

Feline Infectious Peritonitis (FIP) Treatment

Feline infectious peritonitis is generally believed to be an incurable condition. Most reported "recoveries" were probably curable conditions wrongly diagnosed as FIP. However, treatment can occasionally effect a remission, sometimes for months.

Note: this section is intended for veterinary surgeons.

Because FIP is an immune mediated disease, therapy includes suppressing the immune response, usually with corticosteroids. Anti-viral treatments alone don't usually prolong the cat's life by much and many are quite toxic to cats. It is also important to maintain the cat's general nutrition status, by adding vitamins and antioxidants. Before embarking on any of the following therapies, it is essential to ensure that the diagnosis is correct, immunosuppressive drugs could markedly worsen other conditions (such as bacterial peritonitis or pleurisy). See Diagnosis of FIP

I should very much like to conduct a clinical trial on the effectiveness of various treatments for FIP, but unfortunately don't have the funding to do so. I'd like to thank Mr Wayne Carr, whose generous donation made some preliminary investigations possible.

Immunosuppressants

Cats receiving immunosuppressants should also receive antibiotic cover to protect them against other infections.

Prednisolone

Prednisolone is the main immunosuppressant used in feline infectious peritonitis, it is safe, tends to make the cat feel better and stimulates his or her appetite. I treated one cat with dry FIP with prednisolone alone and he survived for 10 months. Prednisolone suppresses both the humoral and cell-mediated immune response.

Prednisolone has the advantage of also being the treatment for lymphocytic cholangitis, which can be mistaken for FIP, so where the diagnosis is in doubt, prednisolone can be given anyway: the cat with lymphocytic cholangitis has a good chance of recovery, the cat with FIP unfortunately will die.

Prednisolone should never be used in cats with septic peritonitis or pleurisy, which is why cytology is a very important part of FIP diagnosis, as there will be many more white blood cells in the effusion of a cat with sepsis, and a good cytologist will detect the bacteria or fungi.

Dose: 2-4mg/kg/day given by mouth, sliding dose every 10-14 days, until optimal dose for that cat is found.

Thalidomide

The rationale of using thalidomide in the treatment of feline infectious peritonitis is to reduce inflammation and the humoral immune response to feline coronavirus while leaving the cell mediated (anti-viral) immune response intact. Only 4 cats with FIP have been treated with thalidomide so far and unfortunately all died. However, one with a thoracic effusion did eliminate his effusion and had a remission of 3 months. I think that, to be effective, thalidomide would need to be used very early in the disease, before too many blood vessels became damaged.

Be sure to obtain the owner's consent for using a drug not licenced for cats.

Dose: 50-100mg at night. CANNOT BE USED IN PREGNANT CATS as it is teratogenic.

Interferon

Feline interferon omega

[Virbagen Omega](http://www.virbagenomega.com/centre.html) - <http://www.virbagenomega.com/centre.html> (made by Virbac) is recombinant feline interferon

omega (IFN omega) is available in many countries now. This product was first used in treatment of FIP by Japanese vet and scientist Takuo Ishida. He presented his data at SIFFS and his [abstract](http://www.felinecoronavirus.com/abstracts.htm#ishida) <http://www.felinecoronavirus.com/abstracts.htm#ishida> can be read on the SIFFS website. This is his protocol: IFN omega was initially given subcutaneously at 1 MU/kg every other day, and then once every week for variable period if remission was seen.

Glucocorticoid: (dexamethasone 1 mg/kg intrathoracic or intraperitoneal injection once only) or prednisolone. Oral prednisolone was initially given at 2 mg/kg once daily, and the dosage was gradually tapered to 0.5 mg/kg every other day after remission.

In Dr Ishida's study, 4 cats of 12 completely recovered and two survived 4 and 5 months. Those cats which recovered completely all had the effusive form of FIP and were relatively older cats.

Interferon Omega does seem to effect a cure in around a third of cats with FIP. I am working alongside vets in practice in the UK to monitor a number of cats being treated with this product. It seems to be very important to begin treatment as soon as possible after the onset of clinical signs. We are seeing success in younger cats too, and even cats with non-effusive FIP. Some cats are being treated orally using 50,000 Units a day. Once diluted (in water or saline) IFN Omega maintains its potency in the fridge for up to 3 weeks, so keep most IFN Omega in the freezer until needed.

Diluting feline interferon

Virbagen Omega comes in vials of 5 or 10 million units. It is reconstituted with 1ml of diluent. To get 50,000 Units/ml, put one 5MU vial into 99mls saline or sterile water, or a 10MU vial into 198 mls saline or water. Aliquot into 20ml syringes or tubes and freeze. Remember that reconstituted, diluted Virbagen Omega lasts only up to 3 weeks in the fridge.

Updates on treatment will appear in the English version of the website before the translated pages.

Contact for Virbagen Omega in UK: [Callum Blair](mailto:cblair@virbac.co.uk) (cblair@virbac.co.uk)

Suppliers: Virbagen Omega can be obtained from [Abbeyvet](http://www.abbeyvet-export.co.uk) (www.abbeyvet-export.co.uk)

Reference: Ishida et al, 2004. Journal of Feline Medicine and Surgery. Vol 6 Issue 2 pp 107-110

Human interferon alpha

Dose: Non-effusive feline infectious peritonitis (FIP): 30 i.u./daily or for 7 days at alternate weeks given by mouth.

In effusive FIP 30 i.u./daily can be used, or larger doses of interferon can be given by intramuscular injection daily (104 - 106 i.u. per day). By 6-7 weeks, if the cat is still alive, interferon will no longer work at this dose because the cat will make antibodies against it.

To obtain human interferon-alpha (Roferon or Intron A), write a prescription for your local pharmacist. Obviously, in areas where feline interferon is available it is preferable as it is likely to have more effect than the human interferon.

Diluting human interferon

To get 30 i.u./ml: Intron A can be obtained as 1 million i.u. for about £10.00. Dilute whole vial in one litre of saline, giving 3000 i.u./ml. Put one ml of 3000 i.u./ml into 99ml of saline, to get 30 i.u. per millilitre. Aliquot into 1ml volumes* and freeze for up to a year. Defrost as required, keep refrigerated for up to a week.

*In the UK: 2ml tubes are available from Sarstedt, supplier's ref: 72.694.006. Fax: 0116 236 66099 Tel: 0116 235 9023.

To get 104 i.u./ml put 1 x 1 million i.u. vial of Intron A or Roferon into 99ml sterile saline and divide into 1ml doses and freeze. For 105 i.u./ml use 9mls saline and proceed as above. For 106 i.u./ml use the whole vial.

Vitamins and antioxidants

Vitamin A

Vitamin A is an antioxidant. The dose of Vitamin A is 200 i.u./day given by mouth or in the food. Cats cannot metabolise the beta-carotene form so must be given vitamin A as fish oil, e.g. halibut liver oil. Too much vitamin A can cause excessive laying down of bone at the joints, so don't use this supplement for more than 4-6 weeks.

Vitamin B1 (thiamine)

Vitamin B1 (thiamine): 100 ug/day given orally (i.e. by mouth or in food).

Vitamin B complex

Multivitamins B are a good appetite stimulant and can be obtained from health food shops or chemists (I particularly like the one from Boots). Dose: paediatric dose.

Vitamin C

Ascorbic acid 125 mg twice daily given by mouth or in food. Vitamin C is an antioxidant. Remember that given over a long period of time, vitamin C can predispose to oxalate crystals in the urine.

Vitamin E

Dose of vitamin E: 25-75 i.u./cat twice daily given by mouth or in food. Vitamin E is an antioxidant.

Other supportive drugs

Aspirin

For anti-inflammatory activity and pain relief.

Dose: 10mg/kg every 48-72 hrs per os.

Ampicillin

Antibiotic cover is essential when immunosuppressing a cat.

Dose: 50 mg bid per os.

Anabolic steroids

For appetite encouragement and anti-catabolism, especially if the kidneys are affected.

Choose from the following (in the UK):

Laurabolin injection: 2-5mg/kg every 21 days.

Nandrolin injection: 2-5mg/kg as a weekly injection.

Nandoral tablets - one a day either whole or crushed into food.

Retarbolin injection: 1mg/kg every 21 days.

Orandrone tablets: 0.5mg/kg daily (the tablets are 5mg).

Remember to warn the owner that the cat's urine could become more strong smelling with this treatment. The injectables usually require to be kept in the dark.

Thromboxane Synthetase Inhibitors

Two cats with abdominal effusions were treated with ozagrel hydrochloride with success (Watari *et al*, 1998).

Dose: 5-10mg/kg twice daily and prednisolone at 2mg/kg/day.

Monitoring treatment / Prognosis

Whatever treatment you opt for, it is important to monitor the cat's progress. Initially, I measure the haematocrit (Hct), globulins, albumin to globulin ratio (A:G), alpha1-acid glycoprotein (AGP) and the cat's weight every 7-14 days to see how the cat is progressing. Later, examinations might only be monthly if the cat is doing well. It is not worth measuring the FCoV antibody titre more often than every 2-3 months, there will be no discernible difference within a shorter period. The AGP should be the first to fall if treatment is having a positive effect because AGP is a measure of inflammation. Positive signs are globulin levels decreasing, and the albumin: globulin ratio(A:G) increasing, Hct increasing and reticulocytes appearing in blood smears and weight increasing. Negative signs are AGP remaining high, globulins staying high or increasing, A:G decreasing, weight loss. When Hct gets to below 20% and is non-regenerative (no reticulocytes seen on blood smear examination) then the cat should probably be humanely euthanased if your clinical opinion is that he or she is no longer getting any happiness out of life. Clearly, if the cat is distressed at any point in the treatment, then euthanasia will be required. Sadly, cats with effusive feline infectious peritonitis usually only survive a few days, possibly weeks at best. Cats with non-effusive FIP can last many weeks or months, though after neurological signs begin euthanasia usually ensues fairly rapidly.

For AGP testing see [Companion Animal Diagnostics](http://www.gla.ac.uk/companion). (<http://www.gla.ac.uk/companion>)

Further reading

Feline Infectious Peritonitis Virus: Advances in Therapy and Control by Richard C. Weiss. 1994 Consultations in Feline Internal Medicine 2. Edited by John R. August. Published by W.B. Saunders Company. Harcourt Brace Jovanovich, Inc., The Curtis Center, Independence Square West, Philadelphia, PA 19106. pages 3-12
ISBN 0-7216-4674-3

Ishida T, Shibana A, Tanaka S, Uchida K, Mochizuki M. 2004 Use of recombinant feline interferon and glucocorticoid in the treatment of feline infectious peritonitis. JFMS 6

<http://www.felinecoronavirus.com/abstracts.htm#ishida>

Watari T, Kaneshima T, Tsujimoto H, Ono K, Hasegawa A. 1998 Effect of thromboxane synthetase inhibitor on feline infectious peritonitis in cats. J Vet Med Sci. 60(5):657-9.

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