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Ever since its first recognition feline infectious peritonitis (FIP) has been one of the major challenges and although its prevalence varies in different countries, it has a worldwide distribution and is an important cause of mortality. FIP represents many challenges, but for the practitioner particularly making a pre-mortem diagnosis, the clinical picture is extremely variable and this is a disease that will surprise the most experienced clinician. Confirmatory tests are often not realistic, yet the practitioner is aware of the responsibility of making a putative diagnosis of FIP which usually equates to a recommendation to the owner of euthanasia.

FIP is a consequence of infection with feline coronavirus (FCoV). FCoV is highly infectious and the prevalence of infection is very high in most cat populations. Serological surveys show that approaching 50% of the general cat population have been infected with FCoV and in high risk populations such as cats from pedigree breeding colonies, more than 90% of cats have tires. Although infection with FCoV is widespread, only a minority of infected cats develop FIP and its occurrence is both sporadic and unpredictable. There have been advances in our understanding of the factors which contribute to development of FIP but the critical factors are still unknown and there is controversy over whether this is related to key mutations in the virus that facilitate its escape from the gut and dissemination, the host response to the virus or a combination of both. A major challenge in testing for FIP is the need to differentiate infection in cats with coronavirus infection that is not associated with significant clinical disease from those with FIP.

History
Historical features may help to increase the index of suspicion of FIP. It is most commonly seen in young pedigree cats derived from large, multicat households with clinical signs typically developing soon after moving to a new home for the breeder and sometimes linked to recent stresses such as vaccination and neutering. Various breed predispositions have been suggested including Burmese, Birmans, Ragdolls, Bengals, British Shorthairs (Pesteanu-Somogyi et al, 2006) and Persians. A second peak in prevalence is seen in older cats at 10 years of age or more.

Clinical signs
Body fluid accumulation is the most characteristic feature of FIP, particularly affecting the abdomen, leading to the classic presentation of ascites. Approximately 25% of effusive cases also show thoracic fluid accumulation which may be a pointer to differentiation of other causes of ascites and around 10% show fluid accumulation just within the thorax. Fluid accumulation occurs in around 75% of cases of FIP and may be present in some cats with predominantly non-effusive clinical features which can be of diagnostic value. The clinical features of non-effusive cases are very variable. Nervous tissue, the kidney and eye are amongst the more common sites, which may lead to ataxia, seizures, other neurological signs, renomegaly (usually bilateral and uveitis/retinitis). Around 25% of cats with FIP have hyperbilirubinaemia and some of these will have clinically detectable jaundice. FIP occasionally manifests in an enteric form with enlargement of mesenteric lymph nodes which can readily be mistaken as neoplasia (Kipar et al, 1999).

Imaging
Radiography and ultrasound scanning can help to identify effusions and organomegaly. Occasionally fibrinous tags may be detected in the abdomen and the liver may show a variable heterogenous appearance.

Routine laboratory changes
The most common laboratory changes are:
Lymphopenia 75% cases  
Neutrophilia 50% cases  
Anaemia (non-regenerative) 40% cases  
Hyperglobulinaemia 50% cases  
Hyperbilirubinaemia 25% cases  

(Sparkes et al, 1994)

Serum protein electrophoresis frequently shows an increase in gamma globulins, sometimes appearing as a paraproteinaemia, and increases in α2 globulins. Alpha acid glycoprotein levels may be raised (>3 mg/ml) (Paltrinieri et al, 2007).

Effusion and analysis
Effusions in FIP typically have very high protein contents consisting mainly of globulin, almost invariably with more globulin than albumin. Cell counts are variable but often low consisting of a mixture of inflammatory cells including neutrophilia and macrophages with RBCs.

CSF analysis
Increased numbers of inflammatory cells and elevated protein levels (>50 mg/dl) may be found on CSF analysis of FIP cases with neurological signs, but frequently this is normal (Steinberg et al, 2008).

Demonstration of coronavirus
Interpretation of coronavirus titres is complicated by the widespread occurrence of titres in cats with prior FCoV infection without FIP. High titres, however, do increase the suspicion of FIP. A negative (or low titre) does not eliminate the possibility of FIP.

Some studies have suggested that detection of virus in blood using PCR may help in diagnosis, on the basis that this indicates mutation of the virus which has allowed escape from the gut and dissemination (Herrewegh et al, 1995). However, low levels of virus may be detectable in cats with FCoV infection without FIP and the levels of viral RNA may be very low or undetectable in confirmed cases (Can-Sahna et al, 2007).

Attempts have been made to identify specific mutations associated with development of FIP which could be used as molecular tests but, although the sites of mutation have now been identified, the mutations are variable in different cases. If effusions are present, demonstration of virus using RT-PCR assay or immunofluorescence to detect virus in macrophages may help in diagnosis. However virus may be found in cats infected with FCoV which have effusions caused by other diseases and failure to demonstrate virus does not rule out the possibility of FIP.

References

**Sick cat**

**History**

**Clinical signs**

*Suspicion of FIP*

? *dyspnoea - thoracic fluid*

? *ascitic fluid*

No

*diagnostic investigations*

haematology - lymphopenia

biochemistry - ↑ globulin

*SPE*

imaging - thoracic/pericardial serology

? *biopsy*

? *lапarotony*

Yes

*gross appearance*

protein content - >35 g/L

>50% globulin

usually low cellularity

*is it FIP or lymphocytic cholangitis?*

*radiography for thoracic fluid*

No

Yes

*FIP*