

FIP Treatment

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Symptomatic Treatment

There is currently no effective treatment that is legally available for cats with confirmed FIP. Until new treatments can be approved and marketed, treatment remains largely symptomatic. A low to moderate dosage of prednisolone or prednisone (starting at 2 mg/kg, orally, once a day for two weeks and then 0.5-1 mg/kg indefinitely), coupled with a diet high in animal protein (e.g., 1/2 cooked chicken, turkey or rabbit and 1/2 a favorite commercial cat food) and a lot of personal care, is the simplest and possibly most effective symptomatic treatment. Symptomatic treatment ultimately depends on the cat's immune system to cure the infection. Some cats may have mild or subclinical disease isolated to a single intestinal lymph node, which may be detected as an abdominal mass upon routine physical examination or during a spay operation. Cats with more severe clinical signs will often go into a more chronic and less severe stage of disease after several weeks. As we gain more experience with treating rather than euthanizing cats when FIP is diagnosed, we begin to appreciate that a proportion of cats may survive for many weeks, months, and rarely a year or more. However, it is still fair to say that FIP is ultimately fatal to most cats if left to run its natural course.

There are misconceptions on the value of removing fluid effusions. Cats with chest involvement and breathing difficulties can benefit greatly by removal of pleural fluid. Chest fluid also tends to be slowly replaced, especially when cats are treated with prednisolone. Removal of abdominal fluid should be discouraged unless it is so massive that it interferes with breathing. Abdominal effusions tend to be rapidly replaced at the expense of body fluids and proteins. Owners can be encouraged to maintain symptomatic and palliative treatment for as long as weight and activity are maintained. This can be days, weeks, sometimes months, and rarely a year or more. However, owners should be apprised of the extremely high morality that occurs among cats with clinically active FIP.

There is some debate on whether certain non-steroidal anti-inflammatory drugs (e.g., TNF-alpha blockers such as pentoxifylline, thalidomide), specific immunomodulators (e.g., feline interferon omega, human recombinant alpha or beta interferon), and non-specific immunostimulants (e.g., several plant- or microbial-based biologics) have any efficacy against FIP. Although an initial study with feline interferon omega indicated efficacy, a subsequent large double blind and placebo-controlled trial showed it to be without efficacy. Human alpha and beta interferon are also of doubtless benefit and are immunogenic to cats and will be ultimately destroyed by the resulting antibodies. A similar large-scale trial with pentoxifylline also showed it to be non-effective against FIP.

Homeopathic Treatments for FIP

There are several web sites that are offering various homeopathic medications for cats with FIP. They are basically dilute tinctures of various plant extracts. These extracts are quite expensive, and many desperate owners will be tempted to use them. One of these companies is in Australia (<http://www.naturalpaws.com.au/feline-infectious-peritonitis-fip-usefulinfo-112-false.html>).

Another product in the US is called Peritan FP and it can be found at -

<http://www.greenpetdepot.com/products/peritan>. There are several others as well. Interestingly, advertised statements about the efficacy of Peritan for FIP conclude with the following statement – “These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.” People should also be aware that some of the anecdotes attesting to the efficacy of a certain product for FIP are deliberately posted. Furthermore, many of the cats described may never have had FIP in the first place.

Non-specific Immunostimulants

The use of non-specific immunostimulants has been popular in veterinary medicine for decades, usually for treating specific signs of feline leukemia and feline immunodeficiency virus infection such as anemia or low lymphocyte counts. There are occasional anecdotal reports of cats with “FIP” being cured or their lives prolonged by such treatments. These types of immunostimulants include substances such as Staphylococcal A protein, ImmunoRegulin (*Propriobacterium acnes*), Acemannan (mucopolysaccharide extract of Aloe Vera leaves) and Imulan (lymphocyte T-cell immunomodulator). There is no evidence that these biologics have any beneficial effect on actual cases of FIP.

The most popular non-specific immunostimulant being used to treat cats with dry FIP is an extract of tree leaves. Polyphenyl immunostimulant (PI) is classed as a biologic by the USDA and is manufactured by Sass and Sass in Tennessee (<http://www.sassandsass.com/>). PI has been given a conditional license by the USDA as therapeutic for “symptoms” of feline herpes virus infection. According to the Sass and Sass website they are conducting research on its use for FIP and other diseases of companion animals. Although not currently approved for the treatment of FIP by the USDA, it is being widely used off label for prolonging the life of cats with milder forms of FIP. Polyphenyl immunostimulant as a potential treatment for cats with FIP has an interesting history that extends from Russia to the United States. The research and chemical structure of PI is based on a biologic “plant extract” called Phosprenyl, which is used in Russia to treat a wide range of viral infections in many animal species (<http://www.2ndchance.info/fip-gamavite.pdf>). PI may also have a Russian origin. The following web posts were published in Russian, but with the help of Google translator it is possible to access much of this material in English -

[http://translate.google.com/translate?hl=en&sl=ru&u=http://pesikot.org/forum/index.php%3Fshowtopic%3D219269&prev=/search%](http://translate.google.com/translate?hl=en&sl=ru&u=http://pesikot.org/forum/index.php%3Fshowtopic%3D219269&prev=/search%3F)

The first publication on the use of PI for FIP outside of Russia was an article: (<http://www.vet.utk.edu/research/fip/FIPpolyphenyl.pdf>) published by Dr. Al Legendre and

colleagues. In this study, three cats with subclinical dry form FIP were treated with Polyprenyl Immunostimulant. Two of the three cats were alive and well 2 years after diagnosis. The results from these three cats were used to justify a much larger treatment trial on 58 cats presenting solely with dry FIP. The results of this study were presented in 2012 at the ACVIM forum: <http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&ved=0CEgQFjAD&url=http%3A%2F%2Fwww.vet.utk.edu%2Fresearch%2Ffip%2FPolyprenylACVIM2012Statement.doc&ei=FBP8UfLxAar3iwKdjoH4CA&usq=AFQjCNGpuOmQKYuzCY17BJ5Gt9FRQwqvPg&bvm=bv.50165853,d.cGE>. Twenty-two percent were alive at least 165 days and three cats lived longer than 365 days (5%), which was longer than what was expected. However, this study was faulted for not including a placebo control group and was subsequently published in more detail and including a historical control group - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5306384/>. This report described 60 PI treated cats with dry FIP and 59 cats with similar dry FIP from the literature that had not been treated. Eight of the 60 cats survived over 200 days, and 4 of 60 survived over 300 days. No historical control cat that suffered solely from dry FIP and not treated with PI lived longer than 200 days. The conclusion was that PI treatment prolonged the life of cats with the dry form of FIP.

The published results with PI are difficult to interpret, but it can be safely concluded from the researchers words that cats with wet FIP are not responsive to treatment and that there may be a small increase in survival time for cats with the milder dry form of FIP. It is also important to note that the USDA has not added FIP to its list of approved diseases for PI treatment and that the makers of PI do not promote its use for FIP. However, it has gained a vocal following on the web that generates a considerable market for treating FIP. PI may cost over \$400 a month if used on an average size cat and dosed accordingly and this expense can be magnified by associated veterinary expenses.

Non-specific Anti-viral Drugs

Common drugs such as cyclosporine, cholesterol inhibitors such as itraconazole, various antibiotics, and several herbal extracts inhibit FIP virus in cell-culture, but the anti-viral effect is weak and potential toxicity great. These substances have their biologic effects by inhibiting normal metabolic processes of cells and some of these processes are usurped by viruses to aid their own replication. The amount of drug required to achieve the needed level of virus inhibition would be toxic or damaging to the cells and thus to the host cat.

Targeted Anti-viral Drug Therapy

The current hope for treatment of FIP rests with several of the same types of specific anti-viral drugs that have been used to treat viral infections of humans such as hepatitis C and HIV/AIDS. These are small molecules that are readily absorbed into cells and specifically target viral proteins that are essential for virus replication. Their toxicity for non-viral processes (i.e., cellular functions) is extremely low, making them both safe and efficacious. We have described our laboratory and field experiences with GC376, a viral protease inhibitor, in an article in the Journal of Feline Medicine and Surgery. An abstract of this article can be accessed at the

PubMed website (<https://www.ncbi.nlm.nih.gov/pubmed/28901812>). The rights for GC376 have been obtained by Anivive and they are starting the lengthy process of obtaining FDA approval for treating cats with FIP and eventual marketing - <https://www.k-state.edu/media/newsreleases/2018-09/fipantiviral92018.html>.

We have also published our initial research studies on a second compound (nucleoside analog GS-441524- Gilead Sciences, Inc.) and these results can be found at the Veterinary Microbiology journal open access article website (<https://www.sciencedirect.com/science/article/pii/S0378113518301603>). We are in the process of publishing field trial results with this very promising viral RNA inhibitor in the Journal of Feline Medicine and Surgery. Similar reports will be forthcoming as other drugs go through experimental and field testing. We are convinced based on our research that anti-viral drugs of the type currently used for HIV/AIDS and hepatitis C virus (HCV) infection, and in test phase for Ebola, Marburg, MERS, SARS, and bat coronavirus infections will provide the best chance for curing this terrible disease of cats. These drugs include protease inhibitors, nucleoside analogs, RNA polymerase inhibitors, as well as other classes of anti-viral drugs that might target specific aspects of RNA virus replication.

Unfortunately, the research phase for these drugs has ended and no more field trials are contemplated at this time and no drug is legally available for veterinarians or owners. The processes involved in getting these new drugs FDA approved and commercialized is long and it may be 2-5 years before these or similar drugs find their way to veterinarians for use in the treatment of cats with FIP. This delay has created a vigorous and growing black-market for drugs like GC376 and GS-441524. GC376 is being illegally produced in China and sold through subsidiaries in Europe and US. GS-441524 is also being produced illegally in China but has not yet appeared on the market. Manufacturers and secondary suppliers state that these drugs are to be used for research purposes only and not for use veterinary or human applications but are well-aware of their great demand and willingness of many cat owners to pay an extremely high price for them. We have no idea of the purity or biological activity of these black-market compounds and veterinarians have no experience with preparing them for treatment or using them to treat cats with FIP. The treatment period for naturally occurring FIP is a minimum of 12 weeks, not the two weeks based on treating cats with experimental FIP. Many owners have spent thousands of dollars on black-market drugs and have had to stop treatment before this time, even though their cats are responding, due to the cost. The FIP will relapse if treatment is stopped too soon. Owners and veterinarians using should be also aware of possible legal and ethical consequences arising from the use of black-market drugs.