

Feline Infectious Peritonitis in a Domestic Short Hair Cat: A Case Report



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Feline Infectious Peritonitis in a Domestic Short Hair Cat: A Case Report



This is to certify that I have examined the clinical report and found it complete and satisfactory in all aspects for evaluation

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Abstract

Feline infectious peritonitis (FIP) is a world-wide spread chronic progressive virus infection, often with a fatal end. The disease is caused by Feline Coronavirus (FCoV), a group of enveloped, positive stranded RNA virus belonging to the family Coronaviridae. The morbidity and mortality of this disease in cats is very high but information on FIP in Bangladesh is limited, if not absent. The present report describes a case of FIP in a cat presented to Teaching and Training Pet Hospital and Research Center at Purbachal, Dhaka with a history of high fever, anorexia and chronic weight loss. Clinical examination of the cat revealed anemia, distended abdomen with fluid and jaundice. Laboratory investigation revealed neutrophilic leukocytosis, lymphopenia and hyperglobuliemia and elevated liver enzymes as detected by CBC and serum biochemistry. FIP antibody was determined using FASTest FIP kit and ascites was detected by ultrasound. The case was finally diagnosed as FIP based on the collective findings of the history and clinical signs coupled with findings of laboratory results. The cat was treated with antiviral and antibiotic in combination with supportive treatment including fluid therapy, steroids and immunomodulatory drugs. The cat was then discharged, and the owner was advised to continue the treatment.

Introduction

Feline infectious peritonitis (FIP) is an immune mediated disease triggered by infection with a feline coronavirus (FCoV) (Pederson, 2009). FCoV belongs to the family coronaviridae, a group of enveloped, positive stranded RNA viruses frequently found in cats (Lewis et al., 2015). The disease is characterized by granulomatous lesions ('dry' or non-effusive FIP) and/or by vasculitis that induce the development of cavitory effusions ('wet' or effusive FIP). FIP can affect cats of any age and sex, but it most commonly affects kittens between the ages of 6 months and 2 years. Although the disease can occur in any breed, purebred cats (including Persian, Abyssinian, Bengal, Birman, Himalayan, Ragdoll, and Rex breeds) are most likely to be affected. When a kitten's mother's immunity starts to decline at around 5 to 6 weeks of age, it is possible for them to catch the virus from her or from carriers.

The virus is endemic especially in environments in which many cats are kept together in a small space (e.g., catteries, shelters, pet stores). At least 50% of cats in the United States and Europe have antibodies against coronaviruses (Sparkes et al., 1992; Horzinek et al., 1986). Although the prevalence of FCoV infection is high, only approximately 5% of cats in multiple-cat household situations develop FIP; the number is even lower in a single-cat environment (Pedersen, 1976; Addie et al., 1992). The prevalence of FIP has not been studied yet in Bangladesh.

Most infections are presumably brought on by ingesting the virus. Transmission by inhalation is also possible. Because cats shed particles of the virus in feces, litter box exposure is the most important source of infection. The virus can also be transmitted through saliva, by mutual grooming, sharing the same food bowl, sneezing, and through close contact. Cats living in multiple-cat households are at greater risk of the disease.

The clinical presentations of FIP are variable and often complex, depending on the variations in the virus and the nature of the host immune response. Around 50% of cats diagnosed globally are purebred and younger than two years old (Pedersen, 1995). "Effusive" and "non-effusive" are two general categories that describe the disease across all ages and breeds. Throughout the course of the illness, cats with FIP may alternate between forms (Addie et al., 2004). Furthermore, cats with non-effusive FIP may develop

effusions in the terminal stages of disease (Pedersen, 1995). Typically, the cats with effusions have ascites; abdominal effusions, and/or pericardial effusion (Hartmann et al., 2002). The non-effusive form of FIP frequently presents with a more ambiguous set of symptoms, such as fever, weight loss, lethargy, decreased appetite and/or jaundice (Trulove et al., 1992).

According to reports, cats with FIP have morbidity and mortality rates of 90% and 100%, respectively (Hok, 1993). Using non-invasive techniques, diagnosing FIP is challenging. Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) on blood (not available in Bangladesh), effusions or tissue, and serum antibody tests (available in Bangladesh) have been thought to be helpful in supporting a clinical diagnosis of FIP (Pedersen, 1983), but they must be taken into consideration along with the patient's history and other clinico-pathological findings and can never be used alone (Addie et al., 2004).

As it is a highly contagious and fatal disease for cat, the detail study regarding the disease is important to prevent and control the disease. Information on the diagnosis, treatment, prevention, and vaccination status of feline infectious peritonitis in cats in Bangladesh is limited, if not absent. The present report describes a case of feline infectious peritonitis in a domestic short hair cat presented to the Teaching and Training Pet Hospital and Research Centre, Purbachal, Dhaka.

Study site

The present case was recorded in Teaching and Training Pet Hospital and Research Centre (TTPHRC) during an internship placement from 12 – 16 November 2022. TTPHRC under CVASU was set up in 2018 for providing hands-on training to the interns and postgraduate veterinary students as well as to provide services to the owners for their pets. The facilities for the pet animals and birds include treatment, vaccination, deworming, health check-up and surgery. Furthermore, zoo and exotic animals are brought here for treatment and health checkups. It has a well-equipped operation theater, X-ray, ultra-sonogram and laboratory facilities.

Case description

A domestic short-haired female cat aged 6 years and weighing around 4.2 kg was brought in TTPHRC with a history of lethargy, anorexia and weight loss for a period of 15 days. The cat's temperature was 102.4°C. The respiration and heart rates were found 32 breaths and 142 beats per minute, respectively. The appetite had been poor for several days. The cat was severely dehydrated and exhibited weakness and dyspnea. The abdomen was moderately distended with fluid (Figure 1) and a profound anemia was evident. Jaundice was noticed during clinical examination. The cat was checked for complete blood count (CBC) and serum biochemistry and recommended for detection of antibodies against the feline coronavirus using FASTest FIP and Revalta test. The owner was also advised to perform ultrasonogram of the cat to detect acities.

Diagnosis

A general clinical examination revealed pleural effusion in the absence of pericardial fluid. The results of CBC and serum biochemistry are given in Table 1 and Table 2, respectively. A complete blood cell count indicated a low packed cell volume (PCV) of 26% and haemoglobin level was found below the normal range. Neutrophilic leukocytosis and lymphopenia were found by CBC test.

A serum biochemical analysis of serum revealed hyperglobulinaemia (4.9 g/dL) with a low albumin 2.1 g/dL. The aspartate aminotransferase level was 51 m/L which is indicative of liver damage. The serum bilirubin level was found 0.7 g/L which was slightly higher than the reference value.

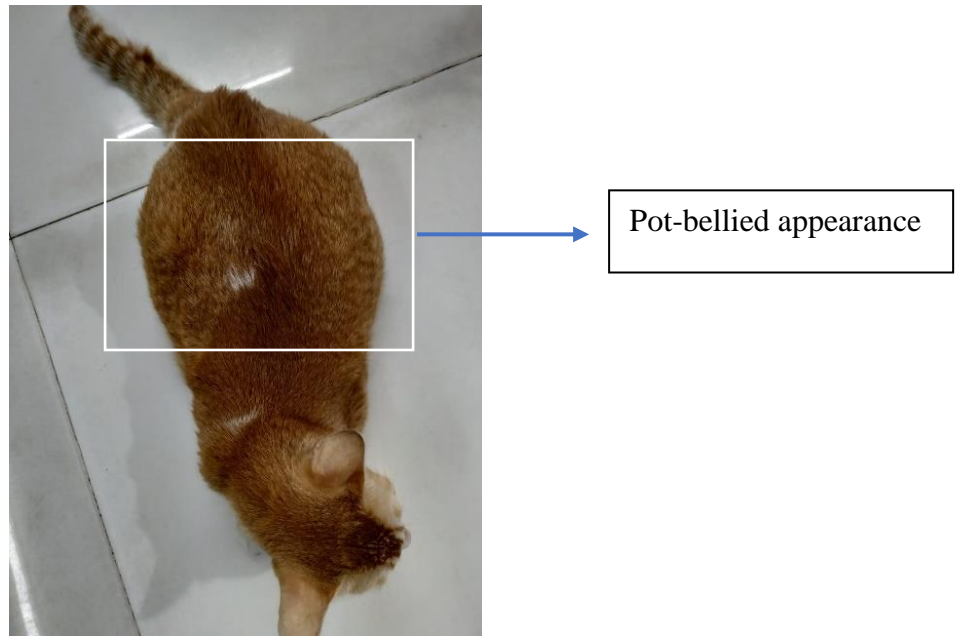


Figure 1: FIP positive Cat

Table.1 Results of Complete Blood Count (CBC) of the cat presented to Teaching and Training Pet Hospital and Research Center

| Parameters | Presenting values | Reference values |
|-------------------------------------------|-------------------|------------------|
| Red blood cells (RBC) (g/L) | 4.2 | 5-10 |
| Packed cell volume (PCV) (%) | 26 | 30-45 |
| Hemoglobin (Hgb) (g/dL) | 5.5 | 8-15 |
| Mean corpuscular hemoglobin concentration | 25.5 | 30-36 |
| White blood cells (WBC) | 26 | 5.5-19.5 |
| Neutrophils (%) | 90 | 35-75 |
| Lymphocytes (%) | 8.5 | 20-55 |
| Monocytes (%) | 1 | 1-4 |
| Basophils (%) | 0 | 0-1 |
| Eosinophils (%) | 1 | 2-12 |

(Reference values, from The Merk Veterinary Manual, 9th edition)

Table 2. Results of Serum Biochemistry of the cat presented to Teaching and Training Pet Hospital and Research Center

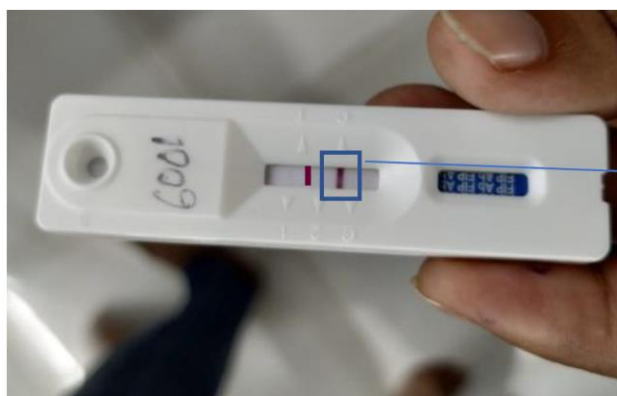
| Parameters | Presenting values | Reference values |
|----------------------------------|-------------------|------------------|
| AST (μ/L) | 51 | 9.2-40 |
| ALT (μ/L) | 48 | 8.3-53 |
| Albumin (g/dL) | 2.1 | 2.4-3.8 |
| Globulin (g/dL) | 4.9 | 2.4-3.7 |
| Bilirubin (g/dL) | 0.7 | 0.1-0.4 |
| Alkaline Phosphatase (μ/L) | 33 | 9.2-40 |
| Creatinine (mg/dL) | 0.9 | 0.5-1.9 |
| Blood Urea Nitrogen (mg/dL) | 17 | 15-30 |

ALT, Alanine aminotransferase; AST, Aspartate aminotransferase

(Reference values, from The Merck Veterinary Manual 9th edition)

The cat was found positive for FIP by FASTest FIP kit (Figure 2) and gave positive reaction to Rivalta test (Figure 3). Rivalta test was performed in the following way:

A reagent tube was filled with 5 mL distilled water; 1 drop of acetic acid (98%) was added, and the tube content was thoroughly mixed. On the surface of this solution, 1 drop of the effusion fluid was carefully layered. If the drop disappeared and the solution remained clear, the Rivalta's test was defined as negative. If the drop retained its shape, stayed attached to the surface, or slowly floated down to the bottom of the tube (drop- or jellyfish-like), the Rivalta test was defined as positive.



Test line showing positive result

Figure 2: FIP positive in kit test

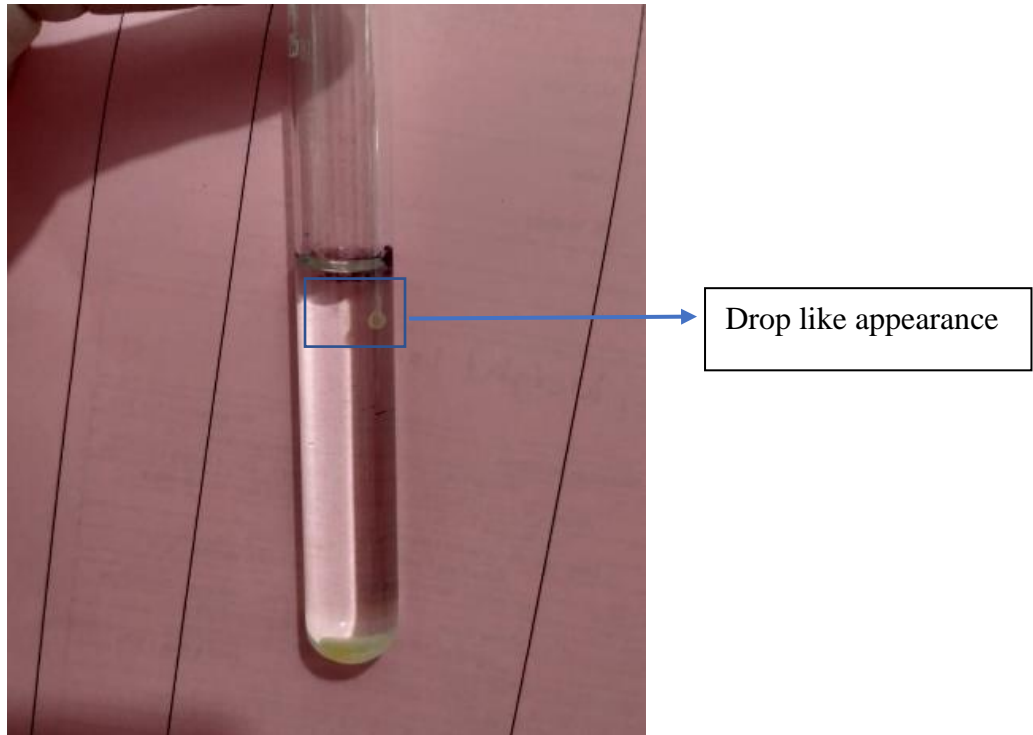


Figure 3: Positive Rivalta test for FIP

The ascitic fluid from the patient was analysed by ultrasonography to confirm the effusions (Figure 4).



Figure 4: Ultrasonogram for the detection of ascites.

Based on clinical signs and laboratory results, the cat was diagnosed as a case of feline infectious peritonitis. The clinical signs and the results of laboratory test (CBC, serum biochemistry, FASTest FIP, Rivalta test and ultrasonogram) suggested a diagnosis of feline infectious peritonitis (FIP).

Treatment

The cat was treated with fluid therapy, antiviral and antibiotic medication, as well as steroids, antihistaminic, and immunomodulatory drugs. The cat received the following medications: Remdesivir (Remivir 100) as an antiviral administered subcutaneously once daily for 84 days and Doxycycline (Doxicap capsule) as an antibiotic for 14 days. As a form of supportive care, the cat was treated with fluid therapy (5% dextrose saline and 0.9% saline), Glucocorticoids (Tablet Cortan, 5 mg) for 7 days, Famotidine for 14 days and Cyanocobalamin administered subcutaneously for 7 days. The cat was then discharged with instructions to continue the treatment.

Discussion

Although FIP has been reported in cats of all breeds, wild cats are less likely to contract the disease. However, any age group can be susceptible. Although kittens, young cats, and male cats are more prone to this disease. The clinical signs in affected cat of this case were fever, abdominal distension due to ascites and anorexia which is consistent with the report previously described by Wolfe and Griesemeer (1966). Leukocytosis, particularly neutrophilia, and mild anemia were the main findings of the complete blood count (CBC) at the time of presentation (Table 1). Hyperglobuliemia, elevated liver enzymes, and blood urea nitrogen were all revealed by serum biochemistry examination (Table 2). Similar hematological and serum biochemistry findings in cats suffering from the wet form of FIP were reported by Hartmann et al. (2003). All cat breeds around the world are susceptible to disease, however due to a lack of hybrid vigor, purebred cats are said to have a higher incidence of developing disease.

FIP cannot be effectively treated; instead, the disease must be managed in order to avoid it. The same viral biotype will be continuously shed by the infected cat if it becomes a lifetime carrier. Fecal waste should be properly disposed of, and healthy cats should be kept away from infected litter boxes as an effective preventive measure because the virus

can remain active in fecal material for up to 7-8 weeks, which is a potential source of infection for healthy cats in the litter box. The occurrence of the disease can be decreased by reducing the number of cats, early weaning of newborn kittens, keeping cats in separate cages, effective cleanliness and cattery design, careful selection of breeding males, screening of diseased cats, and vaccination (Addie and Jarrett, 1990).

Clinico-epidemiological findings and laboratory results, such as fluid assay (total protein and albumin to globulin ratio) where necessary or feasible, were used to diagnose FIP cases. Total protein in cats with FIP can reach high concentrations of up to 12 g/dL (120 g/L) and more where albumin to globulin ratio is less than 0.8 (Hartmann et al., 2003). The cats who displayed listlessness, lethargy, diminished or absent appetite, fluctuating fever, increased bodily fluid effusion, trouble breathing, or dyspnea were initially suspected as having feline infectious peritonitis. Finally, it was being confirmed by rapid diagnostic test kit and Rivalta's test. The sensitivity and specificity of the rapid test was found 84.6% and 100%, respectively (Addie et al., 2015).

No molecular test was performed to detect the virus in this case. Detection of FCoV in feces or tissues/exudates via RT-PCR can be used as FIP diagnosis in combination with other tests (Sharif et al., 2011).

Conclusion

The clinical signs and laboratory results suggested a diagnosis of feline infectious peritonitis. The confirmatory diagnosis of the present case was based on the collective findings of the history and clinical signs coupled with findings of laboratory results including CBC, serum biochemistry, rapid test, Rivalta test and ultrasonography of the abdomen. Along with an antiviral, supportive treatment was given to the FIP affected cat. Though vaccine against FIP virus is not commercially available but combined vaccination against other viral diseases could have boosted the immune system of the cats to fight against FIP.

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