Feline Infectious Peritonitis (FIP) Diagnosis

Feline Infectious Peritonitis (FIP) occurs when a cat reacts inappropriately to Feline Coronavirus (FCoV) infection. Most cats simply become infected, shed FCoV for a month or two, mount an immune response and eliminate the virus. However, some cats, instead of clearing FCoV infection, develop FIP. Purebred cats are more likely to succumb to FIP. Age is also an important risk factor, with 70% of cases being less than 1 year old. However FIP may occur in all ages.

The name FIP is slightly misleading. FIP is not inflammation of the peritoneum, it is a systemic vasculitis. The clinical signs which the cat develops depend on which blood vessels are damaged, and on which organ(s) the damaged blood vessels supply.

The key event in the development of FIP is the infection of monocytes by feline coronavirus (FCoV). If FCoV succeeds in replicating within the monocyte, this leads to an inflammatory sequence of events which results in pyogranulomas forming around blood vessels. In acute FIP, where there is a lot of virus and many blood vessels affected, the resulting leakage from damaged blood vessels causes the clinical signs of effusive FIP – ascites, thoracic effusion, pericardial effusion.

In non-effusive FIP the course is more chronic: fewer blood vessels are affected, the cat's immune system tries harder to contain the infection, leading to larger pyogranulomata and the clinical signs of chronic inflammation relating to the organ(s) containing the pyogranulomas.

Diagnosis of FIP can be challenging and typically requires a combination of testing, including:

1. **General blood panel.**
   Sample: EDTA whole blood

Hyperglobulinaemia - this is often marked. Albumin:Globulin ratio of <0.8 is highly suspicious for FIP.

Additional findings may include a non-regenerative anaemia.

2. **Effusion fluid analysis.**
   Sample: Effusion fluid in EDTA and Plain tube

Effusion protein content - generally > 35g/L

Cytology - Macrophages and neutrophils (pyogranulomatous inflammation) are typical, and effusion fluid nucleated cell counts are not usually significantly elevated.

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3. **Immunocytochemistry of effusion fluid.**
   Sample: Effusion fluid in EDTA

Detects FCoV within monocytes / macrophages. A gold standard test with 100% specificity. Negative immunocytochemistry does not rule out a diagnosis of FIP since the sensitivity is only 54%. This is because not all samples will contain viral antigen.

4. **Coronavirus antibody titre by IFA (immunofluorescent antibody).**
   Sample: Serum (plain or gel tube)

This serum test is not specific for FIP virus, because it detects antibodies to all coronaviruses. Cats with clinical FIP usually have a high titre (1:640 or higher), although a few cases may show low titres in the terminal stages, particularly in the effusive form. Note that high titres may also occur in healthy cats shedding feline coronaviruses (FCoV) in faeces, so always correlate results with other diagnostic features.

5. **Histopathology of biopsy or necropsy samples.**
   Sample: Tissues in formalin pots

Identification of classical lesions of pyogranulomatous vasculitis is highly suggestive of FIP.

6. **Immunohistochemistry of biopsy or necropsy samples.**
   Sample: Tissues in formalin pots

Detects FCoV within monocytes/macrophages (using the same methodology as the fluid effusion immunocytochemistry) in the classic lesions of pyogranulomatous vasculitis already identified through standard histopathology. This is a gold standard test with a specificity of 100% and sensitivity of 95% for FIP diagnosis.

7. **Serum Protein Electrophoresis (SPE).**
   Sample: Serum (plain or gel tube)

Where a blood sample has shown elevated globulins, serum protein electrophoresis (SPE) may be useful in differentiating a polyclonal response to infections and inflammation (including FIP) versus monoclonal gammopathy secondary to lymphoid neoplasia.

References:

Feline Infectious Peritonitis : European Advisory Board on Cat Diseases guidelines on prevention and management.

Addie et al, Journal of Feline Medicine and Surgery (2009) 11, 594-604

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