

Pyometra in Cat: Haemato-Biochemical Evaluation



**Clinical Report Presented in Partial Fulfillment of the Requirement
for the Degree of Doctor of Veterinary Medicine (DVM)**

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December 2024

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Statement of Author

I, Khondoker Mohammad Iftekhar Zahan, would like to strongly assure you that I have performed all of the work outlined here in this report. I have gathered the information from various books, national and international journals, websites, and references. All the references have been duly acknowledged.

Therefore, I reserve the entire responsibility for this report.

The Author

December, 2024

List of Acronyms Symbols Used

Abbreviation	Elaboration
%	Percentage
ALT/ SGPT	Alanine Aminotransferase
AST/ SGOT	Aspartate Aminotransferase
ALP	Alkaline Phosphatase
BUN	Blood Urea Nitrogen
>	Greater than
<	Less than
Hb	Hemoglobin
etc.	Et cetera
et. al	And his associate
*	Expected Answer
CVASU	Chattogram Veterinary and Animal Sciences University

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Abstract

Pyometra is one of the most common reproductive problems in adult cat. A two-year-old Persian cat with a history of vaginal discharge, alopecia and breeding history of a month back was brought to the Teaching and Training Pet Hospital and Research Centre at Chittagong Veterinary and Animal Sciences University in Bangladesh. A general physiological examination was conducted initially followed by a specific examination. Abdominal ballottement revealed that the uterus felt larger and firmer than usual. Following an ultrasound examination, many tubular radio-opaque structures packed with fluid from the caudal to mid-abdomen were discovered.

Blood analysis showed that the level of Bilirubin, ALT, and Lymphocyte increased, and Neutrophils decreased. All the findings confirmed that cat had suffering from pyometra. Following confirmation, the decision was made to do an ovariohysterectomy under general anesthesia. The cat recovered fully and without any complications.

Keywords: Cat; Pyometra; Ultrasonography; Blood Analysis; Biochemical

Chapter-I: Introduction

Pyometra is a serious and potentially life-threatening condition characterized by the accumulation of pus within the uterus. Though it's very common in bitches, feline is rarely affected. Pyometra is one of the common causes of death in older bitches and queen and kidney damage with nephritis is often associated with it (Smith, 2006; *Veterinary Obstetrics and Genital Diseases.*, n.d.). Queens are seasonally polyestrous animals, meaning they have multiple heat cycles during their breeding season. This frequent hormonal cycling increases their susceptibility to pyometra, especially in older queens. Pyometra usually develops during the luteal phase, and the hormone progesterone play the key role for the establishment of infection with ascending opportunistic bacteria (Hagman, 2012). *Escherichia coli* is major pathogen which responsible for development of pyometra ((PDF) *Canine Pyometra: An Update on Pathogenesis and Treatment*, n.d.). The clinical presentation of pyometra is similar in cats and dogs. Clinical symptoms are well described and derive from the site of infection (purulent vaginal discharge, abdominal pain) (*Studies on Clinico-Epidemiology and Surgical Management of Canine Pyometra.*, n.d.). In 'open-cervix pyometra' a blood stained; purulent vaginal discharge may be the only clinical sign one can noticed, Animals with 'closed-cervix pyometra' may not show any vaginal discharge but systemically illness are common. Besides, more severe clinical signs and abdominal enlargement frequently occur in closed cervix pyometra cases (Hagman, 2012). More systemic effects (lethargy, depression, anorexia, polyuria, polydipsia and vomiting) (*Studies on Clinico-Epidemiology and Surgical Management of Canine Pyometra.*, n.d.). It is characterized by endometrial hyperplasia with cystic dilation of endometrial glands and accumulation of purulent exudates in the uterine lumen (Uçmak & İslamoğlu, 2023). Cystic endometrial hyperplasia pyometra complex is not very common in queens (Agudelo, 2005). Pyometra affects the function of several organs including marrow, liver and kidneys. The systemic effects of pyometra are reflected by several laboratory parameters. The most characteristic alteration is an inflammatory leukogram with marked elevation of the total white blood cell count. Biochemical parameters like blood urea nitrogen (BUN) and plasma creatinine indicate about kidney damage (*Veterinary Obstetrics and Genital Diseases.*, n.d.). Abdominal ultrasound is the most important diagnostic tool in a pyometra case. The uterine horns typically appear distended with hypo-/ to hyperechoic fluid with or without flocculation. The uterine wall often appears thickened with irregular edges and small hypoechoic areas consistent with cystic changes of

the endometrial glands. Treatment includes correction of fluid deficits, proper administration of antibiotics against bacterial organisms and removal of infected uterine contents. The other management includes surgical removal of ovary and uterus (ovariohysterectomy) or use of $\text{PGF}_{2\alpha}$ (Nak et al., 2005). Ovariohysterectomy is considered as the treatment of choice for pyometra as it leads to immediate removal of diseased uterus and the uterine content, with elimination of possibility of disease recurrence. The decision to try medical or surgical therapy is based on the physical status and breeding capacity of the queen.

The present research emphasizes on the assessment of X-ray, ultrasonographic changes, hematological and biochemical changes in pyometra in a cat.

Chapter-II: Materials and Methods

2.1 History and Clinical Examination

A two years old pregnant Persian breed cat was admitted to Teaching and Training Pet Hospital and Research Centre, Chittagong Veterinary and Animal Sciences University, Bangladesh, with history of discharge from vagina (Whitish and cloudy), anorexia, loss of appetite also found alopecia and vomiting of single episode. It had also mated history before one month ago. At first, general physical examination was done, and then special examination was carried out. On physical examination, body temperature found 99.3f. On abdominal ballottement the uterus felt harder than normal.

2.2 Blood Test

To conduct a biochemical test, blood was collected and stored in anticoagulant-free tube. After that, the serum was separated by centrifugation of blood at 3000 rpm for 5 minutes. Biochemical test was carried by a semi-automated biochemical analyzer (Humalyzer 3000, GMBH, Germany) by following specific protocol. For complete blood count (CBC), blood was collected in an EDTA-anticoagulated tube and mixing properly by using a rotator. After confirming the sample was free from clots or haemolyzed, and it was analyzed by OV-560 RET hematology analyzer. The analysis was conducted following the manufacturer's instructions and established protocol. Biochemical and hematological are shown in table-1 and table-2 subsequently. In hematological analysis, all the parameter are within normal range except Neutrophil and Lymphocyte. Neutrophil are slightly lower than the normal value where as lymphocytes are slightly higher than the normal range.

In biochemical analysis, Bilirubin and SGPT level are slightly elevated but not significant. Other parameters such as Glucose, creatinine, BUN, SGOT, ALP are within normal range.

2.3: Imaging:

Two lateral radio-graphs were taken to determine the condition of uterus. Lateral radiograph revealed multiple tubular, radio opaque fluid filled structures from caudal to mid abdomen

(fig-1) Ultrasonography was performed using a B mode real-time 5MHz micro convex transducer. In abdominal ultrasound, multiple anechoic fluid filled areas were found in uterus (fig 2).

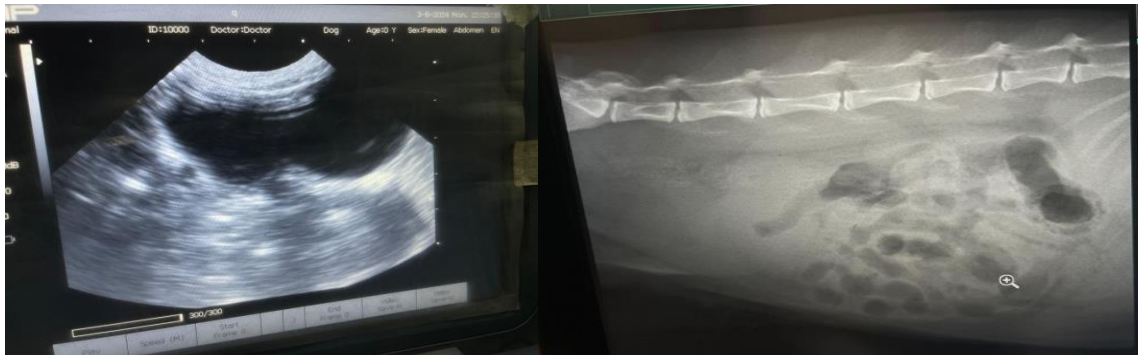


Fig 1: Ultrasound image of Pyometra

Fig-2: Radiological change in Pyometra

Table 1: Hematology Report for Cat

Test Name	Result	Reference Value
Hemoglobin (Hb%)	10.7 g/dl	9.0-15.5 g/dl
RBC Count	6.85 m/ul	4.60-10.00 m/ul
HCT/ PCV	31.5%	27.0 - 49.0 %
MCV	43.2 fL	39.0-53.0 fL
MCH	13.7 pg	13.0-20.0 pg
MCHC	32.1 g/dl	29.0-37.0 g/dl
RDW_CV	18.2 %	15.0-22.0 %
Total WBC Count	10,800 /cumm	5,000-19,000 cumm
Neutrophils	36%	38-80 %
Lymphocytes	54%	12-45 %
Monocytes	02%	1-7 %
Eosinophil's	08%	01-11 %

Basophil's	00%	00-01 %
T. Circulatory Eosinophil's Count	931 /cumm	100-1200 /cumm
Absolute Neutrophils (NEU)**	3.121 10 ⁹ /L	2.320-12.580 10 ⁹ /L
Absolute Lymphocytes (LYM)**	6.461 10 ⁹ /L	0.730-7.86 10 ⁹ /L
Platelet Count	1,90,000 /cumm	1,00,000-5,18,000 /cumm
PCT	0.24%	0.09-1.00 %

Table 1: Biochemical Report for Cat

Parameters	Reference Value	Test Result
Glucose	50-170 mg/dl	62.8
Bilirubin	0.1-0.4 mg/dl	0.9
Alanine Aminotransferase (ALT/ SGPT)	10-100 u/l	168
Aspartate Aminotransferase (AST/ SGOT)	10-100 u/l	44
Alkaline Phosphatase (ALP)	10-50 u/l	43
Blood Urea Nitrogen (BUN)	14-36 mg/dl	22
Serum Creatinine	0.6-1.6 mg/dl	1.5

Chapter-III: Result & Discussion

Pyometra has been described as being prevalent in cats over five years of age (Feldman, 2015). But in our study the cat age was only two years of old. It may be due to the improper management practices taken during the estrous period or may be due to hormonal alteration which are not evaluated. Clinical signs (vaginal discharge, lethargic condition and anorexia) found in this case having the similarity with findings of another author (Krekeler & Hollinshead, 2023). The author records vaginal discharge, abdominal distention, dehydration and pyrexia as clinical signs. Ultrasonography is an effective method for identifying uterine anomalies early on, which could lead to earlier and more effective treatment. Ultrasound allows determination of uterine size, the thickness of the uterine wall and the presence of fluid accumulation within the lumen. In some cases, the character of the fluid within the uterus (serous versus viscid) can be determined (*Diagnostic Ultrasound in the Dog and Cat.*, n.d.). According to the current study, the cat's hemoglobin normal prior to treatment, indicating anemia was absent in this case. The findings is inconsistent with the findings of some authors who recorded a mild normocytic, normochromic, nonregenerative anemia (Department of Animal Reproduction, Gynaecology and Obstetrics, College of Veterinary and Animal Sciences, Mannuthy, Thrissur- 680 651 Kerala Veterinary and Animal Sciences University Kerala, India et al., 2024). In this case the MCH is 13.7pg, that's indicate iron deficiency anemia may be affected (*Understanding Your Cat's Blood Work Results - All Feline Hospital Located, 2300 S. 48th St. Suite 3 Lincoln, NE 68506*, n.d.). In this case, all the hematology parameter are normal except Neutrophils and Lymphocyte. In this study neutrophil is little bit lower than normal range (Neutropenia). This finding is not consistent with the usual hematological change in pyometra case, where neutrophilia is prominent change. In one study in dog pyometra case, neutropenia is recorded in closed pyometra (Paudel et al., 2023). Only differences in animal, cause this study is based on feline pyometra. However, neutropenia may develop in chronic or severe cases due to immune suppression or exhaustion of the bone marrow reserve. Lymphocytosis, characterized by an elevated lymphocyte count, is an unusual but documented finding in cases of feline pyometra. Lymphocytes, critical components of the adaptive immune system, include B cells, T cells, and natural killer (NK) cells. Their involvement in pyometra may reflect an immune system response influenced by chronic infection, stress, or underlying conditions. In the Case Relative Lymphocyte Count is 54% (Reference: 12–45%). The lymphocyte proportion

exceeds the normal upper limit, indicating relative lymphocytosis. Pyometra can cause liver derangement and kidney function changes(Nak et al., 2005). Occasionally, Alanine Aminotransferase (ALT) levels are moderately increased because of hepatocellular damage caused by septicemia, diminished hepatic circulation and cellular hypoxia in the dehydrated cats (Department of Animal Reproduction, Gynaecology and Obstetrics, College of Veterinary and Animal Sciences, Mannuthy, Thrissur- 680 651 Kerala Veterinary and Animal Sciences University Kerala, India et al., 2024). In this study, Bilirubin and ALT is higher than normal range, which is indicating hepatocellular damage. Renal dysfunction may develop secondary related to bacterial endotoxin to pyometra(*Pyometra - ScienceDirect*, n.d.). Blood urea nitrogen (22 mg/dL) and creatinine (1.5 mg/dL) are within reference ranges, indicating that renal function remains uncompromised. Renal insufficiency is a well-documented complication of pyometra due to decreased glomerular filtration or pre-renal azotemia caused by dehydration. Other biochemical parameter (Aspartate Aminotransferase (AST/ SGOT), Alkaline Phosphatase (ALP) are in normal range.

Chapter-IV: Conclusion

Pyometra is a serious health issue in cat. Therefore, these patients must undergo immediate diagnosis by ultrasonographic, radiological, hematological and blood biochemical examination. The analysis of various parameters helps in the assessment of the clinical status of the animal and the prediction of the prognosis.

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ACKNOWLEDGEMENT

The author wishes to acknowledge the immeasurable grace and profound kindness of almighty “Allah” the supreme authority and supreme ruler of universe, who empowers the author to complete this task successfully.

The author feels proud in expressing his deep sense of gratitude and indebtedness to internship supervisor Dr. Abdul Mannan; Deputy Chief Veterinary Officer, Teaching and Training Pet Hospital and Research Center, Chittagong Veterinary and Animal Sciences University for his trustworthy and scholastic supervision to make this report.

The author expresses thanks and warmest sense of gratitude to his parents and all well-wishes.

The author

December, 2024

BIOGRAPHY

I am Khondoker Mohammad Iftekhar Zahan, Son of Md. Younus Ali and Mst. Shahinur Begum. I passed my Secondary School Certificate (SSC) examination from Adarsha Bidyaniketon, Manikde, Dhaka, Dhaka Board in 2015 and Higher Secondary Certificate (HSC) examination from Adamjee Cantonment College, Dhaka, Dhaka Board in 2017. I enrolled for Doctor of Veterinary Medicine (DVM) degree in Chittagong Veterinary and Animal Sciences University (CVASU), Chittagong, Bangladesh in 2017-2018 sessions. At present I am doing my Internship program which is compulsory for awarding my degree of Doctor of Veterinary Medicine (DVM) from Chittagong Veterinary and Animal Sciences University. In the near future I would like to work in pet sector and also have massive interest in Government first class job.