Feline Infectious Peritonitis

Research & Development

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- **Feline infectious peritonitis** (FIP) is a common and aberrant immune response in cats to infection with feline coronavirus (FCoV)
- FCoV is a virus of the gastrointestinal tract. Most infections are either asymptomatic or cause diarrhea, especially in kittens, as maternally derived antibody wanes at between 5 and 7 weeks of age.

- The virus is a mutation of feline enteric coronavirus (FECV). From the gut, the virus very briefly undergoes a systemic phase, before returning to the gut where it is shed in the feces.

- The pathogenesis of FIP is complex. There is a general consensus that FIPVs arise from mutations enabling them to enter or replicate more successfully in monocytes (a type of white blood cell). However, many aspects of virus–host interactions affecting the disease remain uncertain, such as the factors that influence disease form (wet or dry), outcome (death or resistance), and host susceptibility.

Virus and disease transmission

- There is a lack of evidence that FIP as such is transmissible from cat to cat, although it may explain rare mini-outbreaks of FIP.[8] However, the virus, FCov, is transmissible from cat to cat.
- A study on 59 FIP infected cats found that, unlike FCoV, feces from FIP infected cats were not infectious to laboratory cats via oronasal route.
- FCoV is common in places where large groups of cats are housed together indoors (such as breeding catteries, animal shelters, etc.).

The virus is shed in feces, and cats become infected by ingesting or inhaling the virus, usually by sharing cat litter trays, or by the use of contaminated litter scoops or brushes transmitting infected microscopic cat litter particles to uninfected kittens and cats. FCoV can also be transmitted through different bodily fluids. The virus is easily spread through direct contact between cats. The most common form of spreading is through saliva, as most multiple cat homes share food and water dishes. Another major form of spreading is grooming or fighting. When an infected cat grooms a healthy cat, it leaves its contaminated saliva on the fur. Later, when the healthy cat goes to groom themselves, it ingests the contaminated saliva and then becomes infected.

Clinical signs

- There are two main forms of FIP: effusive (wet) and non-effusive (dry). While both types are fatal, the effusive form is more common (60–70% of all cases) and progresses more rapidly than the non-effusive form.

- Effusive (wet) FIP
- The hallmark clinical sign of effusive FIP is the accumulation of fluid within the abdomen or chest, which can cause breathing difficulties. Other symptoms include lack of appetite, fever, weight loss, jaundice, and diarrhea.

- Non-effusive (dry) FIP
- Dry FIP will also present with lack of appetite, fever, jaundice, diarrhea, and weight loss, but there will not be an accumulation of fluid. Typically a cat with dry FIP will show ocular or neurological signs. For example, the cat may develop difficulty in standing up or walking, becoming functionally paralyzed over time. Loss of vision is another possible outcome of the disease

Diagnosis

- **Diagnosing effusive FIP**
- Diagnosis of the effusive form of the disease has become more straightforward in recent years. Detection of viral RNA in a sample of the effusion (liquid drained from body), such as by reverse transcription polymerase chain reaction (RT-PCR) is diagnostic of effusive FIP.[13][14][15] However, that does require that a sample be sent to an external veterinary laboratory. Within the veterinary hospital there are a number of tests which can rule out a diagnosis of effusive FIP within minutes:
- Measure the total protein in the effusion: if it is less than 35 g/L, FIP is extremely unlikely.
- Measure the albumin to globulin ratio in the effusion: if it is over 0.8, FIP is ruled out; if it is less than 0.4, FIP is a possible—but not certain—diagnosis.[16]
- Examine the cells in the effusion: if they are predominantly lymphocytes (a type of white blood cell), then FIP is excluded as a diagnosis.

- **Diagnosing non-effusive FIP**
- Non-effusive FIP is more difficult to diagnose than effusive FIP because the clinical signs tend to be more vague and varied: the list of differential diagnoses is therefore much longer. Non-effusive FIP diagnosis should be considered when the following criteria are met:
- History: the cat is young (under 2 years old) and purebred: over 70% of cases of FIP are in pedigree kittens.
- History: the cat experienced stress such as recent neutering or vaccination
- History: the cat had an opportunity to become infected with FCoV, such as originating in a breeding or rescue cattery, or the recent introduction of a purebred kitten or cat into the household.
- Clinical signs: the cat has become anorexic or is eating less than usual; has lost weight or failed to gain weight; has a fever of unknown origin; intra-ocular signs; jaundice.

- Biochemistry: hypergammaglobulinaemia; raised bilirubin without liver enzymes being raised.
- Hematology: lymphopenia; non-regenerative—usually mild—anaemia.
- Serology: the cat has a high antibody titre to FCoV: this parameter should be used with caution, because of the high prevalence of FCoV in breeding and rescue catteries.
- Non-effusive FIP can be ruled out as a diagnosis if the cat is seronegative, provided the antibody test has excellent sensitivity. In a study which compared various commercially available in-house FCoV antibody tests, the FCoV Immunocomb (Biogal) was 100% sensitive; the Speed F-Corona rapid immunochromatographic (RIM) test (Virbac) was 92.4% sensitive and the FASTest feline infectious peritonitis (MegaCor Diagnostik) RIM test was 84.6% sensitive.