Diagnosing Feline Infectious Peritonitis (FIP)

Confirming a diagnosis of FIP is not easy. Clinical signs are often non-specific, routine blood work is not pathognomic and serological testing, PCR and histopathology often cannot provide a definitive diagnosis.

It is often a combination of some/all of the above that make the disease "very likely" to be present.

Clinical Signs

Clinical signs include lethargy anorexia, ± weight loss. There may be fever, icterus, pleural or peritoneal effusion, and CNS signs and uveitis in dry forms.

Routine Haematology and Biochemistry

Routine haematology shows no specific abnormalities, however, about 1/3 of cats with FIP have microcytosis in the absence of anaemia. Leucocytosis and neutrophilia ± left shift are often seen.

Liver enzyme activities are usually within reference, however, elevated bilirubin is seen in many affected cats. Most cats have elevated globulin and an A:G ratio < 0.8, whereas a ratio of > 0.6 makes FIP unlikely.

Serology

Cats with FIP tend to have high coronavirus antibody titres, however, there is significant overlap with healthy cats and about 10% are seronegative.

Fluid Analysis

FIP fluid is pale to bright yellow, clear to turbid, and often has a high total protein (TP) and relatively few cells (2-5 x 10^9cells/L). Counts may occasionally reach 20 x 10^9cells/L and rarely 30 x 10^9cells/L. The A:G ratio is often, although not invariably <0.8.

The Rivalta test has high sensitivity and specificity with false positive results occurring in cats with bacterial peritonitis, however, this can usually be ruled out by cytology. A 2015 study by Giordano *et. al.* found that Δ TNC (the ratio between total nucleated cell counts in the DIFF and BASO channels on a Sysmex XT-2000iV haematology analyser), is high in effusions due to FIP compared to other effusions types. A Δ TNC > 1.7 showed sensitivity of 90.0% and specificity of 93.5% for determining the presence of FIP.

Cytology of CSF in neurological FIP often shows marked neutrophilic pleocytosis (> 100 x 10^6 cells/L) and a CSF coronavirus titre > 1:25

Molecular Testing

PCR targeting feline coronavirus can detect viral particles in fluid and tissue, however, sensitivity is moderate only and a negative result doesn't exclude presence of the virus. Blood samples are not suitable for analysis because of very low sensitivity.

Newer molecular tests can detect mutations in the 3c and/or S feline coronavirus proteins which is consistent with FIP.

Histology

Identification of pyogranulomatous inflammation and vasculitis on histology can help further support a diagnosis of FIP. This can be done on biopsy samples, however, affected vessels may not always be present in small biopsies. The gold standard for diagnosing FIP is considered to be immunohistochemistry which demonstrates viral particles within macrophages. However, false positive staining may occur, and the process is carried out at referral laboratories which prolongs time to diagnosis. Immunocytochemistry can also be carried out on effusions, however, sensitivity is hampered by low macrophage numbers in some samples.

Summary

Currently there is no test that is both 100% sensitive and 100% specific for confirming FIP and diagnosis can remain challenging in some patients.

Samples to Submit

EDTA blood for a CBC

Serum for a sick animal panel or as a minimum for TP, bilirubin and A:G ratio

Peritoneal fluid in EDTA for Δ TNC analysis and cytology ± PCR for coronavirus RNA

Fixed tissue for histopathology ± immunohistochemistry.

Reference: A Giordano, A Stranieri, G Rossi, S Paltrinieri. (2015). *High diagnostic accuracy of the Sysmex XT-2000iV delta total nucleated cells on effusions for feline infectious peritonitis. Veterinary Clinical Pathology, 44(2), 295–302.*