

## FELINE INFECTIOUS PERITONITIS

### *What causes Feline Infectious Peritonitis?*

Feline Infectious Peritonitis (FIP) is a severe disease of domestic cats and some exotic cats. It does not affect non-feline species, such as dogs. It is caused by a coronavirus.

The incubation period is controversial. In experiments with the virus, cats will develop the disease within two weeks of infection. However, in household situations, it appears that the virus may be dormant in some cats for several months, or even years, before the disease occurs.

### *What are the clinical signs?*

FIP is a chronic, wasting disease that results in poor appetite, fever, and weight loss over several weeks; it is ultimately fatal. Because various organs may be affected (i.e., liver, kidneys, brain, eyes, etc.), a variety of clinical signs may be associated with this disease. For example, blindness or seizures may occur in one cat, while another will have signs of liver disease (jaundice).

There are two forms, the wet (effusive) form and the dry form. The wet form results in accumulation of large quantities of fluid in the chest or abdomen. If it occurs in the chest, the cat will experience difficulty breathing. When it occurs in the abdomen, a large, bloated appearance will result. The dry form affects the target organs in a similar fashion, but no fluid is produced. If enough time passes without the cat dying, the dry form may progress into the wet form. Diagnosis of FIP is much easier if fluid is present.

### *How is FIP diagnosed?*

Diagnosis of FIP may be difficult and frustrating. There are no specific tests which are reliable in all cases. Although organ biopsy is the most reliable, this requires major surgery. For obvious reasons, surgery may not be advisable in a sick cat. The following tests are usually used on cats with suspicious clinical signs.

**1. Coronavirus Test.** This test detects antibodies to any coronavirus. Antibodies are the circulating defense agents of the immune system. There are two coronaviruses that affect the cat: the FIP virus and the enteric coronavirus. If positive, this test indicates that one or both of those viruses WAS or IS present in the cat. However, we do not know which virus is reacting to the test. Since antibodies may persist even if the virus is no longer present, a positive test can be misleading in some cases. Also, terminally ill cats may have their antibodies "tied up" when large amounts of the FIP virus are present. This can result in a false negative test result. Therefore, this test must be interpreted in conjunction with results of other tests. These tests are listed below.

**2. Polymerase Chain Reaction (PCR) Test.** This new test is more specific for the FIP virus than the coronavirus antibody test; however, it is still just a test for the presence of the FIP virus. A positive test means the *virus* is present, but does not necessarily mean the *disease* is present. This test is also subject to some false negative results.

**3. Serum Protein Levels.** If the total serum protein is 7.8 g/dL or greater AND the A:G ratio (ratio of two different blood proteins ) is less than 0.6, FIP becomes a more likely diagnosis. A few other

diseases may also cause this, but these are also very severe and usually fatal. These findings occur in 50% of the cases of FIP.

**4. White Blood Cell Count.** If the white blood cell count is greater than 25,000 cells/ $\mu$ l, FIP becomes a stronger possibility. However, several other diseases may cause this and some of these are not fatal. Also, many cases of FIP have a normal white blood cell count (less than 18,000 cells/ $\mu$ l).

**5. Abdominal/Chest Fluid Analysis.** If fluid is present, this is a very meaningful test. If the characteristics of the fluid are appropriate and the cat has the correct clinical signs, a diagnosis can be made with greater assurance. Unfortunately, this fluid is not present in the dry form of FIP.

**6. Fine Needle Aspiration of the Liver or Kidneys.** A few cells may be aspirated from the liver or kidney without stressing the cat (i.e., with a local anesthetic in the skin). FIP produces a particular inflammatory pattern in these organs which, although not diagnostic, is strongly suggestive for the disease. This helps to rule out other diseases.

**7. Radiographs (X-rays) of Chest or Abdomen.** Radiographs serve to identify enlargements in organs and the presence of fluid in the chest or abdomen. They are helpful but not diagnostic and are used to decide which other tests are appropriate.

**8. A combination of three blood tests.** Cats with the combination of a low lymphocyte (a white blood cell) count, a high blood globulin (protein) level, and a positive coronavirus antibody test have been shown to have a 94% chance of having FIP.

**9. Organ biopsy.** Organ biopsy is the only test which is diagnostic of FIP. A case workup in the absence of organ biopsy often includes several or all of the above tests. Strongly suggestive findings with several tests often provides the basis for a presumptive diagnosis of FIP.

### ***Is FIP contagious?***

As with other viruses, spread of infection to other cats is a concern. However, there are three stages of FIP infection, and significant risk to other cats occurs in only the first two stages.

**1.** The first stage is *initial infection*. During the two to four week period following viral infection of the cat, a large amount of virus is shed; other cats in direct contact with virus will be exposed.

**2.** The second stage is one of *dormancy*. The virus is inactive within the cat, so it causes no disease. If the cat is stressed during this stage, some virus shedding may occur. Otherwise, the cat is not contagious. However, some cats shed enough virus during the stressed period to be a threat to surrounding cats. This stage may last a few weeks to several years.

**3.** The third stage is *clinical illness*. It usually lasts a few weeks and terminates in death of the cat. As a rule, the cat is not contagious during this stage.

### ***What is the treatment and prognosis for a cat with FIP?***

Many treatments have been tried for cats with FIP, but none have been consistently successful. Apparently, an occasional cat will recover, but this is the exception rather than the rule. Removing fluid

from the chest or abdomen in cats with the wet form will make them comfortable for a short while, and a few drugs will make some of them feel better. However, there is no known curative treatment.

The prognosis for a cat with FIP is very poor. Once a reasonably reliable presumptive diagnosis has been made, euthanasia is often the most appropriate course of action.

***Is there a way to disinfect the premises?***

The coronavirus may live for up to three weeks in the environment. If viral shedding into the environment seems likely, a 1:30 mixture of household bleach and water (i.e., 1 cup of bleach in a gallon of water) should be used to disinfect food and water bowls, litter pans, cages, bedding material, and items that will not be adversely affected by household bleach.

***What about prevention?***

A preventive vaccine against FIP is available, but neither veterinarians nor the manufacturer recommend that the vaccine be given routinely to all cats. The vaccine is generally recommended for cats in contact with free-roaming cats or for those living in households that have had a cat with FIP. Initially, two doses are given at a 2-4 week interval. An annual booster is needed to maintain immunity.