An update on the treatment of feline infectious peritonitis

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Introduction

Highly effective antivirals for the treatment of FIP are now available. Legal access to remdesivir, and subsequently its intermediate (or principle) metabolite GS-441524, started in 2020 in Australia and the UK. Since that time, we have gained experience in managing FIP and monitoring treatment, with excellent outcomes. Legally available sources of antivirals effective for FIP for veterinary use now exist in many other countries, although in some parts of the world there remains, sadly, no quality assured, legally available supply.

This article summarises the current advice on the treatment of FIP to aid practitioners managing these cases. It is based on currently available information, but this does evolve as more experience is gained and new evidence is published, so regular updates are written. It includes information on all medications shown to be effective in the management of FIP but it remains the responsibility of the attending veterinarian to follow regional prescribing regulations. Treatment needs to be tailored to the individual cat based on response, compliance, and client finances. For further information on making a diagnosis of FIP, please see the further reading at the end of this document.

Treatment protocols

Antivirals that veterinarians can legally prescribe vary by country, but are often acquired via compounding pharmacies.

These include remdesivir, GS-441524, molnupiravir and EIDD-1931, which are all nucleoside analogues, acting by interfering with viral RNA replication.

At the time of writing, countries with access to compounded nucleoside analogues include Australia, Canada, Cyprus, Czech Republic, Dubai, Finland, France, Germany, Hong Kong, India, Ireland, Japan, New Zealand, Norway, Portugal, Singapore, South Africa, Sweden, Switzerland, UK, and USA. Some countries, like the USA, UK and Australia, also have access to the EIDD-1931, which is the prodrug of molnupiravir (MPV, sometimes called EIDD-2801).

Antivirals that inhibit the 3C-like protease inhibitor also exist. These include GC-376 and nirmatrelvir but they are far less commonly used than the nucleoside analogues and this stage, are not recommended as monotherapy, they are always combined with a nucleoside analogue.

The dosages in the protocols described in this document are based on experience using reputable quality assured preparations with known antiviral content.

Extrapolation is not applicable to other preparations where the active component and/or its content are not known. All dosages are given in Table 1.

USE OF BLACK-MARKET PRODUCTS TO TREAT FIP

The authors do not recommend the use of black-market products to treat FIP but recognise the challenge of obtaining antivirals in regions without legal formulations. Analysis of such products reveals variable amounts of antiviral and a lack of quality assurance. At worst they could be harmful e.g., severe injuries have been reported after subcutaneous injection of highly acidic medications. Drug prescribing regulations may also prohibit veterinarian involvement in owner-sourced medications, and it is recommended that regional regulations are consulted to ensure compliance to local rules. Although the authors recognise that these preparations have been used successfully, they recommend using quality assured legally available antiviral preparations whenever they are available within a country or region.

Oral GS-441524

Oral GS-441524 (available as a suspension 50 mg/mL and tablets 50 mg) can be used from the start of, and for the entire, FIP treatment course (typically 6-12-week/42-84-days; see later regarding the duration of treatment courses). It is important to support owners in medicating their cats, which can be challenging. Further study is needed to review the effect of food on GS-441524 absorption, but it is recommended to give GS-441524 on an empty stomach or in a small

treat (tablets can be crushed for this), leaving a gap of 30 minutes or more before feeding a larger meal. Fasting cats overnight can increase their hunger to facilitate medicating in the morning, and similarly for an evening dose.

Remdesivir

Injectable veterinary reformulated remdesivir (10 mg/mL) or human-licensed remdesivir (100mg/vial) is effective in the treatment of FIP but is associated with side effects, particularly pain on subcutaneous injection. Previous FIP treatment protocols suggested that remdesivir should be used at the start of FIP treatment, before transitioning to oral GS-441254, but we now know that oral GS-441524 is effective when given from the start of FIP treatment. Injectable remdesivir, given intravenously to avoid subcutaneous injection pain, is now only indicated over oral GS-441524 in the following situations:

- Severe neurological signs with inability to swallow or tolerate oral medication;
- Extremely dehydrated/unwell cats;
- Cats that cannot be orally medicated for other reasons.

If a cat has a poor appetite and/or is sick, affecting the ability to medicate it, hospitalisation for supportive care and 48 hours of intravenous remdesivir can result in significant clinical improvement, facilitating transition to oral medication with GS-441524. The remainder of the treatment course can then be given as oral GS-441524. The transition from remdesivir to oral GS-441524 can be immediate, i.e., from one treatment to the next.

A compounded oral remdesivir preparation (capsule form) has been used successfully to treat cats with FIP when GS-441524 was not available, for example in New Zealand (Renner et al., 2025).

Molnupiravir (EIDD-2801)

Molnupiravir (EIDD-2801) is another nucleoside analogue that inhibits viral replication and is metabolised into EIDD-1931 (NHC). In USA and Australia, molnupiravir and EIDD-1931 are available from compounding pharmacies. Initial use was as a second-line antiviral for cats that failed to respond to remdesivir / GS-441524. However, recent studies suggest that it may be used as a primary treatment option. Molnupiravir is subject to restrictions on its use in Europe but is legally available in other regions. It has been used successfully to treat FIP, used as both a first line agent and as a rescue treatment in cats that relapse following GS-441524 treatment. It can be mixed with food for administration. Safety concerns include a narrower therapeutic window, potential for neutropenia and risk of generating FCoV mutations (see 'Side effects of antivirals'). Current recommendations suggest caution when exceeding 15 mg/kg every 12 hours. When considering the use of molnupiravir, it is also important to note its mutagenic and teratogenic properties, and the observation of viral resistance observed in COVID-19 cases.

Use of molnupiravir should be reserved for:

- Cats failing to respond to treatment with GS-441524 (or remdesivir) despite adequate dosage;
- Cats relapsing after treatment with GS-441524 (or remdesivir) at adequate dosages;
- Regions where molnupiravir is the only antiviral legally available to veterinarians to prescribe.

EIDD-1931

EIDD-1931 is the active form of molnupiravir and is legally available for veterinarians to prescribe in some countries in a 60 mg tablet form. Our knowledge on the usage of EIDD-1931 is far less than for GS-441524. Similar to molnupiravir, it appears to be associated with more severe side effects than GS-441524, and also has teratogenic concerns (see 'Side effects of antivirals'), thus its use should be reserved for difficult cases and where it is the only antiviral legally available to veterinarians to prescribe in these circumstances.

Nirmatrelvir

Nirmatrelvir (Paxlovid™), a human-licensed protease inhibitor, can be prescribed legally by veterinarians in some countries. Because nirmatrelvir has a very short half-life, it is always given in combined with ritonavir (included in each box), which slows its metabolism by inhibiting the cytochrome P450 pathway. Nirmatrelvir has efficacy in vitro, especially when combined with other antivirals. Paxlovid™ is currently under prospective investigation for use in FIP, with anecdotal reports of success in highly refractory cases (especially neurological FIP) that have not responded to GS-441524 or molnupiravir alone. One of the authors (SC) is aware of 15 such cases, mostly neurological, where 13 improved rapidly following the addition of Paxlovid™ to the nucleoside analogue treatment. However, this remains unpublished and anecdotal data, so should be interpreted cautiously and used more as a last resort until additional research is available.

GC-376

GC-376 has shown promise in trials, potentially in combination with nucleoside analogues, but is not currently legally available.

Side effects of antivirals

- Remdesivir causes pain on subcutaneous injection in 50% of cats so this route of administration is not recommended unless it is the only option. In this situation, pre-treatment with analgesics (e.g., gabapentin, pregabalin, buprenorphine, topical EMLA anaesthetic cream, etc.,) is recommended. Following IV remdesivir administration, cats may seem depressed or nauseated for a few hours.

- Remdesivir, GS-441524, molnupiravir and EIDD-1931 may result in increases in ALT enzyme activity that do not require specific treatment (seen in ~30% of cats). Although some vets prescribe hepatoprotectants such as S-adenosylmethionine (SAME) supplements, the need for these has not been confirmed and so their use should be balanced with costs and ease of administering oral medication. Mild eosinophilia and lymphocytosis are also reported during treatment with nucleoside analogues, and do not require treatment. All side effects resolve on stopping medication.

- Molnupiravir and EIDD-1931 may cause cytopenias, mainly leucopenia due to a neutropenia, and occasional anaemia at higher dosages. They may occasionally cause hair loss, whisker loss and folding of the ears. All side effects resolve on stopping medication. Sub-clinical hyporexia and nausea are also suspected to occur more commonly. Maropitant has been used in such cases.

- When considering the use of molnupiravir, it is also important to note its mutagenic and teratogenic properties and viral resistance observed in COVID-19 cases. Staff/caregivers should wear gloves when administering this medication, and pregnant humans should avoid handling. Similar concerns exist for EIDD-1931. For these reasons, the authors recommend reserving molnupiravir and EIDD-1931 as second-line antivirals.

- Uroliths of GS-441524 have been rarely described, although not with legally available GS-441524 or remdesivir preparations, suggesting that their occurrence may be associated the higher (and often unknown) levels of antivirals found in black market formulations. It may be prudent to investigate any urinary signs including acute kidney injury that develop in cats being treated with these antivirals. Veterinarians are strongly encouraged to submit any uroliths for stone analysis and report current or recent antiviral use. If any crystals in urine appear that are atypical, please photograph these and contact fipadvice@gmail.com.

Duration of antiviral treatment

Most published treatment studies have used a 12 week/ 84-day antiviral treatment course, and this is still often used. Shorter courses of 6 weeks /42 days of oral GS-441524 at 15mg/kg q24hrs have been used successfully to treat cats with effusions in a recent study (Zuzzi-Krebitz et al., 2024). In this study, all cats were diagnosed and treated with antivirals very quickly, and were hospitalised for the first week of treatment for antiviral administration and supportive care; it may be that this intensive care at the start of therapy influenced the success of the shorter treatment courses.

These cats almost all responded to treatment very rapidly, with clinical (including effusion resolution), haematological and biochemical (including alpha-1 acid glycoprotein; AGP) values returning to normal in most cats within 4 weeks/ 28 days.

However, this is not true of all cats with FIP and hence treatment duration should be decided on the basis of the cat's response. Shorter courses may be suitable if treated cats respond rapidly, with resolution of clinical signs (including effusions) and normalisation of biochemistry abnormalities (including AGP) for 2 weeks recommended before stopping antiviral treatment e.g., normal values at 4 and 6 weeks to stop treatment after 6 weeks.

Cats should be closely monitored for relapse. Where AGP is not available, serum amyloid A (SAA) can be used but anecdotal reports suggest that SAA is very variable and not as useful as AGP in helping to decide if antiviral treatment can be stopped. Communication with caregivers should discuss that, currently, most published response rates and outcomes are for cats treated for 12 weeks/ 84 days.

Dosage and frequence of administration recommendations

With experience, and as yet unpublished data on therapeutic drug monitoring (TDM), dosage recommendations have increased for antivirals from initial FIP treatment protocols. However, one must remember that published evidence shows that over 85% of cats respond to the previously recommended drug dosages, which is still a great response. We believe that individual cats vary in their absorption of oral GS-441524, with those absorbing poorly possibly requiring higher dosages to achieve clinical and biochemical remission. It is important that dosage of oral GS-441524 is adjusted according to clinical response if needed.

Based on our collective experience, our recommendations are:

- The daily dosage of oral GS-441524 can be given once daily (q24h) or divided (split) twice daily (q12h);
- Some cats may benefit from q12h treatment to optimise serum levels of GS-441524, but this is not uniform;
- For cats that are challenging to medicate, and responding well, q24h treatment is acceptable;
- Higher dosages of oral GS-441524 (20 mg/kg divided into 10 mg/kg q12h) may overcome issues with poor absorption in some cats and have a better chance of crossing the blood brain barrier and the blood eye barrier in cats with ocular or neurological signs
- Some have used a standard dosage of 15 mg/kg/day q24h in all cats, regardless of clinical signs (Zuzzi-Krebitz et al., 2024). In this study all cats were hospitalised for intensive care in the first week of treatment and this may contribute to the success of this dosage of GS-441524;
- Dosage should be adjusted according to the clinical response of the cat and there can be variation in dosage required despite dosing for type of FIP

FIP TYPE	DRUG	DOSAGE
Effusion(s) without neurological or ocular signs	GS-441524 PO^	15 mg/kg q24h or split q12h†
	Remdesivir IV*/SC	15 mg/kg q24h
	Molnupiravir (EIDD-2801) PO	10-15 mg/kg q12hr
	EIDD-1931 PO	15 mg/kg q12hr**
No effusions and without neurological or ocular signs	GS-441524 PO^	15 mg/kg q24hr or split q12hr†
	Remdesivir IV*/(SC)	15 mg/kg q24hr
	Molnupiravir (EIDD-2801) PO	15 mg/kg q12hr
	EIDD-1931 PO	15 mg/kg q12hr**
Ocular signs present (+/- effusion)	GS-441524 PO^	20 mg/kg q24hr or split q12hr†
	Remdesivir IV*/(SC)	20 mg/kg q24hr
	Molnupiravir (EIDD-2801) PO	15 mg/kg q12hr
	EIDD-1931 PO	15 mg/kg q12hr**
Neurological signs present (+/- effusion)	GS-441524 PO^	10 mg/kg q12hr
	Remdesivir IV*/(SC)	20 mg/kg q24hr
	Molnupiravir (EIDD-2801) PO	15-20 mg/kg q12hr
	EIDD-1931 PO	20 mg/kg q12hr**

Table 1: Dosages of commonly used antiviral drugs according to type of FIP

^PO (orally) – give fasted with water bolus or tablespoon of wet food/treat, with a full meal at least 30mins later.

†Divided dose may improve plasma concentrations when using oral GS-441524 and is preferred by some authors, but q24h dosing remains highly effective and appropriate, particularly where compliance may be an issue. Additionally, GS-441524 at a standard dosage of 15 mg/kg q24h PO has been successfully used by one research group for all types of FIP, regardless of signs; it may be that the very prompt treatment, hospitalisation and intensive care of the cats given this one standard dosage contribute to the reported success.

**Slow IV (intravenously) – Give as constant rate infusion (CRI) over 30 minutes to 2 hours, can be diluted in saline.*

***These EIDD-1931 dosages are currently recommended for relapses; for first line therapy lower dosages may be considered as 20 mg/kg Molnupiravir = ~16 mg/kg EIDD-1931 hence consider reducing the dose by a 5th; but more studies are needed*

FIRST CHOICE OF ANTIVIRAL

Despite the continued evolution of treatment strategies, nucleoside analogues such as oral GS-441524 remain the preferred first-line therapy, with protease inhibitors serving as adjuncts for refractory, relapsed or severe cases not responding to adequate dosages of nucleoside analogues. Nucleoside analogues are well tolerated with few adverse effects and are better studied in terms of response compared to alternative antivirals.

As global access to legal antiviral formulations expands, the prognosis for FIP has improved dramatically, transitioning from an invariably fatal disease to one with a high likelihood of long-term survival, with survival rates often in excess of 90%, especially when compliance and supportive care are optimal.

MONITORING CATS, INCLUDING MEASUREMENT OF BODY WEIGHT

Cats should be re-examined after 1-2 weeks of antiviral treatment (sooner if not improving or deteriorating) and dosage adjusted depending on monitoring results (see 'Monitoring'). It is very important to weigh cats weekly during treatment, using accurate scales e.g., cat or baby scales (Figure 1). Weight gain and/or growth in kittens will occur with successful treatment necessitating an increase in dose to ensure that the dosage of antiviral administered is still appropriate for the type of FIP being treated as in Table 1. Not increasing the dose as the kitten grows appears to be one of the most common causes for a poor response to treatment, and treatment failure. However, if the cat's weight decreases as a result of resolution of effusions, the dose should not be decreased; maintain the same dose and adjust upwards if weight gain occurs.

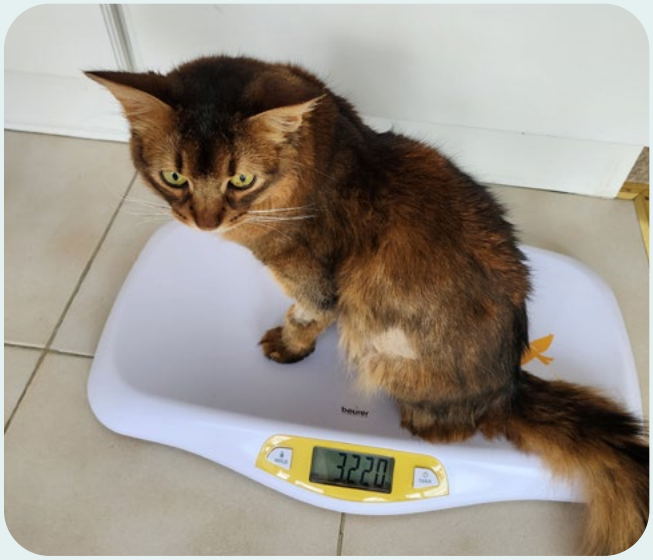

Figure 1: *It is important to regularly weigh cats being treated for FIP and adjust the medication dose*

What to expect during treatment

- In the first 2-5 days you should see an improvement in demeanour, appetite, resolution of pyrexia, and reduction in abdominal or pleural fluid (if present).
- More clinical signs attributable to FIP may be seen during the initial few days of treatment, i.e., before the medication has had time to take effect. This can include development or recurrence of pleural fluid which may require drainage (if the cat is at home, advise the owner to measure resting respiratory rate and respiratory effort). Neurological signs or uveitis may also develop (e.g., owners may notice a change in iris colour). If neurological or ocular changes are noted, the drug dosage should be reviewed in case an increase is indicated.
- See 'Comorbidities' for information on other conditions that could complicate interpretation of response and affect the success of treatment.
- Effusions usually resolve by 2 weeks. If an effusion is still present at 2 weeks, consider increasing the dosage (by 5-10 mg/kg/day and consider splitting into q12h doses if treated orally q24h).
- Serum albumin increases and globulin decreases (i.e., they normalise) may take several weeks, but note that globulins can initially increase when a large volume effusion is absorbed. In some cases, globulins may remain mildly increased, even at the end of a successful treatment course, and this mild hyperglobulinaemia has not been associated with relapse in our experience, if all other parameters have normalised.

- Lymphopenia and anaemia may take longer to resolve, up to 10 weeks. A lymphocytosis (and eosinophilia) can also occur during successful treatment (these are likely drug side effects).

- Enlarged lymph nodes (especially mesenteric) typically reduce in size over a few weeks of treatment; however, in some cases, they do not return to normal size or normal ultrasonographic echogenicity, even by the end of treatment. However, this does not seem to signify FIP relapse if all other parameters have returned to normal; treatment can be stopped as planned and the patient monitored.

- Some cats with neurological FIP have persistent neurological signs that can remain even after recovery from FIP. Neurological signs should be reassessed with repeat examinations and mild persistent, but stable, signs after 2-4 weeks may not indicate poor response if all other parameters have returned to normal and the cat is doing well.

Note on using antiviral treatment trials as an aid to diagnosis

In some situations, it is not possible to achieve a definitive diagnosis of FIP due to cost constraints, availability of testing, instability of the patient precluding invasive testing or the clinical signs being limited to the CNS and/or eyes. Antiviral treatment trials can be considered, using an appropriate dosage and objective measures to identify improvement e.g., serial neurological or ocular examinations. Improvements in demeanour and return of normothermia are expected within 48 hours, and add weight to the presumptive diagnosis. Note that effusions can take longer to resolve (see 'What to expect during treatment') and improvements in haematology and biochemistry abnormalities can also take weeks. Failure to improve on an adequate dosage of antivirals should prompt investigation for an alternative diagnosis. Most cats are notably better by 2-5 days; however, a small number of cats can take up to 10 days; that said, there have usually been some positive signs before then.

Ruling out other diseases remains important whenever possible, and especially when the treatment response is not as expected. Unfortunately, some cats may have FIP alongside another condition, such as lymphoma or low-grade septic ascites. These cats might show partial improvement with antiviral treatment, only to plateau later if the comorbid disease is not addressed. For this reason, it's essential to try and maintain as thorough a diagnostic approach as possible and avoid relying solely on treatment response to guide diagnosis, particularly in cases that don't respond as expected.

Monitoring during treatment

Clinical response is most important to monitor; a failure to improve may necessitate an increase in dosage (and review for alternative diagnoses or comorbid disease). Monitoring should be adequate to assess response but, particularly when the cat is doing well, repetition of costly tests that are unlikely to alter treatment (e.g., limiting testing to previously abnormal parameters and/or basic screens) and multiple, potentially stressful, clinic visits should be limited. Owners should be encouraged to weigh their cat at home (e.g., using inexpensive baby scales) and keep a diary of appetite and demeanour, resting respiratory rate and other parameters as indicated. **The recommendations below will change depending on the cat's response to treatment:**

- After 48 hours an improvement in demeanour and normothermia is expected. A verbal report of progress and ease of medicating the cat should be obtained around this time as it is essential that antiviral administration is effective.

- After 2 weeks, weight, demeanour, effusions (in-house scanning, abdominal girth measurement as an alternative for abdominal effusion monitoring) should be reviewed.

Additionally, serum biochemistry and haematology can be assessed, adapting to cost constraints as needed (e.g., consider whether measurement of total protein, PCV, and plasma colour assessment, using a spun microhaematocrit tube, could be used as a cost-effective and rapid initial screen to indicate whether additional testing is indicated).

Normalisation of serum acute phase proteins (e.g., AGP, if elevated before treatment) may be useful to predict remission. Normalisation of a previously abnormal serum albumin:globulin ratio (to >0.6) after 2-3 weeks is also encouraging.

If anticipating the need the 12 weeks/ 84 days of treatment, the cat should be re-examined after 6 weeks, and the above assessments repeated, with normal results (including AGP if possible) thereafter at 10 and 12 weeks before stopping treatment at 12 weeks. If intending to stop treatment earlier due to a rapid excellent response and medication compliance (please see note on 'Duration of antiviral treatment' above) earlier monitoring time points can be used; ideally, the cat should be normal on examination and blood assessments for 2 weeks before stopping treatment e.g., at 4 and 6 weeks to stop treatment after 6 weeks.

Stopping treatment and persisting abnormalities

Mild persistent hyperglobulinaemia and mild abdominal lymphadenomegaly are sometimes reported at the end of the treatment period and are not associated with relapse. If all other parameters are normal (including AGP if available) then treatment can still be stopped.

Point-of-care ultrasonography (POCUS) is a useful and cost-effective way to monitor effusion resolution and/or lymph node size (Figure 2). Persistent (stable) neurological signs (e.g., ataxia, urinary or faecal incontinence) have been noted in cats without any evidence of ongoing FIP and advanced imaging reveals persistent abnormalities without active infection/inflammation. Such cats reaching the end of the treatment period should have repeat neurological examinations, and if signs are stable and all other parameters have normalised, owners should be warned changes may be persistent and advanced imaging could be an option for investigation/confirmation, but generally treatment can be stopped without relapse of FIP.

Figure 2: *Point of care ultrasound is very useful for identifying effusions. Note the cat is allowed to adopt a comfortable position for the scan*

Monitoring after treatment

Once treatment is completed, cats should be monitored for relapse by their owners. Signs such as loss of appetite, weight changes, or other clinical signs should prompt reassessment. The clinical signs of relapse may differ from those at initial diagnosis (e.g., neurological signs may be seen in cats that previously had effusions). Ideally, the cat is examined ~4 weeks after stopping treatment, although stress needs to be minimised for the cat including visits to the clinic. Monitoring AGP may provide reassurance if it remains normal. Any clinical signs should be promptly investigated. However, relapses are uncommon (likely under 5%) and are extremely rare after a month has elapsed after antiviral treatment completion.

Additional supportive treatment for cats with FIP

- Cats with FIP have often lost weight and body condition so nutrition is a priority. Appetite stimulants such as mirtazapine (and/or capromorelin oral solution) may be useful and some sick cats may benefit from feeding tube placement short-term; this can also facilitate medicating. Since nasal tubes are poorly tolerated by cats and may cause depression, cats with profound anorexia that cannot be alleviated by the drugs above may benefit from an oesophagostomy (O-)tube being placed (Figure 3).

Figure 3: *Cats with FIP need additional support including feeding tubes for nutrition if inappetent*

- Drugs such as maropitant or ondansetron may benefit cats feeling nauseous and encourage eating.

- Occasionally, FIP can cause severe, sometimes immune-mediated haemolytic, anaemia (see 'Important comorbidities') and blood transfusion can be considered alongside antivirals.

- Generally, corticosteroids are not required in the treatment of FIP when giving antivirals. Cats with uveitis (intraocular pressure should be assessed in case of complications such as glaucoma) may need topical corticosteroids for the first 1-2 weeks; however, requirement for corticosteroids to control uveitis beyond this time-frame often suggests an antiviral dosage increase is needed. Cats with severe neurological signs occasionally require

short-term systemic corticosteroids (1-5 days) to reduce meningeal inflammation. Rarely, cats with FIP develop immune-mediated haemolytic anaemia (see 'Important comorbidities') and these cases often require systemic corticosteroids.

- FIP is likely a painful condition due to peritonitis, pleuritis, renal or liver capsular distension or ocular pain. If patients have normal renal function and hydration, a non-steroidal anti-inflammatory drug could be prescribed or opioid medication considered. Multimodal analgesia is needed for very painful cats with monitoring for efficacy (e.g., using the Feline Grimace Scale: https://www.felinegrimacescale.com).
- Cats with seizures may require treatment with antiseizure medications such as levetiracetam and phenobarbitone during antiviral treatment.
- Hepatoprotectants e.g., SAME, with or without silybin are not usually required, even in cats with ALT enzyme activity increases.

SUPPORTING CAREGIVERS

Giving medications orally to cats can be challenging and FIP treatment is life saving and essential. Caregivers should be supported with advice on how to administer oral medications at home, tips include:

- Discuss preferred formulations (liquids or tablets if both available);
- Advise how medications can be given, eg in a treat (liquid or pill 'putty' types, preferences can vary between cats, Figure 4);
- Advise that GS-441524 tablets can be crushed and mixed with a treat/small volume of favoured food;
- Avoid putting medications in a main meal as this can reduce food intake and lead to only part of the medication being consumed;
- Fast cats overnight before offering medication in a small amount of food in the morning, before the main meal (exceptions may be young kittens or cats grazing overnight);
- Demonstrate how to give tablets or liquids directly into the mouth if needed;

Figure 4: *Support caregivers in giving medication, for example using liquid treats*

- Follow up with caregivers after 24-48 hours via their preferred communication route (telephone, text, email) to discuss challenges and alternatives if necessary.

In the event of a poor response or relapse during treatment

Examples of this include recurrence or lack of resolution of effusion, pyrexia, development of new ocular or neurological signs, or persistent clinical pathology abnormalities (note persistent mild hyperglobulinaemia has been reported and not associated with relapse provided other parameters normalised [see 'Duration of treatment']). Firstly, ensure that you are still confident that the cat has FIP; review the diagnosis, look for additional pathology, and consider repeat sampling (e.g., external laboratory analysis and culture of any fluid; cytology or biopsy of lymph nodes ± feline coronavirus antigen or RNA detection by immunostaining or reverse-transcriptase PCR, respectively, but bear-in- mind that finding coronavirus is more difficult when the cat is on treatment). Reassess acute phase proteins; however, they can remain normal with relapse.

If relapse occurs during treatment; increase the dosage of GS-441524 (or remdesivir) by 5-10 mg/kg/day and consider splitting into q12h doses if treated orally q24h) and monitor as above, ensuring treatment is not stopped before the cat has been normal clinically and on clinical pathology results for at least 2 weeks. The increased dosage used will depend on the dosage the cat is on at the time of the relapse, the nature of the relapse and finances, but can be up to that recommended for neurological FIP (see Table 1) or even higher (please seek guidance when considering this). Similarly, if relapse occurs on

treatment with molnupiravir or EIDD-1931, consider switch to GS-441524 if available, or increase the molnupiravir or EIDD-1931 dosage to the maximum recommended (see Table 1), or consider nirmatrelvir, as discussed earlier under 'Treatment protocols'.

In the event of relapse after completion of treatment

Relapse is most likely to occur in the first month after completing treatment and may present differently to the original diagnosis (e.g., effusive case developing neurological signs). If relapse occurs after completion of treatment on GS-441523; restart GS-441524 (or remdesivir) course at a higher dosage (20 mg/kg/day; splitting oral GS-441524 into q12h doses); the optimum duration for repeat treatment is not known but 12-weeks repeat treatment has been used successfully. The increased dosage used will depend on the dosage the cat was previously treated with and the nature of the relapse, but can be up to that recommended for neurological FIP (see Table 1).

If the cat is already receiving a high dosage of GS-441524 (and/or TDM serum levels are adequate, if measured or available), consider switching to an alternative antiviral e.g., EIDD-1931, and seeking guidance (FIP advice email or your local feline specialist). If considering Paxlovid™ for a non-responding FIP case, a dose of nirmatrelvir 75 mg/cat plus ritonavir 25 mg/cat, q12h by mouth, can be considered alongside continuing nucleoside analogue treatment. Ritonavir may interfere with the metabolism of other drugs processed by cytochrome P450, so check for potential interactions before prescribing.

Important comorbidities

Ongoing research continues to refine the treatment protocols presented here. Clinicians should consider individual patient response, comorbidities such as immune-mediated haemolytic anaemia (IMHA) and sepsis, and the potential impact of emerging antiviral resistance.

Immune-mediated haemolytic anaemia IMHA

IMHA arises due to immune-mediated erythrocyte destruction and can be non-associative or associative with disease processes such as FIP. If associative IMHA is suspected, these cats should have positive saline agglutination test or Coombs' test when performed and ideally be also tested for retroviral infections and Mycoplasma haemofelis. Cats with associative IMHA often have moderate to severe anaemia and require corticosteroid therapy (~1-2mg/kg/day prednisolone with a fast taper as anaemia is resolving) and one of the authors (PC) also recommends starting clopidogrel for these patients (18.75mg PO once a day) to reduce the risk of thrombotic complications. If IMHA is diagnosed and treated early, these cats usually achieve remission as any other FIP cat.

Myocarditis

As more cats are being treated with antiviral drugs instead of being euthanized, new disease processes that may be associated with FIP are being recognized.

This includes the development of myocarditis and myocardial injury, which have also been documented in humans and animals with SARS-CoV-2. Cats with FIP can present with elevations in serum cardiac troponin and wall thickening on echocardiography, both of which could be suggestive of myocarditis and/or myocardial injury; however, antiviral therapy may reduce active myocarditis in cats with FIP and most of these cats have normal troponin levels at the end of the therapy. Symptomatic cardiovascular treatment (including pimobendan, clopidogrel, furosemide or atenolol) have been used concurrently with antivirals, to good effect.

Prognosis

Response rates are greater than 85%, with cats that respond rapidly (e.g., returning to completely normal within 30 days) having a better overall response.

Some cats fail to respond to antiviral treatment, often deteriorating in the first 2 weeks; some cats may be too sick for the antivirals to work, although intensive care alongside prompt intravenous remdesivir, as well as addressing comorbid disease, can result in a successful outcome.

Relapse is uncommon (<10%) but tends to occur in the first month after stopping treatment. Survival times are long (although we are all still learning about this) with late relapses (or reinfections) rarely reported. Since the drugs have only been available in the last few years, we don't yet know if cats that appear to be cured stay that way lifelong, although results so far are very encouraging.

NEUTERING, PARASITICIDE TREATMENT, AND VACCINATION DURING OR AFTER TREATMENT FOR FIP

Neutering is ideally performed from a month after treatment is completed if the cat has responded well. However, if leaving the cat unneutered is causing stress (e.g., attempts to escape or distress for queens in oestrus "on heat") then neutering during treatment can be considered if the cat is doing well on treatment with at least another 2-4 weeks of treatment remaining if possible. There is no contraindication to routine worming or flea treatment for cats on antiviral treatment for FIP.

No information is available on response to vaccination of cats receiving treatment for FIP. Prospective studies are needed but analysis of treated cases suggests that cats can be safely vaccinated after or during successful treatment without causing relapse of FIP. Given unknown effects of antivirals on live vaccination efficacy, vaccination is ideally postponed to one month after completion of treatment (and to avoid any vaccine reaction being confused with relapse). Vaccinations should be given as recommended for the cat depending on its environment and risk (see WSAVA or ABCD Vaccination Guidelines). If urgent vaccination is needed during treatment, due to a high risk of infectious disease, then they should only be given if the cat is clinically well.

If veterinary visits and procedures are necessary, clinic stays should be minimised and Cat Friendly Clinic protocols and handling implemented to reduce stress to the cat.

Treatment with feline interferon (IFN), polyprenyl immunostimulant, or mefloquine

Combinations of IFN omega, polyprenyl immunostimulant, and/or mefloquine have been used in the period following the end of treatment with GS-441524 (or remdesivir) in some cats. However, currently, there is no evidence to suggest they are needed as high response rates of over 85% are seen without these adjunct treatments.

Mefloquine has also been used to treat cats with FIP when cost constraints absolutely prohibit the use of a full course of, or increased dosage of, more effective antivirals such as GS-441524. Studies are needed to evaluate its effectiveness but it should only be used when absolutely no alternatives are available as GS-441524 is known to be very effective, and far more effective than mefloquine.

Therapeutic drug monitoring

Therapeutic drug monitoring (TDM) of oral GS-441524 and acute phase proteins
TDM is available currently at University of Edinburgh in the UK. Cats are sampled after 3-5 doses of starting the oral GS-441524; ideally 1.5ml serum and 0.5ml EDTA should be taken at peak (2-3 hours post-dose) or trough (9-12 hours post-dose) times after GS-441524 is given. More published studies are required to show that TDM results correlate with clinical response; but in an unpublished study of 104 cats treated with GS-441524 and TDM used for dose optimization, 100% were alive after at least 6 weeks of treatment; with the cats being followed for 2 years.

Monitoring acute phase proteins

Acute phase protein (APP) measurements of AGP and SAA are often high when FIP is diagnosed and normalize in most cats while on antiviral treatment.

More studies are needed to evaluate the use of APPs in monitoring and identifying relapses, as often cats with relapsed FIP will not have increase APPs, although normalised AGP measurements for 2 weeks before stopping antivirals are encouraging.

Email Rachael Hammond (Rachael.Hammond@ed.ac.uk) for information on submission for TDM and APPs.

Results can allow adjustment of GS-441524 dosage or frequency of administration. Note: TMD and APP measurements are not widely available in many countries at the moment and more studies are needed to evaluate their efficiency.

FIP Frequently Asked Questions (FAQs)

These FAQs are based on questions submitted to the FIP advice line email – a service, founded by Dr Sam Taylor, that provides advice free of charge to vets to raise their confidence in the treatment of cases of FIP as our knowledge of antivirals emerge and develop. The goal is to increase access to care for cats with FIP. Around 4000 emails have been answered to date by the team.

How long do I treat with GS-441524 antivirals?

- Most published evidence is with 12 weeks/84-days of GS-441524
- Response rates with 12 weeks/84-days of recommended dosages are > 85/90%
- Evidence is emerging for successful outcomes with shorter courses e.g., 6 week/42-days of oral GS-441524
- Shorter courses are more affordable & easier for the cat and the owner
- Note that successful 6 week/42-day courses are primarily described in cats with predominantly effusive disease that respond very quickly to treatment - so consider using shorter (< 12 weeks/84-day) courses in cats with effusions which respond rapidly to treatment (i.e., normalised clinical signs and blood test results by 28-days of treatment)

How do I know when I can stop GS-441524 after a shorter course?

- Rapid resolution of clinical signs, within 28-days
- Normal biochemistry - useful to look for an albumin:globulin ratio (A:G) of > 0.6
- Two normal serum alpha-1-acid glycoprotein (AGP) measurements 2 weeks apart before stopping treatment are encouraging; serum amyloid A (SAA) measurements can be used if AGP is not available, but may not be as reliable, giving falsely elevated results

What dosage of oral GS-441524 should I use?

Some clinicians adjust the oral GS-441524 dosage dependent on signs seen with FIP:

- No ocular or neurological signs ± effusion 15 mg/kg q24h (or 7.5 mg/kg q12h)
- Ocular signs ± effusion 15-20 mg/kg q24h (or 7.5-10 mg/kg q12h)
- Neurological signs ± effusion 10 mg/kg q12h
- Some cats absorb GS-441524 better with q12h dosing c.f. q24h dosing, hence the option to split the dose and give q12h; worth considering if response to treatment is less than expected

Other clinicians use a standard oral GS-441524 dosage regardless of the signs seen with FIP:

- Any FIP presentation 15 mg/kg PO q24h. This dosage is largely based on the treatment of FIP with effusions, usually without neurological or ocular signs, although cats with such signs have also responded. Additionally, the published study reporting results with 15 mg/kg PO q24h GS-441524 treatment hospitalise the cats for the first week of treatment, allowing prompt antiviral medication with intensive supportive care, and this may influence the success rate

What formulation of GS-441524 should I use?

The first successful treatment studies used injectable GS-441524, but most evidence in recent years has been based on **oral GS-441524**, which has shown great success

Oral formulations can be cheaper but importantly, injectable medications are associated with more adverse effects (especially pain on injection). The prodrug to GS-441524, remdesivir, is available as an injectable agent; it was commonly used a few years ago as it was the only antiviral available in some countries but its cost and pain on subcutaneous injection mean that oral GS-441524 is more commonly used, whenever available. It is best to keep injectable remdesivir only for initial intravenous use in cats that are too weak to swallow oral medication. Tablet and liquid formulations of GS-441524 are variably available. **The liquid formulations are favoured by some:**

- Easier to administer to some cats (i.e., often voluntarily accepted in small amount of a high value treat)
- Easier to dose accurately (potential for cost saving in the long-term)
- Unpublished studies suggest that some cats absorb GS-441524 better when administered as a liquid suspension (c.f. as a tablet); worth considering if response to treatment is less than expected

What progress should I expect to see with successful GS-441524 treatment?

Fever, lethargy, altered demeanour, anorexia, and effusions >> improve by 2-5 days
Effusions >> usually resolve by 14 days

- During initial treatment, effusions may worsen before improving
- Monitor for dyspnoea & be prepared to drain if it occurs
- Serum globulin may increase initially due to effusion reabsorption; A:G ratio normalises over several weeks (look for A:G ratio > 0.6)
- Bilirubin should be reducing within 7 days if elevated and normalize by 21 days
- AGP may increase in some cases in the first week; however, it should be decreasing in all cases by week 2. With successful treatment, it is usually normal by 28 days
- Mild hyperglobulinaemia & mild abdominal lymphadenomegaly can persist at the end of treatment - this doesn't seem to be associated with FIP relapse

What if the progress is not as expected?

For example:

- Effusion still present > 14 days
- Persistent pyrexia
- Development of neurological signs or uveitis
- Persistently increased AGP (or SAA)

Note that the following alone do not indicate treatment failure:
- Globulins increase during early treatment due to reabsorption of effusions
- Mild lymphadenopathy (on abdominal ultrasonography) and mild serum hyperglobulinaemia may persist

Troubleshooting if response is not as expected:

Ensure given dose reflects:
- Any weight gain experienced during improvement - the GS-441524 dosage needs to be maintained despite weight gain, meaning doses will need to increase
- The manifestation of FIP (i.e., following the development of neurological signs or uveitis, higher dosages may be needed)

Consider:
- Increasing dosage by 5 mg/kg/day
- Splitting dosing q12h (if giving q24h)
- Switch to oral liquid suspension (if on tablets) in case this is better absorbed

Reconsider the diagnosis of FIP - how sure were you of the diagnosis before starting treatment? Consider differential diagnoses for FIP - shown in ABCD tool

How can the caregiver help?

- The role of the caregiver is very important
- Keep stress to a minimum
- Weigh the cat regularly and accurately at home
- 1-2 x/week - with guidance on thresholds that would indicate when dose adjustments are needed
- Use paediatric/baby scales for accuracy (particularly important in growing kittens) - caregiver can purchase a set for regular use at home
- Offer a balanced diet suitable for their life stage
- Look out for other signs developing e.g., ocular signs, such as change in the colour of the iris
- On discharge/dispensing of medication, discuss the owner's ability to administer medication, the cat's appetite, activity, clinical signs, and the importance of weighing regularly

Regular contact with the primary care clinic via verbal updates:

- After 48h of treatment (within normal working hours) - then as dictated by response
- Contact clinic immediately if unable to administer medication, inappetent, or if any new clinical signs appear

Do I need to avoid corticosteroids during treatment?

Ideally yes, but if the cat **needs** corticosteroids give them! A recent abstract study presented at ECVIM 2024 found that prednisolone (0.5–2 mg/kg/day) did not impede short-term recovery, nor survival, in cats with FIP receiving GS-441524 treatment

Examples of FIP-related conditions / clinical signs that may need corticosteroids are:

- Uveitis (topical corticosteroids are usually adequate)
- Immune-mediated haemolytic anaemia (IMHA; usually characterised by a worsening, often non-regenerative, anaemia despite antiviral treatment, with a positive in-saline agglutination test or Coombs' test) after ruling out other 2° causes of IMHA such as haemoplasmas and retroviruses
- Severe neurological signs such as those associated with raised intracranial pressure

The cat may also have concurrent disease that is not FIP-related but for which corticosteroids are needed e.g., inflammatory bowel disease/chronic enteropathy, lymphoma, asthma (inhaled corticosteroids are preferred, ideally fluticasone)

Do I need to give immunostimulants with antivirals?

There is **no evidence** to support the use of immunostimulants alongside direct-acting antivirals in the treatment of FIP. Remember, >85/90% cats respond to antivirals like GS-441524 without immunostimulants being given

Why do some clinicians advocate the use of immunostimulants?

A multimodal approach to FIP treatment does sound sensible and immunostimulants have been used in human medicine alongside antivirals in the management of systemic viral diseases
(e.g., infectious hepatitis)

Before effective direct-acting antivirals were available, immunostimulants had been used alone for treatment of FIP, with some - albeit very limited - efficacy

Controlled studies are needed as it may be that immunostimulants could be useful in a proportion of cases, likely as adjunctive treatment

If recommending immunostimulants, as an adjunctive agent, consider the evidence-base, the cost they add to protocols, and the potential increase in caregiver burden

What about using mefloquine?

Mefloquine is a cheap, readily available drug used to treat malaria in people
It also has antiviral properties; but its antiviral effects are far, far less than GS-441524
It is given orally with food to reduce the risk of vomiting - severe nausea is common, even if given with food, and may require maropitant and/or ondansetron as per anecdotal evidence

Dosages used in cats have varied in different studies:
• 62.5 mg 2-3x/week
• 10-12.5 mg/kg 2x/week
• 4 mg/kg PO q24h

Occasionally, mefloquine has been used if a caregiver cannot afford more effective antivirals or if antivirals have to be given for a shorter period of time than is ideal due to cost or compliance - in which case mefloquine has been given for a period of time after stopping antivirals

However, no controlled studies exist to show its use as a single or adjunct treatment

Do we give any supplements or change the diet of cats with FIP?

No specific supplements nor special diets are needed during FIP treatment; however, cats with FIP are often in reduced body condition at diagnosis. Hence, an **energy dense, easily digestible diet** appropriate for their life stage is indicated

For cats with poor appetite, antiemetics (e.g., maropitant) and appetite stimulants
(e.g., mirtazapine) may improve voluntary food intake

Anorexic cats may benefit from an oesophageal feeding tube (medications can also be given via the tube)

What about supportive care for cats?

Some cats are very unwell at diagnosis and will need to be hospitalised for **fluid therapy and other intensive care**

Hypoglycaemia and hypotension may need to be addressed with dextrose infusions and vasopressors, respectively

Cats with **severe neurological signs and seizures** may need antiepileptic treatment; corticosteroids may be needed if increased intracranial pressure is suspected

Many cats with FIP will be in pain because of inflammation (e.g., uveitis, peritonitis, pleuritis, hepatic or renal capsule distension) &/or increased intracranial pressure. Analgesia should be provided

Antiemetics, such as maropitant, may help support adequate food intake

Cats with **uveitis** will, initially at least, need topical corticosteroids, with intraocular pressure measured in case of glaucoma development

I think I have IMHA in association with FIP – how do I diagnose and treat it?

Although relatively uncommon, we are recognising cases of associative (secondary) immune-mediated haemolytic anaemia (IMHA) with FIP (both with and without effusions). Anaemia is usually moderate, and non-regenerative in type despite the haemolytic cause. To diagnose IMHA with FIP, cats should have a positive in-saline agglutination test or Coombs' test, and other causes of associative IMHA, particularly haemoplasmosis by PCR, and retroviruses, should ideally be ruled out. IMHA tends to be recognised by cats developing a worsening anaemia, sometimes after starting antiviral therapy. Some also have a thrombocytopenia

Most cats with IMHA associated with FIP need corticosteroid treatment despite the FIP disease responding well to antivirals. Start with a low prednisolone dosage of 1 mg/kg/day PO (can increase to 2 mg/kg/day if inadequate response upon rechecking haematology after 1-2 weeks). If a good response to treatment occurs (resolution of anaemia, often within a month), the prednisolone can be tapered by 50% every 2-4 weeks. If possible, try to stop the prednisolone by the time antivirals are finished. Most cats (around 75%) respond well to treatment but relapses can occur, despite successful treatment of the FIP, necessitating longer term corticosteroids

Some vets also use clopidogrel to prevent clots because both FIP and IMHA can cause hypercoagulable states, but studies have not been performed to confirm that this is needed as adjunct treatment

How do I prevent FIP from developing in in-contact cats?

FIP is usually a sporadic disease and in-contact cat(s) remain well. Very uncommonly, FIP is subsequently diagnosed in in-contact cats (particularly if the in-contacts are young and genetically related to the cat with FIP)

In-contact cats cannot "catch FIP" from living with a cat that has FIP. Attempts to prevent transmission of any feline coronavirus (FCoV) currently shed in the FIP cat's

faeces are unlikely to reduce the risk of disease, as well as being very difficult to achieve in practice and could contribute to stress. Of note:

- It is likely that in-contact cat(s) have already been infected with the same form of ("enteric") FCoV that originally infected the intestines and intestinal tissue, and was shed by the cat that went on to develop FIP
- It is believed that FIP develops, in most cats, following a series of viral mutations within the extra-intestinal tissues of a FCoV-infected cat. It is also believed, because of these mutations, that these FIP-associated FCoVs are not readily shed in faeces
- Note that an exception to this are the very rare FIP outbreaks, such as that in Cyprus and in some larger rehoming shelters, when horizontal transmission of FIP-associated FCoV may have occurred, usually in association with high cat density and increased stress

As stress is thought to 'facilitate' development of FIP, it makes sense to **minimise stress in the household** as much as possible, especially if in-contact cats are < 2 years &/or siblings (due to age & genetic influences on pathogenesis of FIP). This includes keeping groups of cats stable, having adequate resources (food, water, toileting, sleeping, hiding areas and scratching posts) and environmental enrichment

Shall I treat in-contact cats that don't have FIP with antivirals?

No
Although antivirals may help reduce FCoV shedding and treat some cats with intestinal disease (e.g., diarrhoea), there are some very important reasons why **we do not recommend you use antivirals like GS-441524 in cats that do not have confirmed (or highly likely) FIP**

- Antimicrobial stewardship includes preserving usage of antivirals for when they are needed i.e., for treatment of the life-threatening disease (FIP in this case)
- We are concerned of the potential risk of inducing resistance through overuse of antivirals, often at low-doses, especially in healthy cats shedding FCoVs or those with only mild intestinal signs
- As FCoV is ubiquitous, it is very difficult to eradicate long-term from a group of cats, with re-infections likely
- Additionally, evidence of continued faecal shedding of FCoV in cats with FIP in the face of oral GS-441524 treatment is also emerging, questioning the consistent efficacy of FCoV clearance with treatment

Do I need to isolate a hospitalised cat with FIP / undergoing treatment?

No
Normal infection control & hygiene precautions are sufficient in a ward housing a cat undergoing diagnostic investigations and/or treatment for FIP

Cats with FIP are unlikely to be shedding FIP associated FCoV in their faeces. The viral mutations that occur de novo within FCoV-infected cats that lead to FIP usually limit their ability to infect the cells that line the intestines and consequently shedding in faeces and horizontal transmission is unlikely (although may happen very rarely in FIP outbreaks such as in the Cyprus FIP outbreak)

FCoV is an enveloped virus, so it is quite fragile and can be neutralised by regular disinfectants / hand soaps. However, as it can survive in organic matter (e.g. faeces) for a few weeks it is important to clean before disinfectant use

Can I treat a cat with coinfections or comorbidities?

Yes
Evidence is emerging that cats can still have favourable response to treatment, and addressing comorbidities is likely to be an important factor in the success of treatment. But be aware of longer-term prognosis of cats with concurrent FeLV infection

- Abstract ECVIM 2024: No difference between cats with and without coinfections (e.g. feline herpesvirus, retroviruses) in the success of antiviral treatment for FIP
- Abstract ISCAID 2024: FeLV-positive cats responded to antivirals similarly to FeLV-negative cats in initial 6-month period but after this period there was progressive mortality in the FeLV-positive cats, but no further mortality in FeLV-negative cats i.e. they saw the 'expected' progressive mortality with FeLV infection

Can I neuter a cat during or after treatment for FIP?

Yes
Ideally, **wait ≥ 4-weeks after completing antiviral treatment** (to check for relapse once medication has been discontinued, although uncommon)

If delaying neutering is not an option, neutering while on treatment is possible once they are clinically normal:

- e.g., because the stress of not neutering (e.g., behavioural consequences of oestrus) or risk of pregnancy is greater than the potential stress of neutering
- e.g., in a rehoming situation
- Timing - ideally neuter 2-4 weeks before due to complete the antiviral treatment (so that the antiviral is still being given as the cat recovers from the neutering and any stress involved with this)
- Ensure neutering is performed in a cat friendly clinic and manner - think about reducing stress when travelling to clinic, use of anxiolytics, analgesics (including local analgesia blocks) and minimise hospitalisation time

Can I breed from a cat that has had FIP?

No
There is a significant genetic component (Foley & Pedersen 1996, suggested >50%) to the susceptibility for the development of FIP following FCoV infection

We advise against breeding from cats that have survived FIP, instead they should be neutered

Can I vaccinate a cat during or after treatment for FIP?

Yes
If the cat is clinically normal & vaccination is indicated i.e., there is a risk of infection from the infectious agents that vaccines protect against

- Ideally, ***wait ≥ 1 month after completing antiviral treatment*** (to check for relapse once medication discontinued, although uncommon)

- **If delay is not an option, vaccination while on treatment is possible;** however, we have no data on vaccine efficacy when given during antiviral treatment (theoretically possible that some antivirals may affect replication of live vaccines e.g., FCV) although failure of vaccines given in this period has not been reported to our knowledge either

- Important to **assess the risk profile of the cat** (vaccination history; indoor/outdoor; in-contacts) to decide on which vaccines are indicated. The WSAVA, FelineVMA, and ABCD provide guidelines to guide you in the risk assessment for vaccination need. Measurement of feline panleukopenia/parvovirus antibody titres is an option to decide if a vaccine containing this agent is needed

- As always, minimise stress by using Cat Friendly Clinic techniques

Can I give flea and worm prevention?

Yes
Many cats have been treated without problems, prescribe in accordance with their risk profile for infection with parasites

FURTHER READING

Diagnosis of FIP
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Information on feline coronavirus and FIP - link to unabridged pdf is at bottom of this webpage
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Unregulated antiviral agents
Kent AM, Guan S, Jacque N, Novicoff W, Evans SJM (2024): Unlicensed antiviral products used for the at-home treatment of feline infectious peritonitis contain GS- 441524 at significantly different amounts than advertised. Journal of the American Veterinary Medical Association 262 (4) 489-497.

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