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Feline Infectious Peritonitis

What is feline infectious peritonitis?

Feline infectious peritonitis (FIP) is an important disease of domestic cats and most members of the cat family (*Felidae*). It occurs worldwide in cats of all ages, but the disease is most common in young cats less than two years of age. Although FIP is not a particularly common disease, it is important because once a cat develops the disease, the outcome is almost invariably fatal.

What is the cause of FIP?

"Feline Enteric Coronavirus strains can mutate to the more harmful type of virus and cause FIP disease."

FIP is associated with a viral infection called Feline Coronavirus (FCoV). There are many different strains of Feline Coronavirus, which differ in their ability to cause disease. Previously there has been an attempt to classify these strains as either Feline Infectious Peritonitis Virus strains (capable of causing the FIP disease) or Feline Enteric Coronavirus strains (essentially harmless strains, mainly confined to the intestinal tract). It is now recognized that Feline Enteric Coronavirus strains can mutate to the more harmful type of virus and cause FIP disease.

"FIP remains one of the least understood of all cat diseases."

Because the Enteric Coronavirus and the FIP-causing strains of Feline Coronavirus are indistinguishable in laboratory tests (see later) and because many cats, even when infected with known FIP-causing strains do not develop FIP disease, the diagnosis of FIP is very challenging. The factors determining why one cat becomes diseased while others remain unaffected are unclear. Repeated re-infection and/or genetic factors are thought to contribute to the development of FIP. FIP remains one of the least understood of all cat diseases.

How common is infection with Feline Coronavirus (FCoV) in comparison with FIP disease?

Based on blood test surveys, many cats (up to 30% in the general cat population and as high as 80% in catteries) become infected with one or more strains of Feline Coronavirus at some time in their lives. Nevertheless, the incidence of FIP disease is low (less than 1% of cats admitted to veterinary hospitals). As explained above, many infections are with relatively harmless strains, and even when infected with the strains that could cause disease, many cats remain healthy for long periods, even for life.

How does a cat become infected with Feline Coronavirus (FCoV)?

"Cold temperatures may preserve the virus for months."

It is not certain how most cats become infected with FCoV. Direct contact between cats is the most likely route of transmission. The FCoV is present in the blood of infected cats, at least in the early stages, and may be shed in urine and feces. Although the virus is quite fragile and does not survive for more than twenty-four to thirty-six hours in the normal environment, it is believed that cold temperatures may preserve the virus for months. Transmission on clothing or other objects is only likely within a few hours of contact. Biting insects such as fleas may also spread infection.

As explained above, most infections are with relatively harmless strains of FCoV. Unfortunately, this initial benign infection may later mutate to cause FIP in some cats. Even with the more harmful strains, apparently healthy cats may be carriers of the virus, and may shed the virus without ever showing signs of disease. Many cats that develop FIP have no history of contact with other cats showing clinical signs of FIP. The virus can remain dormant or 'latent' in the body for months to years before the cat eventually develops disease.

What clinical signs does a cat infected with FIP develop?

Most cats exposed to FCoV, even to the potentially FIP-inducing strains, are able to develop an immune response that protects them. Thus, only a small proportion of infected cats actually develop clinical disease. However, those that do develop disease almost invariably die.

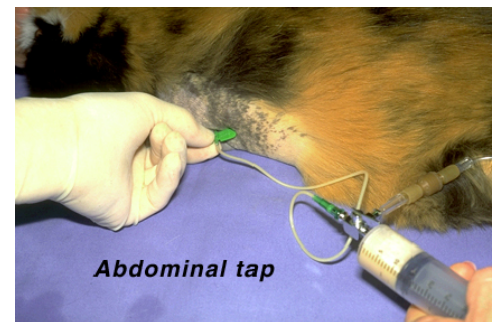
In cats that do develop FIP disease, the first signs of illness may be very vague. Listlessness, lethargy, decreased or absent appetite and a variable fever are commonly reported clinical signs. After a period of several days to a few weeks other symptoms will develop. At this stage, most cats will develop the "wet" form of FIP, which refers to the accumulation of fluid that occurs in body cavities; fluid may accumulate in the abdomen, leading to a swollen abdomen, or in the chest cavity, resulting in difficulty with breathing. In some cats, little or no fluid accumulates ("dry" FIP as opposed to "wet" FIP) but there may be a severe inflammation in one or more organs including the eyes, brain, liver, intestine or other organs of the body, leading to a variety of clinical signs. Once disease develops, most individuals deteriorate rapidly, although some cats remain normal for several weeks. Unfortunately, the disease will eventually result in death in almost every case.

How can FIP be diagnosed?

"The few other diseases produce quite the same type of fluid that FIP creates."

Because FIP presents with a variety of clinical signs, and many of these signs occur with other diseases, FIP is particularly difficult to diagnose. There may be abnormalities in a routine blood analysis, but none is specific for FIP. X-rays may be helpful to determine the presence of fluid in the abdomen or chest. If fluid is present, some of it can be removed by "tapping" the chest or the abdomen.

Analysis of a sample of this fluid at a veterinary laboratory can be particularly valuable, as the few other diseases produce quite the same type of fluid that FIP creates. Nevertheless, fluid analysis does not always provide a definitive diagnosis of the disease. Sometimes FIP is a diagnosis of exclusion, meaning that a variety of similar conditions have been definitely ruled out. The diagnosis may be further complicated because FIP may exist at the same time as some other conditions such as Feline Leukemia Virus diseases.



"Your veterinarian may advise that a biopsy be taken from your cat, so that FIP can be distinguished from a treatable disease."

Currently the only way to make a positive diagnosis of FIP is by histological examination of affected tissue (or by post-mortem examination) by a pathologist at a laboratory. If there is any doubt about the diagnosis, your veterinarian may advise that a biopsy be taken from your cat, so that FIP can be distinguished from a treatable disease.

I understand there are specific blood tests. How reliable are these?

Several companies produce kits that detect antibodies to Feline Coronavirus in blood. Some veterinary laboratories provide tests such as polymerase-chain reaction (PCR) tests, which can detect minute amounts of the virus. Although some of these tests claim to be able to distinguish between the strains, and to detect strains more likely to be associated with FIP, most independent experts disagree with this claim. Therefore, a "positive" test in a healthy cat is not a strong predictor of subsequent FIP disease.

"If a cat has clinical signs consistent with a diagnosis of FIP then a "positive" test is supportive of the diagnosis."

If a cat has clinical signs consistent with a diagnosis of FIP then a "positive" test is supportive of the diagnosis, but not conclusive. In advanced clinical cases, the virus antibodies may be bound into complexes that are not detected by the laboratory test, producing a "false negative" result. Therefore, a "negative" test in the presence of advanced signs does not rule out the diagnosis of FIP.

As you can see, FIP is one of the most challenging diagnoses for your veterinarian to make because of the complexity of the disease and the limitations of current tests.

Is there any treatment for FIP?

FIP is fatal in almost all cases. There is no specific treatment. Anti-inflammatory drugs such as corticosteroids (sometimes used in combination with immunosuppressive drugs of the type sometimes used in cancer therapy), may temporarily suppress symptoms and improve the cat's quality of life. For the clinically ill cat, once FIP has been diagnosed, euthanasia may be the most humane and appropriate course of action.

Is there a vaccine for FIP?

In recent years, some manufacturers have developed vaccines to help in the prevention of FIP. Because the method of transmission and the sequence of events leading to clinical FIP disease are poorly understood, and because infection may have occurred before vaccination, the success of vaccination is not certain. You and your veterinarian can discuss whether vaccination is appropriate for your cat.

Are other cats in the household at risk?

"Infection will lead to this fatal disease in only a few cats."

If your cat has FIP, other cats in your household may be at a greater risk for becoming infected with the virus that can cause FIP. Fortunately, infection will lead to this fatal disease in only a few cats. As a precaution, many veterinarians recommend that you wait about a month after an infected cat dies before introducing a new cat into the house, to minimize the chance of exposure to the virus. In a multi-cat household in which an infected cat has died, it is recommended to wait at least three months to see if any other cats develop clinical disease. However, these previously-exposed cats could be carriers of the disease and could potentially infect any new cats.

This client information sheet is based on material written by: Ernest Ward, DVM

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