

Case Study: Open Pyometra in a Pomeranian Dog at INI Veterinary Service Clinic

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ABSTRACT

A five-year-old female Pomeranian dog presented with vomiting, restlessness, decreased appetite, and vaginal discharge. The physical examination revealed yellowish to brownish purulent vaginal discharge with an unpleasant smell. The X-ray image showed an enlarged uterus, while the hematology results revealed hypochromic normocytic anemia, neutrophilia, lymphopenia, and thrombocytopenia. The blood chemistry test results showed abnormalities, including elevated levels of alkaline phosphatase levels (ALP) and cholesterol as well as decreased amylase levels. Based on the anamnesis, clinical findings, physical examination, and supporting examinations, it was concluded that the dog was diagnosed with open cervix pyometra. The dog was treated with oxytocin hormone at a dose of 0.5 IU/kg BW, methylethergometrine at a dose of 0.125 mg/dog, enrofloxacin at a dose of 5 mg/kg BW, carprofen at a dose of 2.5 mg/kg BW, cyproheptadine at a dose of 0.5 mg/kg BW, ranitidine at a dose of 3.5 mg/kg BW, ondansetron at a dose of 1 mg/kg BW, glyceryl guaiacolate at a dose of 20 mg/kg BW, ambroxol HCl at a dose of 2 mg/kg BW, Fufang® at adose of 1 ml, Sangobion® at a dose of 100 mg/dog, Maxbiotik® at a dose of 66 mg, and Transfer Factor Plus® at a dose of 20 mg. The treatment resulted in an improvement in the animal's condition as evidenced by the absence of nasal and vaginal discharges and vomiting, as well as a stool consistency of two out of five.

Keyword: Pomeranian, pyometra, uterus, discharge, methylethergometrine

INTRODUCTION

Pyometra is a disease that affects female dogs that have not bred. It is prevalent in various breeds, including Boxer, Great Dane, Labrador, German Shepherd, Mongrel, Cocker Spaniel Mix, Spitz, and Pomeranian, with approximately 23% of female dogs

suffering from it (Bhaskar *et al.*, 2014). While pyometra is commonly found in bred female dogs, only a few studies have investigated the incidence of pyometra in postpartum female dogs (Abdelbaset *et al.*, 2022; Paudel *et al.*, 2020). Two types of pyometra can develop in dogs, namely open pyometra and closed pyometra. Open pyometra is

characterized by the presence of purulent vaginal discharge, while closed pyometra has no clinical signs (Hasan *et al.*, 2021).

Dogs with pyometra exhibit varying clinical signs depending on the severity of the disease. Common clinical signs include depression, lethargy, emesis, and anorexia (Paudel *et al.*, 2020). A characteristic symptom of pyometra is the accumulation of pus in the uterine lumen. Pyometra may be caused by bacterial infection or hormonal changes during the estrous cycle. Bacteria that cause pyometra include *Klebsiella sp.*, *Proteus sp.*, *Staphylococcus sp.*, *Pseudomonas sp.*, *Escherichia coli*, and *Streptococcus sp.* (Putra *et al.*, 2022). Pyometra commonly occurs during the diestrus phase due to increased progesterone levels (Abdelbaset *et al.*, 2022).

Progesterone facilitates the secretion of the uterine glands. However, excessive levels of progesterone can lead to the accumulation of uterine gland secretion. This condition creates a favorable environment for bacterial growth, which can cause bacterial flora to become pathogenic bacteria (Putra *et al.*, 2022). If left untreated, pyometra can be fatal. Jitpean (2014) reported that the mortality rate for dogs with pyometra can reach three to four percent. Hagman (2022) suggested that pyometra can lead to complications, such as peritonitis, endotoxemia, and septicemia. Therefore, this study aims to identify the diagnosis and treatment for an open pyometra case in a Pomeranian dog.

MATERIALS AND METHODS

Profile and Anamnesis

A five-year-old female Pomeranian dog weighing 2.4 kg presented with loss of appetite, vaginal discharge, sneezing, vomiting, loose stool, and weakness.

Physical Examination

The physical examination revealed that the body temperature of the dog was between 38°C to 38.8°C and its skin turgor was less than two seconds. The dog appeared weak, had an upright posture, had a symmetrical stance, and stood on all four legs. Its hair was clean, shiny, not shedding. There were no skin lesions and it had a typical dog smell. The skull bones were compact and symmetrical, the ears were upright and symmetrical, and the head moved freely and actively. There were no abnormalities found in either the right or left eyes. Although the nose was symmetrical, a nasal discharge was present during the third week.

The dog had complete and clean teeth and a clean tongue with no ulcers or thickening. Palpation of the trachea area did not elicit any cough response. The dog exhibited a thoracoabdominal breathing pattern with regular rhythm and moderate intensity. No abnormalities were found in the cardiovascular system. The abdomen was symmetrical, but there was enlargement and distension. Borborygmi was heard upon auscultation of the abdomen. Yellowish to brownish purulent fluid was discharged from the vagina. The stool consistency was loose, with a score of four out of five.

Clinical Findings

Based on the results of the anamnesis and physical examination that were carried out, clinical findings were found, including yellowish to brownish purulent vaginal discharge with an unpleasant smell,

vomiting, a stool score of four out of five, and nasal discharge in the form of mucoid fluid.

Supporting Examinations

Table 1 shows the hematology results, including low mean corpuscular hemoglobin concentration (MCHC) values, neutrophilia, lymphopenia, and

thrombocytopenia. Table 2 shows the blood chemistry test results, including high levels of ALP and cholesterol, and low amylase levels. Finally, the X-ray image shown in Figure 1 indicates enlargement and thickening of the uterine lumen.

Table 1. Hematology Results

Parameter	Result	Unit	Standard	Description
Erythrocytes	5.69	M/ μ L	5.65-8.87	
Hematocrit	42.0	%	37.3-61.7	
Hemoglobin	13.3	g/dl	13.1-20.5	
MCV	73.5	fl	61.6-73.5	
MCH	23.4	Pg	21.2-25.9	
MCHC	31.7	g/dL	32.0-37.9	Low
RDW	14.7	%	13.6-21.7	
Leukocytes	13.58	K/ μ L	5.05-16.76	
Neutrophils	12.07	K/μL	2.95-11.64	High
Lymphocytes	0.66	K/μL	1.05-5.10	Low
Monocytes	0.68	K/ μ L	0.16-1.12	
Eosinophils	0.10	K/ μ L	0.06-1.23	
Basophils	0.06	K/ μ L	0.00-0.10	
Platelets	80	K/μL	148-484	Low
PDW	22.9	fl	9.1-19.4	High
PCT	0.10	%	0.14-0.46	Low

Table 2. Blood Chemistry Test Results

Parameter	Result	Unit	Standard	Description
Glucose	78	mg/dL	74-143	
Creatinine	0.7	mg/dL	0.5-1.8	
BUN	25	mg/dL	7-27	
Phosphor	4.3	mg/dL	2.5-6.8	
Potassium	8.9	mg/dL	7.9-12	
Albumin	2.9	g/dL	2.3-4.0	
Globulin	4.4	g/dL	2.5-4.5	
ALT	41	u/L	10-125	
ALP	353	u/L	23-212	High
Cholesterol	384	Mg/dL	110-320	High
Amylase	474	u/L	500-1500	Low

Lipase	418	u/L	200-1800
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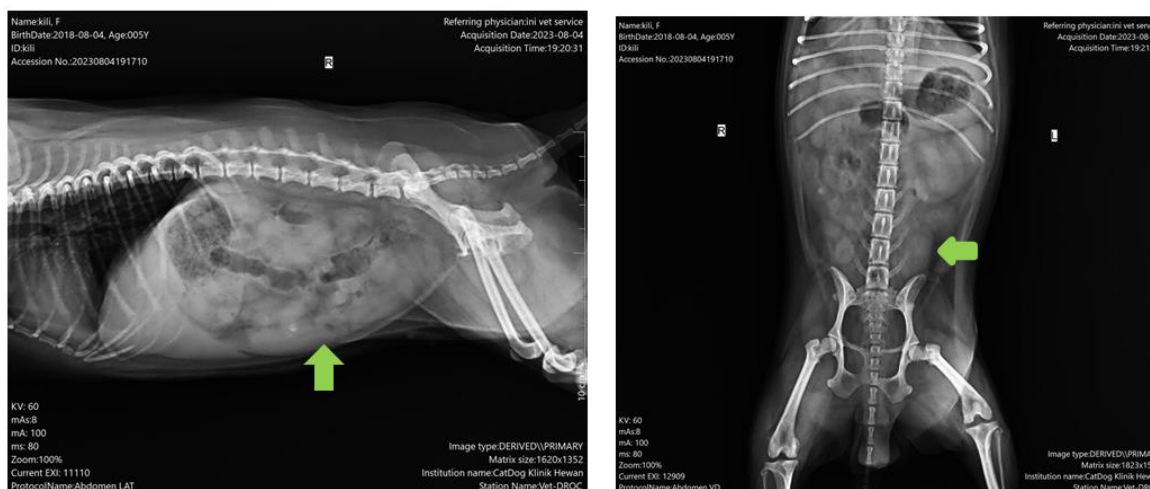


Figure 1. X-ray image of a dog at the (a) LL position and (b) VD position. Green arrows indicate enlarged uterine lumen.

Diagnosis and Prognosis

Based on the medical history, clinical findings, observation, hematology results, blood chemistry test results, and X-ray image, it was evident that the dog suffered from open pyometra with a good prognosis.

Therapy

Surgical treatment is recommended for treating both open and closed pyometra cases (Putra et al., 2022). However, in this study, surgery was not performed due to lack of consent from the owner. Therefore, drug therapy was used for treatment. The dog was treated for approximately one month with oxytocin hormone at a dose of 0.5 IU/kg BW, methylethergometrine at a dose of 0.125 mg/dog, enrofloxacin at a dose of 5 mg/kg BW, carprofen at a dose of 2.5 mg/kg BW, cyproheptadine at a dose of 0.5 mg/kg BW, ranitidine at a dose of 3.5 mg/kg BW, ondansetron at a dose of 1 mg/kg BW, glyceryl guaiacolate at a dose of 20 mg/kg BW, ambroxol at a dose of HCl 2 mg/kg BW,

Fufang® at a dose of 1 ml, Sangobion® at a dose of 100 mg/dog, Maxbiotic® at a dose of 66 mg, and Transfer Factor Plus® at a dose of 20 mg.

RESULTS AND DISCUSSION

The physical examination revealed vaginal discharge in the form of pus with an unpleasant smell, vomiting, anorexia, and lethargy. These symptoms are consistent with the clinical symptoms of pyometra in dogs described by Hagman (2022), including vomiting (13-38%), pyrexia (32-50%), diarrhea (0-27%), vaginal discharge (57-88%), lameness (16%), lethargy (63-100%), tachypnea (32-40%), anorexia (42-87%), tachycardia (23-28%), polydipsia (28-89%), hypothermia (3-10%), abdominal distension (5%), polyurea (34-73%), abdominal point tenderness (23-80%), mucosal membrane

abnormalities (16-76%), uterine enlargement (19-40%), and dehydration (15-94%).

The blood chemistry test results showed abnormalities, including high levels of ALP and cholesterol and low amylase levels. Satria (2019) suggested that elevated ALP levels may indicate liver disease, which can be associated with heart problems that prevent the liver from receiving sufficient oxygen and nutrients. Elevated cholesterol levels in dogs can be caused by a variety of factors, including a lack of activity, a high-fat diet, and poor living conditions. Elevated cholesterol levels require additional attention due to their potential to cause seizures, visual disturbances, and pancreatitis (Wardhani, 2014). In addition, low amylase levels may indicate pancreatic disorders (Nakajima, 2016).

Furthermore, the hematology results showed abnormalities, including low MCHC values, neutrophilia, lymphopenia, and thrombocytopenia. A decrease in the MCHC value indicated that the dog had hypochromic normocytic anemia (Fauzi *et al.*, 2020). Esen *et al.* (2020) suggested that dogs with pyometra may experience hypochromic normocytic anemia which results from hemolysis, acute blood loss, bacterial infection, and bleeding in the endometrium (Ukwuena & Orajaka, 2014; Hasan *et al.*, 2021). Leukocyte values were within the normal range, but there was neutrophilia, which indicated a bacterial infection. In addition, lymphopenia can indicate several conditions, including hormonal disorders. Meanwhile, thrombocytopenia may be caused by infectious agents (Villiers & Ristic, 2016).

The X-ray imaged revealed an enlarged uterus, which exhibited soft tissue opacity.

This finding is consistent with the findings of Fossum (2013) that the X-ray of pyometra showed a tubular shape of the uterus located between the descending colon and the urinary bladder with soft tissue opacity. Meanwhile, the findings of Nurrurozi *et al.* (2019) showed that the X-ray of pyometra showed a radiopaque dilated uterus, with fluid accumulation and located ventrodorsally in the abdomen with a tubular structure that pushed the bowel toward the cranial dorsal.

Pyometra is a reproductive disorder in pubescent female dogs, characterized by the accumulation of pus in the uterine lumen, and can occur whether or not the dog has bred or given birth (Maemunah *et al.*, 2022). Two types of pyometra can develop in dogs, namely open pyometra and closed pyometra. Open pyometra is more common and characterized by purulent vaginal discharge, while closed pyometra has no clinical signs (Hasan *et al.*, 2021). In addition, pyometra is more commonly found in dogs aged between five and 10 years, as observed in a case study of a five-year-old dog (Putra *et al.*, 2022).

The accumulation of pus in the uterine lumen can lead to temporary or permanent reproductive disorders (Prestiana, 2016). Inflammatory conditions can lead to an increase in the number of bacteria, which can become pathogenic and infect the uterus due to hormonal factors that create favorable conditions for bacterial growth. The pathogenesis of pyometra is generally caused by hormonal conditions. During the estrous cycle, estrogen and progesterone indirectly affect the uterus. In dogs, the luteal phase is characterized by high progesterone levels, regardless of the

pregnancy status (Putra *et al.*, 2022). The diestrus phase in nonpregnant dogs lasts for 70 days, during which the corpus luteum produces progesterone, dominating the uterus (Rizky *et al.*, 2023).

Progesterone helps thicken the uterine wall in preparation for pregnancy (Putra *et al.*, 2022). It stimulates the proliferation of endometrial glands and results in the production of uterine milk for the continued development of the embryo before the implantation process. The accumulation of fluid in the uterus provides a suitable environment for the growth of bacteria (Rahayu *et al.*, 2021). In addition, progesterone inhibits the immunity of the uterus. Bacteria can also enter the vagina, leading to a secondary infection of the uterus that causes pyometra (Patrick, 2016). The recommended treatment for pyometra is ovariohysterectomy (OH), which can be performed for both closed or open pyometra and can prevent recurrence. The initial therapy involves opening the cervix and contracting the uterus to allow pus to drain, followed by administering antibiotics to eliminate pathogens (Rahayu *et al.*, 2021).

Several therapeutic agents were administered to the dog during treatment, including oxytocin hormone, methylergometrine, enrofloxacin, carprofen, cyproheptadine, ranitidine, ondansetron, glyceryl guaiacolate, ambroxol HCl, Fufang®, Sangobion®, Maxbiotic®, and Transfer Factor Plus®. The oxytocin hormone was used to stimulate contractions of the uterine wall and open the cervix to allow pus to exit the uterine lumen (Kristanti, 2014). The oxytocin hormone was administered at a dose of 0.5 IU/kg BW (Allerton, 2020). According to Pemayun and

Farhani (2016), oxytocin hormone can be administered to dogs with open pyometra to increase uterine contractions, relax the cervix, and facilitate the exit of pus. However, the success rate of this method is lower than that of ovariohysterectomy.

Pyometra can be treated with prostaglandin F_{2α} (PGF_{2α}), a hormone that can dissolve the corpus luteum, contract the uterus, and relax the cervix to facilitate the exit of pus from the uterine lumen (Putra *et al.*, 2022). Methylergometrine is a drug similar to oxytocin that can induce uterine contractions. It works by inducing a tetanic uterotonic effect to reduce the amount of bleeding and increase the frequency, amplitude, and tone of uterine smooth muscle contractions (Arnov *et al.*, 2017). Open pyometra can be treated by administering methylergometrine at a dose of 0.125 mg/dog for dogs weighing less than 15 kg and at a dose of 0.25 mg/dog for dogs weighing more than 15 kg (Keshavprasad *et al.*, 2023).

Antibiotics were used to prevent infection in the dog. Enrofloxacin, a bactericidal antibiotic with a broad-spectrum activity from the quinolone group, was administered at a dose of 5 mg/kg BW q24h (Allerton, 2020; Meidianthi *et al.*, 2018). This is consistent with Patrick (2016) who suggested that antibiotics, either from the penicillin or quinolone groups, can be used for pyometra treatment. Rickyawan *et al.* (2022) suggested that enrofloxacin an antibiotic used for pyometra treatment by inhibiting the DNA gyrase enzyme, which prevents bacterial replication and leads to bacterial death. In addition, carprofen can be used as an analgesic, antipyretic, and anti-

inflammatory drug at a dose of 2.5 mg/kg BW, (Allerton, 2020).

Carprofen inhibits the COX-2 enzyme, limiting the production of prostaglandins, which are involved in inflammation (Papich, 2021). Meanwhile, cyproheptadine functions as an antihistamine, anticholinergic, and anti-serotonergic agent by inhibiting the effects of histamine to reduce allergic reactions. In this study, cyproheptadine was also used as an appetite stimulant to prevent anorexia and maintain the activity level of the dog. The dose administered was 0.5 mg/kg BW (Allerton, 2020).

Due to the clinical symptoms of vomiting and loose stool, the dog was administered with ranitidine, ondansetron, and Maxbiotic®. Ranitidine, which is a drug used to balance stomach acidity, was administered at a dose of 3.5 mg/kg BW (Allerton, 2020). It inhibits H₂ receptors in the gastric parietal cells, resulting in a reduction in the volume and concentration of gastric acid (Chen & Yeh, 2011). Meanwhile, ondansetron prevents serotonin or 5-hydroxytryptamine from binding to its receptors in the gastrointestinal tract (Chen & Yeh, 2011). This antiemetic drug is a selective drug for 5-hydroxy-tryptamine (5-HT₃) receptor antagonist in the brain and works on the afferents of vagus nerve (Sakti & Budi, 2016). The dose administered was 1 mg/kg BW (Allerton, 2020).

Maxbiotic® is a probiotic supplement containing *L. acidophilus*, *L. salivarius*, *L. casei*, *B. lactis* and *L. lactis*. Probiotics are live bacteria that can improve the balance of intestinal microflora in humans and animals (Yonata & Farid, 2016). In this study, the dog exhibited symptoms of nasal discharge, for which glyceryl guaiacolate and ambroxol

HCl were administered. Glyceryl guaiacolate is a medication used to treat respiratory tract disorders by stimulating receptors to increase the activity of the secretory glands of the respiratory tract. It was administered at a dose of 20 mg/kg BW (Allerton, 2020). Meanwhile, ambroxol HCl is a mucolytic therapy that stimulates the synthesis of surfactant, which reduces the adhesion of mucus to the bronchial wall, thereby increasing immunity against infectious agents. It was administered at a dose of 2 mg/kg BW (Allerton, 2020).

To treat hypochromic normocytic anemia, the dog was administered with Fufang® and Sangobion®. Fufang® is a concentrated liquid derived from a decoction of Chinese herbal medicine that can improve hematopoiesis and increase hemoglobin levels in patients with anemia. However, no systematic research on this topic has been conducted (Zhang et al., 2021). Sangobion® contains copper sulfate, folic acid, vitamin C, vitamin B₁₂, and vitamin B₆. The combination of copper sulfate and folic acid has been shown to be effective in increasing hemoglobin levels. It was administered at a dose of 100 mg/day (Allerton, 2020). The dog also received supportive therapy with Transfer Factor Plus®, which is a protein and peptide supplement that contains antigen-specific information. It can improve the immune system and help maintain balance in the immune system (Nurlinda, 2016). To treat both closed and open pyometra, ovariohysterectomy can be performed (Adigunawan et al., 2019).

CONCLUSION

Based on the anamnesis, clinical findings, and supporting examinations, the dog was diagnosed with open pyometra with a good prognosis. The dog was treated with oxytocin hormone, methylergometrine, enrofloxacin, carprofen, cyproheptadine, ranitidine, ondansetron, glyceryl guaiacolate, ambroxol HCl, Fufang®, Sangobion®, Maxbiotic®, and Transfer Factor Plus® for one month. The treatment resulted in the absence of nasal and vaginal discharges and vomiting, normal bowel movements, and calmness.

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