. Medical treatment focuses on minimizing progesterone's effects by limiting its production and/or activity, eliminating uterine infection, promoting cervical relaxation and evacuation of intraluminal pus, and facilitating uterine healing. Natural prostaglandin F2a (PGF2a) or its synthetic analog cloprostenol, dopamine agonists (cabergoline and bromocriptine), and progesterone receptor blockers are all commonly used medications (aglepristone). Systemic antibiotic therapy, which is generally indicated for 2 weeks or longer, is one of the treatments available.



However, the shortest effective length of supplementary antimicrobial therapy has not been found, and in two investigations utilizing aglepristone, 5 days and 6 days were sufficient. To achieve the best results, the antimicrobial medicine and administration procedure should be based on bacterial culture, sensitivity tests, and pharmacokinetics/pharmacodynamics.

Depending on the results of physical examinations and laboratory testing, additional supportive treatment, such as intravenous fluids and electrolyte replenishment, is given. PGF<sub>2a</sub> promotes smooth musculature and is luteolytic and uterotonic. Hypothermia, frequent urination, diarrhea, salivation, vomiting, restlessness, shivering, and depression are common and dose-dependent side effects that can linger for up to 1 hour after treatment. To lessen the risk of vomiting, PGF<sub>2a</sub> should be given before a meal. To reduce nausea and vomiting, metoclopramide or walking the bitch for a minute to 20 minutes after dosing has been proposed. Death, shock, and ventricular tachycardia have all been documented as serious side effects of the medicine (PGF<sub>2a</sub>), and the therapeutic window is narrow, thus dosage calculations should be done carefully. As a result, it's critical to use the lowest effective dose possible and to keep patients in the hospital during therapy for monitoring and early action if serious adverse effects occur. PGF<sub>2a</sub> is contraindicated in brachycephalic breeds since they are predisposed to bronchospasm. Prior to using an off-label medicine, the owner's consent must be obtained, along with information on the potential hazards. Because efficiency and ideal dosages have yet to be determined, several treatments are still considered experimental. Subcutaneous injection of 0.1 mg/kg every 12 to 24 hours till resolution is commonly suggested in bitches and queens for natural PGF<sub>2a</sub>, ie, dinoprost tromethamine. Despite being at the lower end of the recommended dose range and administered once daily, this dose is associated with numerous undesirable side effects (the recommended range includes higher doses after evaluation of the effect of a lower dose), which is why other lower

dose alternatives and drug combinations are becoming more popular. Other authors recommend starting with 10 mg/kg subcutaneously 5 times on the first day, gradually increasing to 25 mg/kg 5 times on the second day, and gradually escalating to 50 mg/kg on the third day.

From day 3 onwards, 50 mg/kg doses were administered twice to times daily during the course of the treatment, a regimen that caused side effects in 15% of the treated pigs. Bitches recovered after receiving a dose of 100 mg/kg natural PGF2a delivered subcutaneously once daily for seven days, although there were several side effects, therefore smaller doses are preferred. Natural PGF2a, 20 mg/kg, was given intramuscularly on up to consecutive days in one trial, and 30 mg/kg was given subcutaneously twice daily for 8 days in another trial, both of which resulted in sickness remission in 70% of 10 bitches and 100% of bitches, respectively, with no side effects. (J Feline 2009, p.802).

### **PROGNOSIS AFTER MEDICAL TREATMENT:**

Survival and reproductive prospects are described as "guarded to good." To avoid recurrence, it is always recommended to breed in the next estrus cycle after medical therapy. In dogs, the average reported long-term success (resolution of clinical sickness) of medical treatment is around 86 percent (range 46 percent–100 percent), while in cats it is 95 percent (range 90 percent–100 percent). The prognosis for fertility after medical therapy is generally favorable, with a mean fertility rate of 70% (range 14%–100%) in dogs and 60% in cats. In dogs, the mean recurrence rate is estimated to be 29 percent (range 0 percent–85 percent), while in cats, it is estimated to be 0 percent to 14 percent. Fertility rates are higher in younger women after aglepristone treatment. (J Vet Intern 2009, p. 1175).

### **PREDICTIVE MARKERS:**

Leukopenia has been linked to both the presence of peritonitis and higher postoperative hospitalization in surgically treated bitches with pyometra,

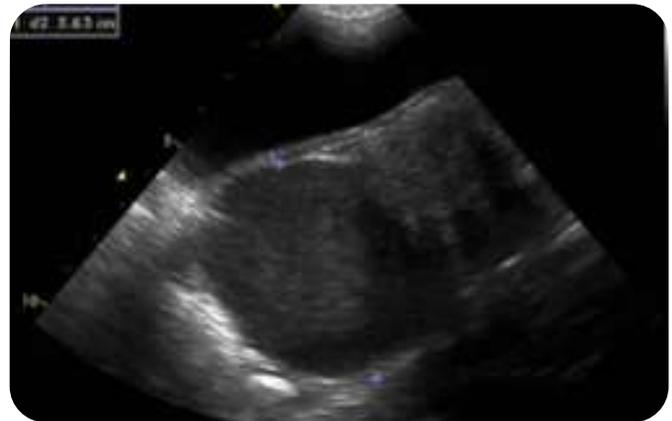
according to the clinical and laboratory data studied. In sepsis, the acute-phase proteins C-reactive protein and serum amyloid A concentrations rise. The length of postoperative hospitalization has been associated to C-reactive protein and PGF2a concentrations. During postoperative recovery, acute-phase protein concentrations decline gradually, and maintained or increasing amounts may signal problems. Proteinuria and urine protein-creatinine levels that persist suggest renal illness that need immediate care. . In bitches with pyometra and sepsis, central venous oxygen saturation, as well as base-deficit and lactate levels, were useful in predicting prognosis. 94 Death has been linked to band neutrophil numbers, lymphopenia and monocytosis, blood urea nitrogen concentrations larger than 30 mg/dL, and creatinine values larger than 1.5 mg/dL. If cageside testing become available, certain inflammatory factors may be clinically relevant for prognostication. White blood cell counts, neutrophils, band neutrophils, monocytes, and the percentage band neutrophils were all favorably linked with postoperative hospitalization in queens, but albumin concentrations were adversely linked. (Nat Genet 2007, p. 1321)

## **DIFFERENTIATION OF PYOMETRA:**

Both pyometra and mucometra/hydrometra have fluid in the uterine lumen, and their clinical symptoms can be identical. However, with pyometra, life-threatening problems might arise as a result of the bacterial infection, thus it's critical to distinguish these conditions to get the best therapy. In some circumstances, an ultrasonographic examination of the uterus to show fluid echogenicity and hemodynamic characteristics can be helpful, although it is not diagnostic. In pyometra, the health status is more dismal, and fatigue and gastrointestinal disorders are more common. In comparison to mucometra/hydrometer, pyometra has more than three clinical indications of disease and a more robust inflammatory response. (Proteomic 2005, p. 112)

### **PREVENTION:**

It is preferable to diagnose and treat CEH and pyometra early, therefore noninvasive diagnostic approaches are required. Elective OHE offers the benefit of being conducted on a healthy animal while also preventing pyometra and other uterine disorders.



Because there are numerous unfavorable side effects of spaying, all of the benefits and drawbacks of such an intervention must be carefully considered in each individual. It is not possible to breed on the first estrus following medical therapy; however, regular monitoring is recommended to rule out any anomalies that may arise during the luteal phase. In high-risk patients, progesterone receptor blockers or prostaglandins may help prevent the development of pyometra. To encourage uterine repair, some researchers propose delaying recurrent estrus after medicinal therapy for pyometra. (Assoc 1991, p. 1427)

### **STUMP PYOMETRA:**

When pyometra develops in remaining uterine tissue in incompletely spayed bitches and queens, it's known as a stump pyometra. It's caused by hormone-producing ovarian remains. Except for a history of previous spay, the clinical appearance is comparable. Ultrasonography normally reveals areas of localized fluid collection at the tissue stump, but unless follicles are present, it can be difficult to locate the ovarian residual tissue. The most common cause is incomplete resection, but other theories include ectopic or vascularized ovarian tissue split from the ovary during surgery. Surgical removal of remaining uterine and ovarian tissue, as well as supportive therapies and antimicrobials, are used to treat the condition. Pyometra has been found in rabbits, rats, guinea pigs, hamsters, gerbils, ferrets, and chipmunks, among other small mammals. The pathogenic microorganisms in dogs and cats with the disease frequently differ from isolates. The use of ultrasonography and cytology to confirm a probable diagnosis based on clinical symptoms and physical examination is beneficial, and OHE is the chosen treatment. In a golden hamster and a guinea pig, aglepristone mixed with antibiotics was successfully used for medical therapy.

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