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Case report

Concurrent manifestation of feline infectious peritonitis and feline panleukopenia virus infection in cat: A case study

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A B S T R A C T

Concurrent infection with Feline Infectious Peritonitis (FIP) and Feline PanleukopeniaVirus (FPV) is rare but clinically devastating. This case study was carried out on a 2.6-year-old unvaccinated male long-haired mixed breed cat weighing about 5.8 kg with the history of recurrent vomiting and minimally responsive of previous treatment at the Teaching and Training Pet Hospital and Research Center, Purbachal, Dhaka of Chattogram Veterinary and Animal Sciences University. The objective of the study was to assess the severity of clinical manifestations, evaluating the hemato-biochemical changes and observing the prognosis of co-morbidity. The cat presented with symptoms including vomiting, lethargy, anorexia, icterus, diarrhea and dehydration. Haematological analysis revealed marked neutrophilia, thrombocytopenia, and elevated packed cell volume (PCV). Serum biochemistry showed severe hyperbilirubinemia, increased hepatic enzymes, hyperglobulinemia, and a decreased albumin-to-globulin ratio. Imaging studies were largely unremarkable except medullary rim was found in kidney. Rapid test kits were positive for both FIP antibody and FPV antigen. Based on diagnosis, treatment was given with antiviral therapy (GS-441524) for FIP and supportive care for FPV, including intravenous fluids and antibiotics but the cat's condition worsened, and the patient ultimately passed away within two days of treatment. This case highlights the complexities of diagnosing and managing concurrent viral infections in cats and stresses the importance of early detection, comprehensive care, and preventive measures in controlling the spread of these infections in veterinary practice.

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1. INTRODUCTION

Viral infections are being considered as the most common causes of cat's mortality. Viral gastrointestinal pathogens, feline panleukopenia and corona viruses are the most frequent. Mixed infections with different enteric virus combinations, bacterial and helminthic co-infections influence the severity of the disease by enhancing intestinal cell turnover and viral replication (Reshma et al., 2024).

Feline Infectious Peritonitis (FIP) is a progressive, immune-mediated disease caused by a virulent mutant form of feline coronavirus (FCoV) and remains one of the most fatal infectious diseases in cats. It typically affects young, stressed, or immunocompromised

individuals and is characterized by pyogranulomatous inflammation, vasculitis, and effusion formation in the "wet" form or granulomatous lesions in the "dry" form (Kipar and Meli, 2014; Pedersen, 2014). Despite advances in molecular diagnostics and antiviral therapy, antemortem diagnosis of FIP continues to be challenging due to its variable and nonspecific clinical manifestations.

Feline Panleukopenia Virus (FPV) is another severe and often fatal disease of cats. FPV primarily targets rapidly dividing cells, leading to intestinal crypt necrosis, profound leukopenia, and immunosuppression (Greene and Decaro, 2022). The disease is most common in unvaccinated kittens and can spread rapidly in multi-cat environments such as shelters and catteries (Greene and Decaro, 2022; Truyen et al., 2009).

Although both FCoV and FPV are widespread in multi-cat settings, concurrent infection with FIP and FPV is exceedingly rare. Co-infection poses significant diagnostic challenges due to overlapping clinical signs such as fever, lethargy, gastrointestinal disturbances, and acute clinical deterioration (Riemer et al., 2016). Furthermore, the severe immune suppression induced by FPV may predispose cats to the development or accelerated progression of FIP, complicating clinical interpretation and management (Stuetzer and Hartmann, 2014). Veterinarians may focus on a single primary pathogen and fail to consider co-infection in complex or atypical presentations because dual infections are seldom described. Given the scarcity of documented cases, reporting concurrent infection with FIP and FPV is essential to expand clinical awareness, enhance diagnostic accuracy, and improve understanding of host–pathogen interactions. This case report describes a rare instance of FIP and FPV co-infection in a cat and highlighting the challenges in diagnosis and the implications for clinical management.

CASE PRESENTATION

Case history

A 2.6 years old unvaccinated long haired mixed breed male cat weighing about 5.8 kg brought to Teaching and Training Pet Hospital and Research Center, Purbachal from Mohammadpur, Dhaka with the history of recurrent vomiting and minimally responsive of treatment from five days. During this period, it was treated with ceftriaxone, ondansetron, pantoprazole and fluid therapy.

Clinical examination

Clinical examination revealed the cat was depressed, dehydrated, laterally recumbent (Figure 1), mildly icteric gums (Figure 2), protrusion of 3rd eyelid (Figure 3) and weakness. The respiratory and heart sound was normal but breathing was slow and deep. Body temperature was recorded 103.1°F.

Figure 1. Dehydrated and laterally recumbent cat

Figure 2. Mild yellowish in gum

Blood Test

A total of 2.5 ml blood was collected in an EDTA-anticoagulant tube and anticoagulant free tube for CBC (total RBC, PCV/HCT, Hb %, total WBC and DLC) and serum biochemistry (total protein, albumin, globulin, bilirubin, SGOT, SGPT, ALP and AG ratio) respectively. The analysis was conducted following the manufacturer's instructions and established protocol. In haematology, total RBC count and HCT/PCV percentage were slightly high. Neutrophilia and eosinophilia with marked thrombocytopenia were detected (Table 1). In serum biochemistry, the total protein and globulin were slightly elevated. The bilirubin was significantly elevated. The SGPT and SGOT levels were also markedly elevated. The albumin and globulin ratio were decreased (<0.6) (Table 2).

Imaging Techniques

X-ray and USG were performed to determine any changes in thorax and abdomen. After proper restraining, it was placed under the light in a lateral position so that photographs of the abdomen, chest and GI tract could be taken. The radiographic findings were almost normal except little gas filled in intestine (Figure 4). The USG procedure was performed at a frequency of 4.0MHz and 15A with a micro convex probe. The scanning of the ventral lower abdomen and lateral flank was performed to identify any changes in abdomen as well as in both kidneys. The ultrasound findings indicated no fluid in the abdomen. The cortex and medulla of both kidneys were well-defined, with a visible medullary rim in each. The hepatic parenchyma showed normal echogenicity, and the urinary bladder was well-filled with normal contents (Figure 5).

Rapid Kit Tests

For FIP test (Testsealab, Hangzhou Testsea Biotechnology Co. Ltd, China), one drop of serum was added to the sample well. After placing, three drops of buffer were added into the sample well, the result may be read within 8-10 minutes. The pink color band in both control and test line indicates positive. For FPV test, (Testsealab, Hangzhou Testsea Biotechnology Co. Ltd, China) a small amount of fecal sample was collected and mixed with the dilution buffer in a clean extraction tube. 3 to 4 drops of the supernatant from the prepared sample were added to the sample well. The test cassette was placed on a flat surface for 5–10 minutes. The pink color band in both control and test line indicates positive. The result of each test kit was positive for both FIP antibody and FPV antigen respectively (Figure 6 and 7).

Treatment Protocol

Antiviral drug (GS-441524®, Hebei Ruican Co., Ltd., China)at the rate of 8mg/kg body weight was prescribed subcutaneously for 84 days for FIP. As a fluid therapy, Hartmann's solution (Hartmann®, OSL pharma Ltd., Bangladesh) was prescribed intravenously at the rate of 20ml/kg body weight for 7 days. Amoxicillin (Moxin IM®, Opsonin Pharma Ltd., Bangladesh) was administered intramuscularly at the rate of 15 mg/kg body weight twice daily for 7 days. Additionally, tranexamic acid (Tracid vet®, Acme Laboratories Ltd., Bangladesh) at the rate of 10 mg/kg body weight was administered subcutaneously twice daily to check bleeding. For vomiting, ondansetron (Emistat®, Healthcare Pharmaceuticals Ltd., Bangladesh) was given intramuscularly at the rate of 0.2 mg/kg body weight, twice daily for 7 days. To prevent anaemia, cyanocobalamin (Cynomin®, Jayson Pharmaceuticals Ltd., Bangladesh) was suggested at a total dose of 250 µg per cat at three-days intervals for a total of five doses. Pantoprazole Sodium (Pantonix IV®, Incepta Pharmaceuticals Ltd., Bangladesh) at the rate of 1 mg/ kg body weight intravenously twice daily for 7 days was also suggested. Regular follow up of patient was maintained from the owner over phone call.

RESULT

During the treatment the patient's condition gradually worsened. At last, the patient expired following two days of treatment.

Figure 3. Protrusion of 3rd eyelid

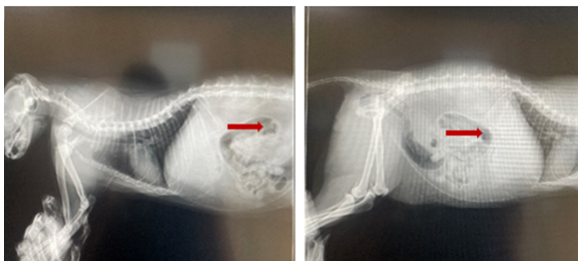

Figure 4. Normal radiography in thorax and abdomen with mild gas (arrow mark)

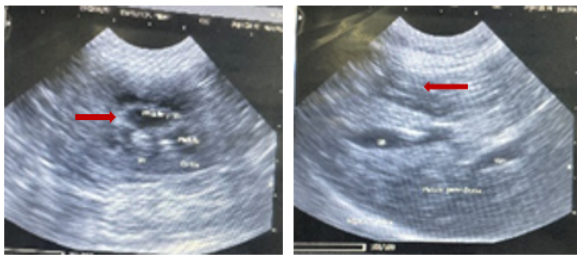

Figure 5. Madullary rim in kidney (arrow mark)

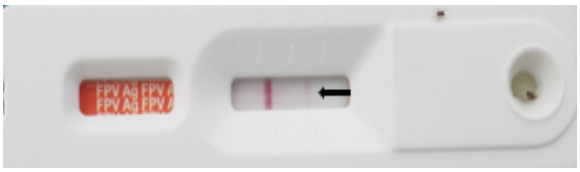

Figure 6. FPV positive in rapid kit test (arrow mark)

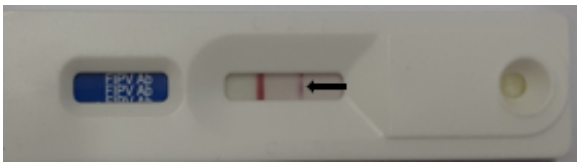

Figure 7. FIP positive in rapid kit test (arrow mark)

Table 1. Complete blood count (CBC)

Parameters	Test Results		Reference Value	Remarks
Total RBC Count	10.10	$X10^6/\mu L$	5-10	H
HCT/PCV	50.4	%	30-45	H
MCV	49.7	fl	39-55	
MCH	16.7	pg	13-17	
MCHC	33.5	g/dl	30-36	
RDW-CV	15.3	%	10-16	
RDW-SD	30.4	fl	35-56	L
Total Platelet Count	114,000	/cumm	3,00,000-8,00,000	L
MPV	10.80	fl	12-18	L
PDW	15.8	%	10-18	
PCT	0.12	%	0.1-0.2	
Total WBC Count	19,300	/cumm	5,500-19,500	
Neutrophils	84	%	27-82	H
Lymphocytes	07	%	09-56	L
Monocytes	02	%	00-08	
Eosinophils	07	%	00-06	H
Basophils	00	%	00-01	
Haemoglobin (Hb)	16.9	g/dl	9.8-15.4	H

DISCUSSION

Concurrent infection with Feline Infectious Peritonitis (FIP) and Feline Panleukopenia Virus (FPV) is uncommon but can produce severe, rapidly progressive disease due to synergistic effects on the immune system and vital organs. FPV causes profound destruction of rapidly

dividing cells, especially in the intestinal crypts and bone marrow, leading to leukopenia, epithelial sloughing, endotoxemia, and secondary bacterial invasion (Barrs, 2019). In contrast, FIP arises from a mutation of feline coronavirus, resulting in immune-mediated pyogranulomatous inflammation and vasculitis (Addie et al., 2009; Hartmann, 2005). When both pathogens are present, their combined actions amplify systemic inflammation, immune dysregulation, and organ damage, contributing to a poor prognosis (Reshma et al., 2024). The patient passed away after two days of treatment might be due to dehydration, secondary bacterial infections, and systemic complications which were supported the previous statement.

Table 2. Serum biochemistry

Parameters	Test Results		Reference Value	Remarks
Total Protein	9.17	g/dl	5.2-8.8	H
Albumin	2.93	g/dl	2.5-3.9	
Globulin	6.24	g/dl	2.3-5.3	H
Bilirubin	8.8	mg/dl	0.1-0.4	H
ALT/SGPT	680	unit/l	10-100	H
AST/SGOT	690	unit/l	10-100	H
ALP	14	unit/l	14	
Albumin Globulin Ratio	0.52		> 0.6	L

In the present case, hematology revealed mild neutrophilia and eosinophilia despite FPV's classical association with leukopenia. Such a finding likely reflects overwhelming inflammation and secondary bacterial infection, which can cause reactive neutrophilia even in FPV-infected cats (Greene, 2012). Thrombocytopenia observed in this patient may have resulted from multiple mechanisms: FPV bone marrow suppression, immune-mediated platelet destruction, and FIP-associated vasculitis causing increased platelet consumption (Hartmann, 2005).

The biochemical abnormalities strongly supported FIP involvement. Hyperglobulinemia combined with a markedly reduced albumin-to-globulin ratio is a well-recognized indicator of dry FIP, driven by chronic immune stimulation and polyclonal gammopathy (Addie et al., 2009). Severe hyperbilirubinemia and the dramatic elevation of SGOT and SGPT suggested significant hepatic injury. In FIP, granulomatous lesions frequently affect the liver, impairing hepatocellular function (Hartmann, 2005). Simultaneously, FPV can contribute to hepatic damage through hypoperfusion and endotoxemia secondary to intestinal injury (Barrs, 2019). Thus, the combined pathological effects likely accelerated hepatic failure in this patient.

Imaging results were largely normal, with no detectable abdominal effusion. This supports the diagnosis of non-effusive (dry) FIP, which typically lacks fluid accumulation and instead presents with granulomatous infiltration of organs (Addie et al., 2009). The absence of ultrasonographic abnormalities does not rule out dry FIP because significant biochemical or immunological changes may appear well before structural lesions become visible (Hartmann, 2005). Only the medullary rim sign (MRS) was seen on ultrasonographic (US) examination of kidneys in this study which was associated with cellular infiltration due to FIP-related vasculitis (Foley and Medicine, 2008).

The positive rapid tests for FPV antigen and FIP antibody must be interpreted with caution, as antibody tests cannot definitively distinguish between FCoV exposure and FIP. However, when positive antibody results coincide with characteristic hyperglobulinemia, a low A:G ratio, and compatible clinical progression, they strongly support an FIP diagnosis (Addie et al., 2009).

CONCLUSION

This case illustrates the severe and rapidly fatal consequences of concurrent FIP and FPV infection in an unvaccinated cat. The overlapping mechanisms of immune suppression, systemic inflammation, and organ damage significantly worsen prognosis. Routine vaccination, early diagnostic screening, and aggressive supportive therapy remain crucial in preventing such outcomes.

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