Case study

A STUDY ON PYOMETRA IN CANINES

ABSTRACT

Aim: To study the incidence of and to review pyometra in canines.
Study design: Case Studies.
Place and Duration of Study: Veterinary Clinical Complex, Krantisinh Nana Patil College of Veterinary Science, Shirwal, Satara. September 4th, 2024 to February 26th, 2025.
Methodology: We included 14 dogs with pyometra, both open and closed cervix type, as confirmed by clinical signs and transabdominal ultrasound. Hematological studies were also carried out.
Results: There were 140 case records of dogs with the history of physio-pathological reproductive problems presented in TVCC during the period from September 4th, 2024 to February 26th, 2025. Out of 140 case records, 11 cases (or 7.85%) were pyometra in canines.
Conclusion: Pyometra is a common reproductive disorder in canines.

Keywords: Pyometra, Transabdominal Ultrasound, Canine, Cabergoline

1. INTRODUCTION

Pyometra is a common reproductive disorder of canines characterized by endometrial hyperplasia, inflammation and subsequent accumulation of purulent exudate in the uterus and is associated with hormonal alterations and bacterial infection. It has a wide range of clinicopathological manifestations and is life-threatening in severe cases. It is responsible for a large part of emergency veterinary care, and depending on the microorganisms involved, it can lead to death due to endotoxemia (Pretzer, 2008). Despite modern treatment routines, the mortality rate due to pyometra is still approximately 3-4% (Egenvall et al., 2001). Pyometra is usually seen in bitches between 9 months and 18 years of age, with a median age of 9 years. Nulliparous bitches have a moderately higher risk of developing pyometra than primiparous and multiparous animals (Nisakanen and Thrusfield, 1998).

Clinically, closed and open cervix forms of pyometra can be distinguished, and the clinical signs vary with cervical patency (Shukla, 2012). Some cases become acute and severe within a week or two and require immediate and early attention to save the patient's life. In other cases, especially those with an open cervix from which pus is draining, the disease may run a course of a month or more. The onset of clinical signs is gradual and insidious. The most obvious sign noticed by owners is vaginal discharge, which may be serosanguinous to mucopurulent. Other signs include depression, inappetence, polyuria, polydipsia and vomition.

The diagnosis of pyometra is established by the history, stage of estrous cycle, physical examination, laboratory and radiologic imaging abnormalities. Ultrasonography is useful in differentiating fetal structures, solid masses and luminal fluids. A considerable alteration occurs in hematological and blood biochemical profiles of pyometra-affected bitches. Leukocytosis and neutrophilia with a regenerative shift to left and monocytosis are observed in cases of closed cervix pyometra and is less marked in cases of open cervix pyometra (Shukla, 2012). Because of prolonged pyometra, liver and kidney disorders occur that may be determined by serum biochemical tests such as aspartate amino transferase (AST), alanine amino transferase (ALT) levels for liver function, whereas blood urea nitrogen (BUN) and creatinine for

kidney function. The characteristic uterine pathology includes an enlarged uterus with accumulation of pus grossly (Greene, 2011) and large cystic endometrial glands with an inflow of inflammatory cells into the glandular and uterine luminal areas microscopically (Kempisty et al., 2013).

Although pyometra is a unique condition, it can be triggered by different bacterial genera. The most commonly isolated bacterium in bitches with pyometra is Escherichia coli (Dhaliwal et al., 1998). However, other gram-negative as well as gram-positive bacteria have also been associated with pyometra in bitches (Rekha and Krishnappa, 2001; Bigliardi et al., 2004). Broad range antibiotics against these bacteria, especially those targeting E. coli have been used effectively in pyometra affected bitches. Perusal of the available literature revealed various reports on canine pyometra in India and abroad. This paper is a review study on pyometra in canines as observed in the Veterinary Clinical Complex, Krantisinh Nana Patil College of Veterinary Science, Shirwal, Satara.

2. MATERIAL AND METHODS

2.1 Selection of Animals

A total of fourteen (n=14) bitches diagnosed with pyometra with the help of clinical examination, radiography and ultrasonography in the Department of Animal Reproduction, Gynaecology and Obstetrics, Krantisinh Nana Patil College of Veterinary Science, Shirwal at Teaching Veterinary Clinical Complex (TVCC) during the period from September 4th, 2024 to February 26th, 2025 were selected for this research work. Blood and serum samples were collected from the pyometra cases and were utilized for hematological and biochemical studies.

2.2 Restraint

Selected bitches were restrained with the help of the owner of the animal, an assistant and a muzzle.

2.3 Technique for Ultrasound Scanning

A real-time B-mode portable ultrasonography machine (Hitachi F31 Aloka) with a 5-7.5 MHz multi-frequency curvilinear transabdominal transducer was used to scan the uterus and ovaries. Prior to the scan, the probe was prepared by applying liberal amounts of the coupling gel on the footprint.

The restrained bitch was well-secured in place before starting the scan. The probe was positioned on the inguinal region to visualize the urinary bladder, which was the first ultrasonically striking organ. The gains were then adjusted with reference to the echogenicity of the urine in the bladder. After visualization of the urinary bladder, the ultrasound probe was advanced cranially until the uterus appeared on the screen. In normal cases, the uterus is rarely visualized, however, in bitches with pyometra, multiple pockets of variable sizes filled with anechoic fluid are observed in the uterine lumen.

2.4 Blood Collection

Blood and serum samples were collected from the 14 pyometra affected bitches. From each dog, 2 ml of whole blood was collected from cephalic vein into vacutainer tubes with EDTA [K3] (VAKU-8, Hindustan syringes & Medical Devices Ltd., Faridabad, India) and was processed on the same day. For serum biochemistry, 2 ml of blood was collected in sterile vials with clot activator (AcCuvet, Peerless Biotech Pvt. Ltd., Chennai, India). The serum was separated out by centrifugation of blood samples a 3000 rpm for 15 minutes and was deep frozen at -20°C till analyzed.

2.5 Hematology

The Packed cell volume (PCV), Hemoglobin (Hb), total red blood cell count (TRBC), total leucocyte count (TLC) and differential leucocyte count (DLC) were evaluated as per the standard procedures (Coles,

1986). PCV (%) was estimated by microhematocrit method and Hb (g%) was estimated by acid hematin method. TRBC (millions/ cm3) and TLC (thousands/ cm3) were carried out by using hemocytometer method. Blood smears were stained with Leishman's stain and DLC was carried out by battlement method. The absolute leucocyte counts were estimated from the DLC and TLC values (Coles, 1986).

2.6 Serum Biochemistry

Blood urea nitrogen (BUN), creatinine, aspartate amino transferase (AST) and alanine amino transferase (ALT) were estimated in the serum samples by using assay kits (Erba, India) on semi auto-analyzer (Erba CHEM-5 plus v2). The methods employed as per the manufacturer were Urease-GLDH method for BUN (mg/ dl), Jaffe's method for serum creatinine (mg/ dl), Modified IFCC method for AST (IU/ L) and IFCC method for ALT (IU/ L).

3. RESULTS AND DISCUSSION

The present study was planned to diagnose pyometra through transabdominal ultrasound and to evaluate the treatment response of the dogs affected with pyometra to antibiotic and anti-prolactin therapy. Hematological and biochemical factors have also been evaluated in these dogs.

There were 140 case records of dogs with the history of physio-pathological reproductive problems presented in TVCC during the period from September 4th, 2024 to February 26th, 2025. Out of 140 case records, physiological conditions contributed 37.08 percent, out of which pregnancy diagnosis (21.14%) contributed major segment followed by estrus detection (10.39%). Ovariohysterectomy and castration were performed in 3.63% and 0.21% dogs, respectively. Mis-mating was recorded in 1.14% and semen evaluation was done in 0.57% of dogs. Among pathological conditions (27.41%), transmissible venereal tumor (TVT) in male and female dogs was major pathological problem (9.7%) followed by pyometra (7.85%) and vaginal hyperplasia (3.13%). Other problems encountered were pseudopregnancy (1.57%), anestrus (1.28%), repeat breeder (1.2%), prolapse of uterus and vagina (1.00%), vaginal hypertrophy (0.92%), vaginitis (0.36%), endometritis (0.28%), cystic ovary (0.21%) and brucellosis (0.07%).

Amongst diseases of gestation and parturition (33.38%), dystocia (32.6%) was encountered most common. Other problems encountered were abortion (0.71%) and mummification (0.07%).

Following ovulation, the plasma progesterone concentration is increased, often exceeding 40 ng/ml. Progesterone causes hypertrophy of endometrial glands, increases uterine glandular secretions and suppresses myometrial activity, thus allowing accumulation of glandular secretions. These secretions provide an excellent environment for overgrowth of bacteria that normally reside in vagina and enter the uterus via the dilated cervix during estrus. Repeated estrous cycles result in a cumulative effect explaining the increased incidence in middle aged to older bitches.

Since estrogens potentiate the stimulatory effect of progesterone on uterus, their administration for treatment of misalliance is strongly discouraged. Exogenous progesterone administration for suppression of estrus also contributes to development of pyometra.

Obvious sanguineous to mucopurulent discharge is observed 4-8 weeks after standing heat in open cervix pyometra. Other signs include lethargy, depression, inappetence/ anorexia, emesis, diarrhea, polyuria/ polydipsia, abdominal distension. The signs are more severe in closed-cervix pyometra.

Fig. 1. Vulvar edema and presence of mucopurulent vaginal discharge on vulvar lips in a 4-year-old Lhasa with open cervix pyometra

Bitches with closed cervix pyometra are often ill at the time of diagnosis when compared to open type with marked clinical signs of depression, lethargy, polyuria, polydipsia, vomiting, diarrhea and abdominal distension. There is no evidence of vulvar discharge.

A carefully obtained history, clinical signs, results of hemogram, biochemistry, radiography and ultrasonography will aid to differentiate pyometra (both open and closed) from a severe vaginal infection. The most valuable of these tests is transabdominal ultrasonography as it also helps to differentially diagnose the condition from pregnancy. Ultrasonography allows determination of size of the uterus, thickness of the uterine wall and the presence of fluid accumulation within the lumen. In pyometra, the uterus is visualized with multiple anechoic (black) fluid-filled pouches of variable diameters, depending on the extent of pus accumulation.

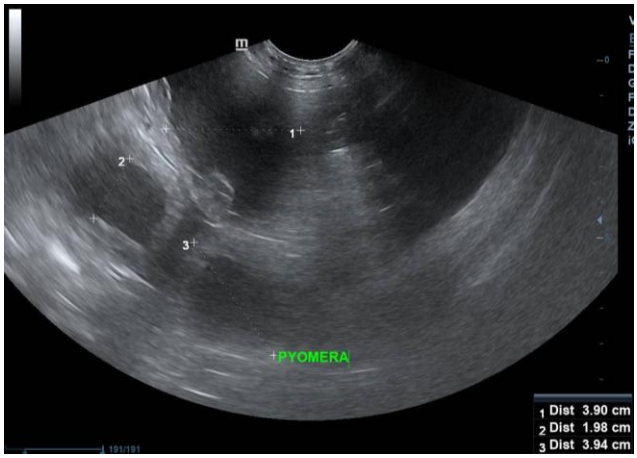

Fig. 2. Anechoic (black) fluid-filled pouches seen in the uterus of a 7-year-old Labrador Retriever on Transabdominal Ultrasound.

Ovariohysterectomy continues to be the choice of treatment for all cases of pyometra. However, medical management is opted when future breeding potential of the bitch has to be preserved. The antibiotic of choice at the TVCC is a combination of ceftriaxone and tazobactam @ 15-25 mg/ kg body weight depending on severity of clinical signs and extent of pus accumulation. Antiemetics like ondansetron @ 0.5 mg/ kg and antacids like ranitidine @ 2 mg/ kg body weight are also given. Supportive therapy also includes multivitamins, intravenous fluids to counter the dehydration and hematinic to counter the anemia accompanying pyometra.

Anti-prolactin drugs like cabergoline @ 0.05 mg/ kg once a day orally for 7 days resolves pyometra by regressing corpus luteum and removing the bitch out of diestrus phase, since canines are dependent on prolactin for CL function.

4. CONCLUSION

In the present study, ultrasonography was utilized to diagnose pyometra in bitches and blood samples were collected to perform hematological and biochemical studies. Out of 140 bitches presented to the Department of Animal Reproduction, Gynaecology and Obstetrics at TVCC during the period from September 4th, 2024 to February 26th, 2025 for various ailments, fourteen were diagnosed with pyometra by clinical examination, radiography and ultrasonography with an incidence of 7.85%. The age-wise incidence was highest (70%) in the age group of 6-10 years. Among the breeds, the highest incidence was seen in Pomeranian (35%) followed by Labrador (30%), Spitz (15%), German Shepherd (10%) and Boxer and Pug breeds (5% each). Also, the incidence was highest in nulliparous bitches (65%) followed by primiparous (25%) and pluriparous (10%) animals.

In the present study, open (85%) and closed (15%) types of pyometra were noticed and all the bitches were in diestrus phase. Anorexia, lethargy, abdominal distension and vomition were the symptoms recorded. Temperature was normal in all cases except in one that showed sub-normal temperature. Mucopurulent to hemorrhagic vaginal discharges with fetid odor were seen in all the cases of open pyometra.

Ultrasonographic imaging of the uterus showed pockets of anechoic fluid of variable sizes in all the bitches. The mean diameter of these pockets was found to be larger in bitches showing closed pyometra than those with open cervix pyometra. The ovaries of all the bitches showed presence of a functional corpus luteum during ultrasonography indicating the stage of estrous cycle to be diestrus phase.

All the animals in the present study recovered uneventfully either through medical or surgical management, although surgical methods were recommended to curb the recurrence of pyometra in these bitches.

In the present study, the mean values of PCV, Hb and TRBC values showed a significant decrease compared to control animals whereas no significant change was seen in the MCV, MCH and MCHC indicating a normocytic, normochromic anemia. Significant leukocytosis with a significant increase in the mean absolute counts of mature and immature neutrophils in pyometra were observed indicating a regenerative shift to left. No significant change was observed in absolute lymphocyte, monocyte and eosinophil counts.

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