

Feline infectious peritonitis and feline leukemia virus co-infection: a case study on diagnostic and clinical pathological findings

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ABSTRACT: Feline Infectious Peritonitis (FIP) is a progressive systemic disease caused by a mutated form of feline coronavirus, often exacerbated by immunosuppressive retroviruses such as Feline Leukemia Virus (FeLV). This case study aims to evaluate the clinicopathological profile of a domestic cat co-infected with FIP and FeLV. A 3-year-old male domestic cat presented with anorexia and mild hyperthermia (39°C). Hematological examination revealed monocytosis, macrocytic hypochromic anemia, and thrombocytopenia. These findings support the typical pathophysiology of FIP involving granulomatous phlebitis and immunosuppressive anemia due to FeLV. Serum biochemistry showed a decreased albumin-to-globulin ratio (0.39), elevated AST, amylase, and total bilirubin, consistent with hepatic involvement. Urinalysis detected bilirubinuria and urobilinogen, indicating hepatobiliary dysfunction. Rapid tests confirmed co-infection with FIPV and FeLV. The combination of hematological abnormalities, serum biochemistry changes, urinalysis, and rapid test results confirms the synergistic pathological impact of FIP and FeLV in this patient. These findings underline the importance of comprehensive diagnostics in feline viral co-infections.

Keywords:

feline infectious peritonitis, feline leukemia virus, co-infection, hematology, biochemistry

INTRODUCTION

Feline Infectious Peritonitis (FIP) and Feline Leukemia Virus (FeLV) are devastating viral diseases causing high mortality in domestic cats worldwide (Pedersen 2014). FIP, caused by a virulent feline coronavirus (FCoV) mutation, manifests in both effusive and non-effusive forms. This disease affects young cats and multicat environments through close contact (Addie 2019). FeLV, a retrovirus of the genus Gammaretrovirus, causes persistent infection, leading to immunosuppression, secondary infections, and malignancies (Hartmann 2012). Transmission occurs through saliva, nasal secretions, and other shared sources (Little *et al.* 2020). Co-infection presents challenges as FeLV may worsen FIP progression (Hartmann & Hofmann-Lehmann 2020). Reports of concurrent infections in Southeast Asia are limited (Sykes 2014). This case report describes the clinical presentation and diagnosis of a cat co-infected with FIP and FeLV, contributing to viral disease management.

CASE

Signalement: A 3-year-old male domestic cat presented with a loss of appetite. **Clinical findings:** The cat had a body temperature of 39°C when examined. **Laboratory tests:** Hematology, blood chemistry, urine analysis, FIPV rapid test, and FIV/FeLV rapid test were performed.

RESULTS AND DISCUSSION

Hematological analysis showed monocytosis (Table 1). Monocytes are crucial in the pathogenesis of FIP, which

causes granulomatous phlebitis (Malbon *et al.* 2019). Analysis showed macrocytic hypochromic anemia, with MCV of 66.6 fL and MCHC of 24.9 g/dL, indicating regenerative anemia in FeLV infections. FeLV-A causes macrocytic anemia via erythroid regeneration (Furman *et al.* 2014). Thrombocytopenia occurs from bone marrow suppression in viral infections such as FeLV, FIV, and FIPV (Jordan *et al.* 1993).

The serum albumin-to-globulin ratio (A/G) decreased to 0.39, with elevated total protein and globulin and low albumin. A low A/G ratio indicated FIP with 85% specificity and 83% positive predictive value (Riemer 2015), reflecting chronic antigenic stimulation. Serum biochemistry showed elevated AST, bilirubin, and amylase, suggesting hepatic injury. SNAP fPL testing confirmed pancreatitis with elevated amylase, indicating inflammation (Schnauß *et al.* 2019).

Urinalysis revealed bilirubin and urobilinogen levels (Table 2). Bilirubinuria indicates hepatobiliary disease in cats. Urobilinogen reflects enterohepatic circulation (Sherding 2013). The FIPV and FeLV antigens tested positive (Figure 1). FeLV increases FIP susceptibility (Hofmann-Lehmann & Hartmann 2020). Monocytosis, anemia, thrombocytopenia, decreased A/G ratio, and bilirubinuria supported the diagnosis of effusive FIP with FeLV.

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Table 1 Hematology and blood biochemistry of 3-year-old male domestic cat with feline infectious peritonitis and feline leukemia virus co-infection.

Parameters	Results	Normal range
Hematology		
Lymphocyte (%)	27.0	12-45
Granulocyte (%)	57.2	35-85
Monocyte (%)	15.8	2-9
Lymphocyte ($10^3/\mu\text{L}$)	5.14	0.8-7
Granulocyte ($10^3/\mu\text{L}$)	10.89	2.1-15
Monocyte ($10^3/\mu\text{L}$)	3.00	1.3
Red Blood Cell ($10^6/\mu\text{L}$)	2.7	6-10
Haemoglobin (g/dL)	4.6	9.5-15.3
Haematocrit (%)	18.5	30-36
MCV (fL)	66.6	29-55
MCH (Pg)	16.6	13-21
MCHC (g/dL)	24.9	29-55
RDW CV (%)	20.3	13-17
RDW SD (fL)	54.5	13-17
Platelet ($10^3/\mu\text{L}$)	69	150-600
Mean Platelet Volume (fL)	12.3	5-11.8
Platelet Distribution Width (fL)	18.8	10-18
Procalcitonin (%)	0.084	0.1-0.5
Blood biochemistry		
Albumin (g/L)	23.3	22.0-44.0
Total Protein (g/L)	83.5	57.0-89.0
Globulin (g/L)	60.2	23.0-52.0
A/G ratio	0.39	
Total Bilirubin (Umol/L)	24.6	0.0-15.0
Aspartate Aminotransferase (U/L)	61	0-48
Alanine Aminotransferase (U/L)	82	5-130
Amylase (U/L)	178	500-1500
Creatine Kinase (U/L)	50	0-559
Creatinine (Umol/L)	39.4	44.0-212.0
Blood Urea Nitrogen (mmol/L)	8.48	4.0-12.9
BUN/Crea ratio	214.957	27,000-182,000
Glucose (mmol/L)	6.44	4.11-8.83
Triglycerides (mmol/L)	<0.3	0.00-1.13
Ca ²⁺ (mmol/L)	1.85	1.95-2.83
Phosphor (mmol/L)	1.82	1.00-2.42

Note: MCV= Mean Corpuscular Volume; MCH= Mean Corpuscular Hemo-globin; MCHC= Mean Corpuscular Hemoglobin Concentration; RDW CV= Red Blood Cell Distribution Width-deviation; RDW SD= Red Blood Cell Distribution Width-size; A= Albumin; G= Globulin; BUN= Blood Urea Nitrogen; Crea= Creatinine

Table 2. Urinalysis results of 3-year-old male domestic cat with feline infectious peritonitis and feline leukemia virus co-infection.

Parameter	Results	Interpretation
Leukocytes (cell/ μL)	500	+3
Ketones (mg/dL)	0	-
Nitrite	0	-
Urobilinogen (mg/dL)	2.0	+1
Bilirubin (mg/dL)	2.0	+2
Glucose (mg/dL)	0	-
Protein (mg/dL)	≥ 300	+3
Specific gravity	1,030	
pH	6.5	
Blood (cell/ μL)	0	-
Ascorbic Acid (mg/dL)	10	+/-
Microalbumin (mg/dL)	≥ 2.5	
Ca ²⁺ (mg/dL)	≤ 4.0	
Creatinine (mg/dL)	≥ 300	
Pro/CR ratio	$\geq 0.4-2.0$	
Colour	yellow	

Note: Pro= protein; CR= Creatinine

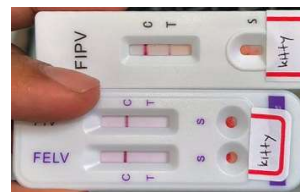


Figure 1 Results of the FIPV and FIV/FELV rapid test of 3-year-old male domestic cat.

CONCLUSION

Clinical findings showed severe immunosuppression and inflammation due to FIP and FeLV co-infection. Key indicators include monocytosis, macrocytic hypochromic anemia, thrombocytopenia, decreased A:G ratio, and bilirubinuria. Co-infection worsens disease progression and requires integrative diagnostic approaches for management.

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