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# Feline Infectious Peritonitis, FIP

*FIP*

**Affected Animals:**
Both domestic and exotic cats are susceptible. Purebred kittens are suspected to be genetically less resistant to FIP infection.

**Overview:**
Cats that are infected with feline coronavirus, a contagious virus transmitted through feces and saliva, run the risk of developing feline infectious peritonitis, a rare and deadly form of this disease. In most cases, the coronavirus itself is not serious, but FIP is usually fatal. FIP causes the cat's immune system to attack its own cells, damaging blood vessels throughout the body. Without adequate blood flow, many of the body's organs are severely damaged and fail. Cats that show signs of FIP generally die from it quickly.

There are two forms of FIP, both of them equally life threatening. The effusive, or "wet," form occurs when fluid is produced in the body's cavities, often resulting in a swollen abdomen, fever, weight loss, and breathing difficulties. The second form, which is non-effusive, or "dry," can lead to neurological disorders such as seizures and brain damage.

FIP is a frustrating disease to veterinarians. It is not yet understood why certain cats with the coronavirus develop FIP while others do not. There is no cure or completely effective vaccine for this fatal illness, nor is there a diagnostic procedure, short of an autopsy, that will conclusively determine the presence of FIP; thus, diagnosis is based on suspicion and clinical signs. The preventive measures available, however, are fairly effective in deterring the spread of FIP.

**Clinical Signs:**
Clinical signs of the effusive form of FIP can vary, but typically include ascites, depression, anorexia, weight loss, fever, dyspnea, and tachypnea. Clinical signs of non-effusive FIP may include pyrexia, weight loss, depression, anorexia, ocular lesions, icterus, and neurological signs such as ataxia and seizures.

**Symptoms:**
Clinical signs of the "wet" form of FIP can include a gradual swelling of the abdomen due to fluid building up in the cavity, depression, decreased or absent appetite, weight loss, fever, difficulty breathing, and a rapid respiratory rate. Clinical signs of the "dry" form of the disease may include fever, weight loss, depression, decreased or absent appetite,

eye problems, a yellow color to the eyes or skin, and neurological signs such as difficulty walking and seizures.

**Description:**
Feline infectious peritonitis is caused by the feline coronavirus, which is shed in the saliva and feces. Generally, cats and kittens that become infected by the coronavirus have fairly mild symptoms such as diarrhea and vomiting that resolve without significant medical intervention. However, FIP, a rare form of coronavirus infection, is a deadly disease with no cure.

The FIP virus causes multiple changes in the body's immune system, leading to a destruction of the blood vessels that results in an inadequate supply of oxygen to the body's cells. The disease manifests itself in two ways: effusive FIP or non-effusive FIP. The effusive or wet form is characterized by the production of large amounts of fluid throughout the cat's body occurring because the affected cat's immune system releases signals that cause the blood vessels to become more permeable. As a result, fluid and white blood cells leak out of the vessels into the body cavities, causing severe damage throughout the body. When the blood vessels can no longer deliver oxygen-rich blood to the organs, the cells in those organs die, resulting in multi-organ failure and death.

Although there is no fluid production with the dry form of the disease, multi-organ failure can result from this manifestation of the illness as well. In addition, non-effusive FIP can attack the brain, causing neurological disorders such as seizures.

**Diagnosis:**
The veterinarian must look for clinical signs of the disease by taking a thorough history, performing a complete physical examination of the cat, and taking blood tests that detect abnormalities in body organs, such as the kidney or liver.

For cats that have symptoms of effusive FIP, an important diagnostic procedure requires taking a sample of the fluid that is building up within the cat's abdomen and submitting this for analysis of the cell types and protein content present within the fluid. For cats that show signs of the dry form of the disease, an organ biopsy of the kidneys and lymph nodes can be taken and sent to a pathologist to look for the microscopic changes that occur in cats with FIP. This procedure is not always recommended, however, as it creates stress that can worsen a sick cat's condition.

At this time, there are no specific diagnostic tests short of autopsy that can determine definitively whether a cat has FIP. The blood tests that are available simply determine if the cat has been exposed to the coronavirus. Exposure to the coronavirus, however, does not mean necessarily that the animal has FIP; typically, the coronavirus leads to other minor disorders, such as intestinal problems like diarrhea and vomiting.

Serologic testing for exposure to feline coronavirus may be conducted if the clinical signs of FIP are suggestive of the disease and confirmation of exposure is needed. An owner may need such a confirmation to ensure that a pet is not transmitting the disease to other animals. Breeding facilities also may request such testing to determine whether there is a

danger of spreading the coronavirus to other cats.

**Prognosis:**
Cats that develop clinical signs of FIP have a grave prognosis: almost 100 percent of them will die. Euthanasia, or humanely putting the cat to sleep, is generally recommended.

**Transmission or Cause:**
FIP is caused by feline coronavirus. Cats acquire the coronavirus when they come into close contact with the feces or saliva of infected cats. Kittens may be more susceptible to developing FIP because their immune systems are less developed, and there may be a genetic predisposition for purebred kittens to get the disease. The virus can be transmitted during grooming, through the ingestion of infected feces, from sneezing, and from close contact with items such as litter boxes and food bowls used by cats with the disease. The virus can survive in the environment in dry conditions for long periods of time. Less commonly, a mother cat can pass on the disease to her unborn kittens.

**Treatment:**
The treatment for cats with significant clinical signs of FIP is usually unrewarding. Because there is no cure for the virus, treatment must take the form of supportive care. Drugs that suppress the immune system and help decrease the inflammation have been used with limited success. All cats that have FIP should be made to rest in a stress-free environment.

**Prevention:**
Litter boxes should be kept clean. The use of vaccines has been controversial, but a new vaccine called Primucell, given intranasally, offers local protection in the nose and back of the throat, which are common sites of entry for the virus. Studies have shown that the vaccine is safe, and although it is not completely effective, it does offer some protection against FIP. It is advised to test a cat for coronavirus prior to administering this vaccination, as the vaccine is unlikely to be effective if the cat is incubating the disease. Also, cats will test positive for exposure to the virus following vaccination.

Because of the increased risk of FIP in areas highly populated with cats, breeders and owners of catteries especially should concern themselves with prevention. The way newborn kittens from infected mothers are handled from birth determines whether they will become infected with the coronavirus. One to two weeks before delivery, the birthing area should be kept free of cats and should be disinfected with a bleach solution made by adding one part bleach to 31 parts water. If the mother cat tests positive for the coronavirus, the newborns should be removed from her at five to six weeks of age to prevent infection; before this time period, they will be protected from the disease by the mother's antibodies.