



Companion Animal Mycobacterial Infections: Owner Information

This advice sheet is designed to help you following a diagnosis of known, or suspected, mycobacterial disease in your cat. The most common mycobacterial disease of UK cats is tuberculosis (TB), which can be caused by two different bugs: *Mycobacterium bovis* or *M. microti*.

There are many other mycobacteria that can cause disease in cats and while these may appear similar to TB, they can need different drugs to treat them, be different in how easy they are to treat and what precautions should be taken. It is therefore important to know which bug is causing disease in your cat.

The greatest risk of owners becoming infected from their cat is from those infected with *M. bovis* that has a wet lesion, scar or wound that is dripping pus. These pose a risk to both other animals in the household as well as owners.

Fortunately, cats do not appear to get disease with *M. tuberculosis*, the main cause of TB in humans. If we did identify *M. tuberculosis* infection in a cat, we would strongly suggest its euthanasia, given the high risk to human health.

Treatment

Around 80% of cats with mycobacterial disease will go into remission if they are treated properly. Unfortunately, we cannot definitely say that these cats are cured as some cats will relapse in the future but thankfully the number is very small (only about 1%). We have most success with cats that have a skin mass or lump (Pictures 1a and 1b), even if the infection has spread to the lungs.



Picture 1a: This 4-year-old male cat had a sore, ulcerating skin mass above his ankle which was diagnosed as tuberculosis (*Mycobacterium microti*).



Picture 1b: This is the same cat after two months of treatment with rifampicin, azithromycin and pradofloxacin, showing marked improvement of the skin lesion.

The most common treatment we recommend consists of three drugs, used for at least 3-6 months, but in some cases we may need to treat for longer. The drugs used to treat TB in cats include some of those that are used for treating TB in humans. While trade names of products vary, the active drugs are the same. Most of the time we use a combination of three antibiotics to treat mycobacterial infections in cats. All three of these drugs belong to different classes of antibiotic and work in different ways. Our typical combination includes:

- Pradofloxacin (sometimes called by the trade name Veraflox)
- Azithromycin (sometimes called by the trade name Zithromax)
- Rifampicin (sometimes called by the trade name Rifadin)

We can now get capsules that contain both azithromycin and rifampicin together.

Pradofloxacin is an antibiotic that is used for a wide range of bacterial infections in cats, including skin and respiratory infections. It is a very safe drug. When using it to treat cases of TB we do sometimes use higher doses than is used for other conditions. Side effects are often related to this increase in dose. As with most antibiotics, pradofloxacin can cause mild gastrointestinal side effects (nausea, vomiting & diarrhoea). As we use this drug at high doses for a long duration, it can result in reduced numbers of certain white blood cells. These cells are important for fighting off infections, but because these cats are on a combination of antibiotics that will have activity against most bacteria, the low white blood cell count should not be a problem. This is reversible, and once this drug is finished the cell count will return to normal.

Azithromycin is a different type of antibiotic that is usually used for treating nasal and lung infections in cats. It also has good activity against a number of other bacteria, including mycobacteria. Similar to pradofloxacin, it is an antibiotic and so can also cause mild gastrointestinal signs (vomiting and diarrhoea). In humans, there is some concern with azithromycin causing heart

problems, however the evidence for this is mixed. If your cat has a history of heart disease, it may be advisable to discuss this with your vet and they may consider using an alternative drug.

Rifampicin is also an antibiotic. This is a key drug for treating TB, both in cats and people. It can target bacteria that are not active and are “hidden” from the other drugs. However, it does have a lot of potential side effects, which appear to be dose-dependent *i.e.* the higher the dose, the greater the risk of developing side effects and the more severe they can be. We think we see some degree of side effects in up to one third of cats. Despite this, it can be safely used provided we carefully monitor cats being treated with this drug. The side effects include:

- **Liver effects:** this drug can cause liver damage, the side effects from which can show in many different ways and affect many different body systems. The most severe side effect would be liver failure; this is incredibly rare in cats. We advise careful monitoring of liver enzymes, an indicator of liver damage, before starting treatment with this drug and then at any subsequent point when your cat appears unwell.
- **Gastrointestinal effects:** as for azithromycin and pradofloxacin, rifampicin can cause vomiting, diarrhoea, nausea, and a reduced appetite
- **Skin:** some cats can have skin reactions to rifampicin, which may present with itchy crusting sores, redness or swelling (Picture 2).
- **Nervous system:** An increased sensitivity to touch may be noticed in some cats, and their skin may start to twitch. More severe signs associated with the nervous system (seizures) are very rare indeed, but if they occur contact your vet immediately.
- **Other:** rifampicin can result in red or orange discolouration of different bodily fluids – saliva, tears, urine – which may appear alarming, but it is not serious.

These are the most common drugs we use to treat TB and other mycobacterial infections in cats. Alternative drugs that may be prescribed include **clarithromycin** (this is very similar to azithromycin) or **doxycycline** (some forms of this drug can cause inflammation of the oesophagus, the tube that carries food to the stomach, so this drug should be given with food or water). In very rare circumstances we may use **ethambutol** (this can cause blindness in rare cases) or **isoniazid** (uncommonly this drug can cause liver damage, seizures, and/or nerve-derived altered sensation). Because of these potential side effects, these medications are reserved for cases not responding to conventional treatment.



Picture 2: this Sphynx cat was being treated with rifampicin, azithromycin and pradofloxacin for *M. bovis* infection. Note the two areas of crusting on the ear and the surrounding redness. This is a classical side effect of rifampicin, and the ears are often affected (image courtesy of Paula Valiente Diana MRCVS).

If you do notice any potential side effects, please contact your vet immediately. It may be necessary to reduce the dose or stop some antibiotics completely.

However, some side effects can be managed with other drugs: **chlorphenamine** (Piriton) is an anti-histamine that can be used to manage itchiness or swelling, and **hydrocortisone** spray is a locally acting steroid which is also very useful for itchiness. To help reduce the risk of liver damage, **SAMe** may be given. Another drug currently being investigated for its liver protection capacity is a drug called **NAC**, and it may also have some activity directly against mycobacteria.

Oesophagostomy Tubes

Treating cases of TB, and other mycobacterial infections, can involve very long courses of antibiotics, potentially upwards of six months. For some cats, and owners, this can prove to be very difficult and stressful. To facilitate giving antibiotics, your vet may place an oesophagostomy, or O-tube (Picture 3). This is a tube that goes directly into the oesophagus (the tube from the mouth to the stomach) and can be used for both feeding cats that have a poor appetite, as well as giving medication. These are tolerated well by cats and allows them to have good quality of life while being treated, even going outside.

It is important to keep the O-tube clean and well maintained. Your veterinary team should be able to provide you with guidance on how to keep the O-tube in good condition. If there are any signs of infection (pus, swelling, or redness) around the site of the O-tube you should contact your vet. The tube should always be flushed before use to make sure it is not blocked.

Home Health & Safety

The following are some useful key points to consider when taking care of your pet at home:

- Maintain minimal contact with your cat until any draining lesions are completely dry and healing, or productive coughs have resolved.
- Adopt stringent hand hygiene measures, using the WHO hand wash technique (as for COVID-19) for effectiveness, before and after handling your cat
 - This should take at least 20 seconds and use water and soap
 - If water and/or soap are not available, use an alcohol-based handrub
 - Please use the following link for further information: <https://www.nhs.uk/live-well/healthy-body/best-way-to-wash-your-hands/>
- Wear disposable gloves for all forms of contact in this initial time period *i.e.* until any moist areas dry up
- Use separate feeding bowls and litter trays, and disinfect after use – bleach at standard dilutions for at least 30 minutes is sufficient to kill mycobacteria
- Ideally, keep the affected cat isolated from other animals and people until a definitive diagnosis has been reached, or treatment has been started and maintained for at least two weeks, and all wet wounds have resolved
- Keep the cat in a warm, dry, ventilated and easy to clean area
- Disinfect and clean bedding on a high wash, using biological detergent, before being touched/used by other animals or people
- For any oral medication, use liquid drugs or use a pill popper if using capsules or capsules – do not give by fingers; alternatively, consider having an O-tube placed

- If your cat is actively coughing, wear a respirator when in the same environment

If the patient had any wet lesions, once these become dry the risk of infection to others greatly reduces. After two weeks on appropriate antibiotic treatment, the patient is considered non-infectious.

The risk of infection being transmitted from cats to people is incredibly rare; only 6 cases have been recorded in 150 years, and all of these were cases of *M. bovis*, where cats had wet wounds dripping pus. However, if you have any of the following signs, please consult your GP:

- Persistent cough lasting longer than 3 weeks especially if you have bloody phlegm
- Weight loss
- Night sweats
- Fever
- Loss of appetite
- Swelling in the neck

You may be advised to go for further testing if indicated and treatment can be given if deemed necessary.