FELINE INFECTIOUS PERITONITIS (FIP) INFORMATION FOR CAT OWNERS

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What is FIP?

FIP, also known as Feline Infectious Peritonitis, is a truly devastating disease. It is caused by a feline coronavirus, which although belonging to the same family of viruses as COVID-19, is completely different. Feline coronaviruses infect cats alone and cannot be transmitted to humans.

FIP Advice Team

Email help service for your vet: fipadvice@gmail.com

How does feline coronavirus differ from FIP?

Feline coronavirus itself is not the same as FIP. Feline coronavirus is a very common viral infection found in cats worldwide, especially in multi-cat households, with more than 90% of cattery/breeding cats, and up to 50% of cats in single cat households, showing evidence of infection (Hartmann 2017). Feline coronavirus infection usually causes no clinical signs in cats but occasionally it can result in mild diarrhoea, especially in younger cats, as the virus multiplies in the cells of the intestinal tract. The virus may survive outside of the cat in the environment for up to 7 weeks in dry conditions, however, it is readily destroyed by common detergents and disinfectants (Kennedy and Little 2012).

As feline coronavirus usually causes no clinical signs, we don't tend to worry too much about this infection. However, in a very small percentage of infected cats, feline coronavirus infection can develop into the disease of FIP; this is believed to occur when the feline coronavirus genetic information changes (mutates), allowing it to cause FIP when the cat's immune response does not prevent FIP from developing.

Which cats are most at risk of developing FIP?

We do not know why in certain cats the coronavirus can mutate to cause this awful disease.
Here are the high-risk groups:

Less than 2 yrs usually developing the disease between 3-16 months

Pedigree cats

Multicat households

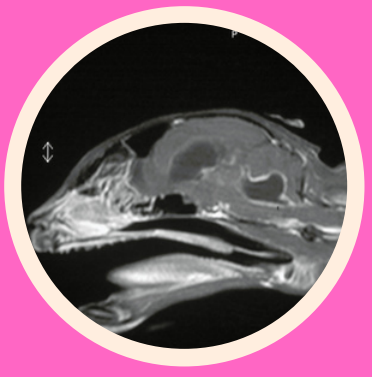
Male cats are at slightly increased risk

How does FIP present?

"Wet FIP"
in which fluid develops in a body cavity – especially the abdomen and/or chest

"Dry FIP"
when no fluid forms

"Neurological FIP"
Brain and/or spinal cord



"Ocular FIP"
affecting the eyes

Testing for FIP

Your vet will be best placed to decide which diagnostic tests are appropriate for your cat to see if FIP is a possible diagnosis. As FIP can present with so many different clinical signs, it is impossible to say which tests are most appropriate as this will vary. It is also important to understand that being able to absolutely confirm a diagnosis of FIP is difficult, and tissue samples are usually needed (e.g., lymph node removal or biopsies) necessitating invasive procedures.

Your vet will perform several routine tests including blood, urine tests, checking the back of the eye, and imaging of chest/abdomen. If any fluid has developed, then obtaining and testing a sample of the fluid (from the abdomen or chest) is very useful to help support a diagnosis of FIP. Further testing that may be required includes sampling of any abnormal organs e.g., a needle sample of the liver, kidneys or lymph nodes (glands) in the abdomen. The tests which confirm a diagnosis of FIP are those which demonstrate the presence of feline coronavirus particles in association with abnormalities (pathology) that are consistent with FIP. These tests are called immunohistochemistry (done on biopsy samples) and immunocytochemistry or immunofluorescence (IF) (done on fluid samples or needle samples from organs such as the liver, kidney, and lymph nodes). More advanced tests such as brain scans (MRI) and further fluid sampling may also be indicated if your cat has neurological signs (such as fits or a wobbly walk).

As the samples that confirm a diagnosis of FIP are usually quite difficult to collect (for example general anaesthesia and surgery may be needed), vets often try and be as confident as possible in making a diagnosis of FIP based on facts and results obtained more easily. These include your cat's age and breed, its history (any recent stress such as neutering/moving house/rehoming may increase the chance of FIP developing), clinical signs (such as fluid in abdomen or chest) and certain blood changes such as high protein levels, liver enzymes and markers of inflammation (such as AGP-1). If fluid is present, your vet will likely obtain a sample of the fluid and look to see if it has the appearance expected with FIP (most often straw yellow in colour, thick and sticky) before sending it to the lab to look at the contents of the fluid. This diagnostic investigation is really important to help rule out other serious conditions such as liver disease, other infections and cancers that can mimic FIP.

It is therefore necessary to undertake many tests to try and determine if FIP is likely, and even then, a diagnosis of FIP may not be confirmed. It is important for your vet to be confident that FIP is likely before starting antivirals as the treatment course is very prolonged and expensive, so it should be reserved for cats with highly likely/confirmed FIP disease. In addition, inappropriate use of antivirals in cats without FIP could lead to coronavirus resistance problems, meaning that cats with FIP may no longer be able to respond to these novel antiviral treatments.

Which laboratory tests are NOT helpful to make a diagnosis of FIP?

Antibody tests (serology)
many cats have been infected with feline coronavirus and the presence of antibodies just shows that the cat has been exposed to a coronavirus but doesn't tell you if the coronavirus is associated with FIP. Indeed, in some cats with severe FIP disease, their antibody levels are low or even negative as the antibodies are 'used up' in the FIP disease process.

Testing faecal (poo) samples
for coronavirus is also unhelpful because many cats are infected with coronaviruses and shed them in their faeces; the tests cannot distinguish between cats with and without FIP.

How was FIP treated in the past?

Previously treatment for FIP was not effective and after diagnosis most cats either died or were put to sleep. Many different treatments were trialled including medications such as steroids, interferon, propentofylline and polyprenyl immunostimulant. But most studies reported poor survival rates and no convincing long-term effect of treatment.

Ground-breaking research on antivirals

Dr Pedersen, a pioneering feline medicine specialist and virologist in the USA, published a study in 2018 (Pederson et al 2018) showing that an antiviral drug called GS-441524, which interferes with the multiplication of feline coronaviruses, was safe and effective for the treatment of cats with wet FIP (ocular and neurological FIP cases were not included). In this study 25/26 cats treated for 12 weeks or longer with injectable GS-441524 appeared to be cured from FIP (1 cat subsequently died of an unrelated heart problem). A further study by Dr Pedersen's group in 2019 (Dickinson et al 2019) showed that GS-441524 was also effective at higher doses in cats with neurological FIP. Until these Pedersen studies, no drug had been found that showed such promise for long term survival and a potential cure for FIP. More recently studies have been published showing effective treatment with oral formulations of GS-441524.

As no licensed GS-441524 product was available, many black-market formulations of GS-441524 became available for internet sale. Not only were these formulations incredibly expensive, but they were also potentially dangerous as the amount of medication, or even the exact formulation of the medication in these drugs, was not known. In many countries of the world, it is illegal for vets to buy these products and it is illegal for owners to administer these products to their cats.

What treatment is now legally available and how effective is it?

GS-441524 (given orally as tablets) and its parent drug remdesivir (given by intravenous or subcutaneous injection) are now legally available as antivirals for cats with FIP as 'specials' preparations in the UK since August 2021. The minimum treatment course required is 12 weeks, so it is long and costly, and it is important to be aware that successful treatment cannot be guaranteed and that relapses with repeat treatment courses may be required. Additionally, the dose of antivirals given must be increased as weight is gained during recovery, again influencing cost. The dosages of the antivirals required also vary with the type of FIP, with neurological and ocular FIP needing the highest dosages, again increasing cost. As owners, you also need to commit to being able to administer the antivirals to your cat, which can be difficult with a long treatment course.

Vets in Australia have had access to oral GS-441524 and injectable remdesivir for a few months longer than those of us in the UK, and between us we have now treated over 1500 cats. There is still a lot of research ongoing but at present the success rate is phenomenal with over 85% of cats responding to treatment following at least 12 weeks of treatment, with long term remission. Cats do need to be closely monitored both during and after the 12 weeks of treatment and your vet will advise you on the monitoring required (likely regular examinations, weight checks and possibly some blood tests too).

What do I need to do if I need more help?

Your vet will be best placed to help and treatment of FIP is a team approach between you and your vet doing the best for your cat. As antiviral treatment of FIP is new, a team of feline experts have set up an email help service for vets at fipadvice@gmail.com – please ask your vet to email for help if they need to discuss diagnosis or treatment of a suspected case of FIP.

It is illegal for vets to advise on patients that are not under their direct care, so please make sure it is your vet who emails the feline expert team as sadly it is not possible for the feline expert team to provide advice direct to owners.

FIP Advice Team

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