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FIP Testing

Feline infectious peritonitis (FIP) is a fatal viral disease of cats. As a veterinarian, FIP is frustrating, as it can be difficult to achieve a diagnosis. As a cat specialist, I am frequently consulted for a second opinion regarding a diagnosis of FIP. If I have a hunch that a cat might have FIP, I try my best to disprove my hunch, because a diagnosis of FIP is a death sentence.

The disease is caused by a type of virus called a corona virus. Most cats are exposed to this virus as kittens. On initial exposure, the virus causes mild enteritis (intestinal inflammation), and maybe some mild diarrhea, or no clinical signs at all. The immune system makes antibodies against the virus, but does not eliminate it, and the virus continues to reside in the intestinal tract, causing no problems.

Occasionally, the harmless intestinal coronavirus mutates, and gains the ability to leave the intestinal tract. Immune system cells, called macrophages, attack and engulf the coronavirus, but they do not kill it. Instead, the virus reproduces itself inside the macrophages. These cells travel throughout lymphatic vessels, spreading the virus throughout the body. This mutated intestinal coronavirus is now the evil FIP-inducing coronavirus. The immune system tries to respond, however, the extent of the response determines the clinical symptoms the cat will exhibit. A strong cellular immune response doesn't eliminate the virus completely, but does contain it, preventing further dissemination. Cats can keep the virus in check for months or years. Age, stress, and malnutrition may reactivate the virus, resulting in full-blown FIP. In cats that do not mount a cellular immune response, viral replication goes unchecked, and the FIP-inducing coronavirus spreads. Damage to blood vessels ultimately develops, and fluid leaks out through the damaged vessels. Effusions (collections of fluid) can develop in the abdominal cavity, chest cavity, and pericardium (the sac around the heart), resulting in what is referred to as the "wet" form of FIP. In cats that mount a partial cellular immune response, viral replication is slowed, and cats develop nodular accumulations of inflammatory cells called granulomas throughout the body. This form of the disease is known as the "dry" form of FIP.

Diagnosis of the disease is difficult because clinical signs are vague. Most cats are young (usually less than one year), and show lethargy, weight loss, poor appetite, and a fever that doesn't respond to antibiotics. A serum chemistry panel often only shows elevated protein (consisting mainly of globulins), unless the virus has begun to affect the kidneys or liver, in which case the liver and kidney parameters may be abnormal. The wet form is easier to diagnose because the presence of fluid in the abdomen or chest is relatively easy to detect, and fluid analysis can give additional information supporting the diagnosis. The dry form remains difficult to diagnose. Biopsy of the affected organs or tissues has remained the only way to definitively diagnose FIP. A rapid, reliable test is critical to allow veterinarians to make the

diagnosis, to lessen suffering in affected cats, and avoid euthanasia of unaffected cats.

Nearly every veterinary diagnostic laboratory offers a “FIP test” to veterinarians. This test is simply a test to measure the presence of antibodies against coronaviruses. These coronavirus-specific antibodies are present in 80-90% of cats in catteries, and in 10-50% of cats in single-cat households. The presence of antibodies in the blood stream DOES NOT mean that the cat has FIP. Only 5-10% of coronavirus-infected cats develop FIP in a cattery setting, and the incidence is much less in a single-cat household.

A recent article in the Journal of Veterinary Internal Medicine (November/December 2003) critically analyzes the various methods used to diagnose FIP in clinical cases. They studied 488 cats with biopsy-confirmed FIP, and compared the results to that of 620 non-infected cats. Most of the affected cats (80%) had fluid accumulation in a body cavity, although this alone was not diagnostic for FIP, as there are many reasons for a cat to have fluid accumulations. Many cats had elevated protein and globulin levels in their serum, but this too proved to be a poor diagnostic test for FIP. In cats with the wet form of FIP, measurement of the globulin levels in the body cavity fluid had more diagnostic utility compared to measuring globulins in the bloodstream, but this still was not definitive. For cats with fluid accumulation, a simple test called Rivalta’s test, can be used to differentiate fluid resulting from FIP vs. fluid resulting from some other disease with very good accuracy, and may be helpful for diagnosing the disorder in cats with the wet form of the disease. Because it’s a test on body cavity fluid, it is not useful in diagnosing the dry form of the disease.

The inadequacies and pitfalls of measuring antibody levels as a diagnostic test for FIP have been debated extensively amongst veterinarians for years. The researchers examined the usefulness of measuring coronavirus-specific antibodies, and they demonstrated that the presence of antibodies in general had a poor predictive value in diagnosing FIP. More interestingly, it was possible for cats to test negative (i.e. have no detectable antibodies against the coronavirus) and still have FIP; 10% of cats who truly had FIP had no detectable antibody on the test. Cats with a very high level of antibodies, however, had a high probability of having FIP (94%). To summarize: low or medium levels of coronavirus-specific antibody had no diagnostic value, negative levels had limited value, and very high levels, if present, raises the probability of FIP considerably. Unfortunately, very high levels were present in only 36 cats in the study.

One approach to the diagnosis would be to try to detect the coronavirus, and then determine whether the virus was the harmless intestinal virus or the mutated, evil FIP virus. A relatively new test called polymerase chain reaction (PCR) is very good at detecting the extremely small numbers of specific infectious organisms in humans and animals, however, the investigators found that while PCR is very sensitive at detecting coronavirus infection, it cannot distinguish between the harmless intestinal coronavirus and the mutated, FIP-inducing coronavirus, despite some grandiose claims to the contrary.

Another method to detect the virus is to search for it inside macrophages and other cells present in body cavity fluid. A study published in 1995 showed the presence of coronavirus in 34 out of 34 samples from cats with FIP-induced fluid accumulations.

In the present study, detection of intracellular coronavirus in macrophages found in body cavity fluid was evaluated, and indeed, there were no false-positive results. A positive test, in other words, predicts with 100% certainty that the cat has FIP. Unfortunately, this type of test tends to be performed in research laboratories, and most commercial laboratories do not offer this test. One must keep in mind that while a positive test is 100% diagnostic, a negative test does not mean that the cat does not have FIP. Also, the test is performed on body cavity fluid of affected cats. It is not useful for cats with the dry form of the disease.

In conclusion, the only way to definitively diagnose FIP is by biopsy, or by detection of coronavirus in cells from body cavity fluid of affected cats. There is no simple blood test that can make the diagnosis, and I shudder to think of how many cats have been euthanized unnecessarily due to a mistaken belief amongst many veterinarians that a positive antibody test is diagnostic for FIP. FIP remains a death sentence for cats, and I urge all cat owners whose cat is diagnosed with the disorder to question their veterinarian extensively as to how the diagnosis was achieved, and seek a second opinion if there are any doubts about the diagnosis.