

What is feline infectious peritonitis?

- Feline infectious peritonitis (FIP) is caused by a feline coronavirus (FCoV).
- FCoV infection is ubiquitous and very common in multi-cat environments.
- Only a small proportion of the infected cats will develop FIP.
- Stress (adoption, neutering, boarding) predisposes cats.
- FIP is especially common in cats <1 year old and in multi-cat environments.
- Pedigree cats seem to be more affected.
- FCoV can survive for up to 7 weeks in a dry environment.
- FCoV is readily inactivated by most detergents and disinfectants.

Infection

- Faeces of shedding cats are the main source of FCoV infection; transmission via saliva or during pregnancy is rare.
- FCoV can be transmitted indirectly (litter trays, shoes, clothes).
- Cats start shedding the virus within one week after infection and continue for weeks or months, sometimes for life.
- FIP is caused by FCoV variants (mutants arising in individual cats) that replicate to high concentrations in macrophages and monocytes, but not or only poorly in the gut. Therefore, under natural conditions, cats infected with the FCoV variant do not play a role in spreading FIP.
- The viral load and the cat's immune response determine whether FIP will develop.

Clinical signs

- Most FCoV-infected cats stay healthy or show only mild enteritis.
- Undulating fever, weight loss, anorexia and depression are common initial features of FIP.
- If disease develops, FIP may occur as
 - an effusive (wet) form, characterised by polyserositis, effusion (ascites, thoracic and/or pericardial effusion) and vasculitis
 - a non-effusive (dry) form, characterised by granulomatous lesions in various organs (renomegaly, chronic diarrhoea, lymph node enlargement).
 These forms are considered the clinical extremes of a continuum.
- Ocular signs include uveitis, keratic ('mutton fat') precipitates in the anterior eye chamber, chorioretinitis, retinal perivascular cuffing and pyogranulomatous chorioretinitis.
- Neurological signs (in ~10%) include ataxia, hyperaesthesia, nystagmus,

seizures, behavioural changes and cranial nerve defects.

- Clinical signs are highly variable and depend on the distribution of lesions.

Diagnosis

- There is no non-invasive confirmatory test available for the dry form.
- Laboratory findings suggestive of FIP are lymphopenia, non-regenerative anaemia, increased total serum protein, hyperglobulinaemia, a low albumin/globulin ratio, high α -1 acid glycoprotein levels and high FCoV-antibody titres.
- High FCoV antibody titres alone have no diagnostic value.
- Effusions suggestive of FIP show a positive Rivalta's test, high protein levels, a low albumin/globulin ratio and contain neutrophils and macrophages.
- FCoV antigen-positive cells (immunofluorescence, immunohistochemistry on biopsy material from pyogranulomas or cell sediment from ascitic fluid) evidenced by specialised laboratories will confirm FIP.
- FCoV RT-PCR of blood samples is becoming available for distinguishing enteric and FIP causing FCoV. FCoV RT-PCRs which are not able to distinguish between the variants are not suitable for diagnosis, as many diseased cats without FIP, as well as healthy cats are RT-PCR positive.

Disease management

- FIP has a poor prognosis. The median survival time after diagnosis is 9 days.
- Euthanasia should be considered only after a definite diagnosis.
- Supportive treatment is aimed at suppressing the inflammatory and detrimental immune response, usually with corticosteroids. However, its benefit is not proven.
- In single-cat households where the cat has succumbed to FIP, it is recommended to wait for 2 months before obtaining a new cat. In multi-cat households, remaining cats will most likely carry FCoV.
- FIP is a problem in group-housed cats (breeding and rescue catteries), and is rarely encountered in cats leading an indoor-outdoor lifestyle.
- Reduction of FCoV contamination can be achieved by strict hygiene and by keeping cats in small, well-adapted groups with sufficient, frequently cleaned litter trays or outdoor access.
- FCoV shedders can be detected using real-time quantitative RT-PCR screening of faeces, but in case of negative results, multiple sampling (4 x over 3 weeks) is necessary.



Vaccination recommendations

- The FIP vaccine is a non-core component.
- There is only one (intranasal) FIP vaccine available in the USA and in some European countries.
- The vaccine is ineffective in cats previously infected by FCoV, but may be helpful in seronegative kittens before they enter an endemic environment.
- If vaccination is considered, the first dose should not be given before 16 weeks of age.



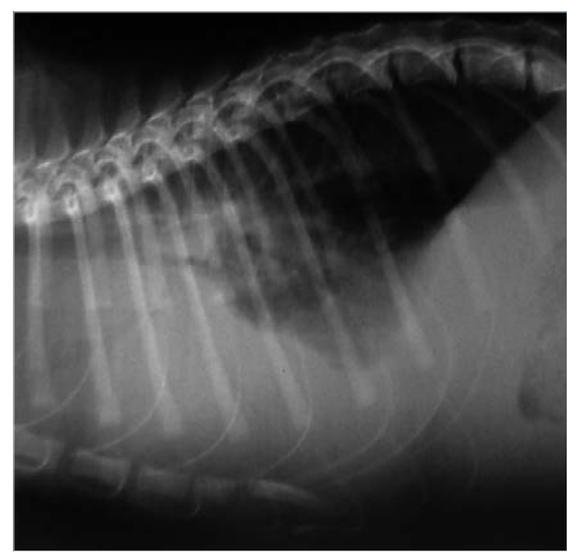
Courtesy of Hannah Dewerchin, University of Gent, Belgium

■ Fluid accumulation in the abdomen in a Sphinx cat with FIP.



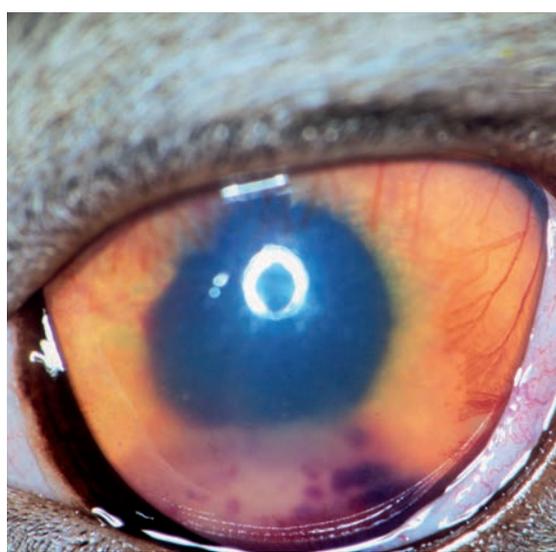
© Meriel

■ Dry form of FIP: granulomatous lesions on the liver.



Courtesy Albert Lloret

■ Radiograph of a cat with FIP showing thoracic and abdominal effusion.



Courtesy Eric Déan

■ Uveitis in a cat with the dry form of FIP.



Courtesy Albert Lloret

■ Hyphaema in a cat developing FIP.