

CHRONIC COUGHING IN CATS Part III: Treatment

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1. Management of bronchopulmonary disease:

The treatment of chronic bronchopulmonary disease aims at the control clinical signs rather than to achieve a cure. Therapy should be tailored to each individual case. The aims are to:

- Alter life-style
- Reverse bronchoconstriction: (β -adrenergic agonists, theophylline)
- Reduce inflammation: (corticosteroids, antibiotics, anti-serotonergics, leukotriene receptor antagonists)

Alter life-style:

A marked improvement in the cat's well being can often be achieved by reducing its exposure to airway irritants (smoke, cat-litter, aerosol, dusty environments, sudden changes in temperature), preventing its access to drugs that can cause bronchoconstriction (β -blockers, aspirin), avoiding stressful events and, for obese cats, instigating a weight loss program.

Medical therapy:

The first line of medical therapy is to treat any infection and give a bronchodilator. It is only if this does not work, or when the disease is more severe, that corticosteroids are added. While oral medication has previously been the main-stay of treatment, inhaled medications are now being used more widely, particularly in more complicated cases. Their major advantage is their general lack of systemic side effects. That said, it is important to remember that few medications (oral or inhaled) have been scientifically trialed in cats, and even fewer have undergone long-term studies.

Inhaled medication (approximate prices as of January 2003):

While the successful use of an inhaler, drug-chamber and small face mask does take a little practice by the owner and the patient, many cats do very well on inhaled medications. (It is best to have the owner introduce the mask to the cat at home, rather than in the clinic, as this leads to more rapid acceptance). The AeroKat Chamber (~£30, €39), see later for details) has been specifically designed for cats and is the preferred choice (Figure 18a). While the Babyhaler or Paediatric Volumatic chambers from Allen & Hanburys can also be considered, they usually require higher doses of medication. (These chambers are cheaper; ~£10, €13, but the higher drug dosages soon accumulate costs) (Figure 18b).

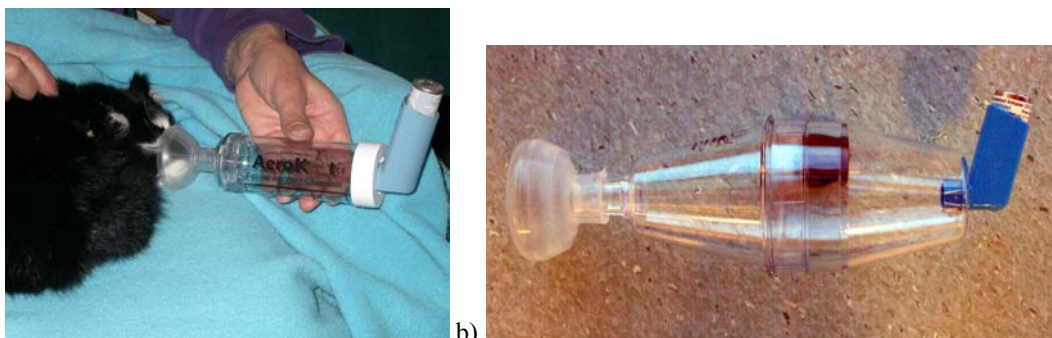


Figure 18. Small face mask, drug administration chamber and salbutamolmetered dose inhaler (MDI). a) The AeroKat Chamber has been specifically designed for cats and is the preferred choice. b) Paediatric Volumatic chamber from Allen & Hanburys can also be considered, but requires higher doses of medication.

Suggested treatment regimens:

Mild cases: *Salbutamol* (100 mg metered dose inhaler [MDI] ~£3, €4), give one dose (one puff), as needed.

Moderate cases: i.e. clinical signs are occurring on a daily basis.

Salbutamol, 1-2 doses, 2-4 times daily.

Inhaled steroids may also be required:

- *Fluticasone* has been used most frequently in cats. It is very expensive, 125 mg MDI (~£40, €52): 1-2 doses, twice daily.
- *Beclomethasone* may be considered as an alternative. 100 or 200 mg MDI (~£15, €20): 1-2 doses, twice daily.
- *Qvar* is a form of *beclomethasone* that is currently under investigation as its smaller particle size may allow for using lower doses. 50 mg MDI (£12, €16): 2 doses, 2-3 times daily.

Where more than one dose is required put one dose into the Chamber then place the mask on the cat's face for 5-10 seconds. Then repeat this for the second dose.

Severe cases: Treat as for moderate cases (i.e. *Salbutamol* [1-2 doses, 2-4 times daily] + inhaled steroids [1-2 doses, twice daily]). However, since inhaled steroids may take 1-2 weeks to achieve maximal effect oral steroids are also required. These can usually be reduced or discontinued once the disease is under better control, typically over 2-4 weeks. (i.e. 5mg prednisolone twice daily for 1 week, then 5mg prednisolone once daily for 1 week, then 5mg prednisolone every other day for 1 week, then stop).

Salmeterol, may be added as a night-time dose to give bronchodilation throughout the night, or given twice daily in more severe cases. 120 mg MDI (£40, €52): 1-2 doses, 1-2 daily.

Oral medication:

Where oral medication is to be used the author usually starts with a two-week trial of long-acting theophylline. If this fails to achieve sufficient control of the clinical signs, prednisolone is usually added. Where one bronchodilator (e.g. long-acting theophylline) fails to give a positive response, a different class of bronchodilator (e.g. terbutaline) may be used instead. (Some authors prefer to use terbutaline as their first choice of treatment).

Where prednisolone cannot be given (recurrent infections, intolerance, diabetes mellitus), and inhaled medication will not be tolerated, the author then tries an anti-serotonergic or a leukotriene receptor antagonist. Over-weight cats that prove hard to diet may benefit from a reduced corticosteroid dose, which may be compensated for by the inclusion of inhaled medication, or in some cases, a leukotriene receptor antagonist.

Reverse bronchoconstriction (Figure 19):

- **Beta₂ adrenergic agonists:**

Salbutamol (Albuterol, ‘Ventolin’), single dose MDI, give as required, effective within 5-10 minutes. (i.e. it is more rapidly acting when given by inhalation than PO, SQ or IM). (See above for treatment regimens). Use of high doses can result in tachycardia and muscle twitching.

Salmeterol (‘Serevent’), is a long-term bronchodilator that takes up to 1-2 hours to take effect but lasts ~8-12 hours. (See above for treatment regimens). Use of high doses can result in tachycardia and muscle twitching.

Terbutaline (‘Bricanyl’) 0.625-1.25 mg PO q12h

As with all of these drugs, this drug is not licensed for use in cats. However, it has been used frequently with few problems reported. Side effects include GI upset, weakness, tachycardia and hypotension. Care should be taken when used concurrently with corticosteroids.

- **Theophylline:** *Slow release theophylline* (‘Corvental-D’) 20-25mg/kg PO q24h.

Theophylline is a weak bronchodilator that also improves mucociliary transport, stabilizes mast cells, and increases the strength of respiratory muscle contractions. It has a narrow therapeutic window, with toxicity resulting in GI upset, hyperactivity, seizures, and cardiac arrhythmia. Efficacy is very dependent on formulation; Corvental-D and Theo-Dur are recommended.



Figure 19. Oral bronchodilators: Terbutaline (‘Bricanyl’) and theophylline ‘Corvental-D’.

Reduce inflammation (Figure 20):

- **Corticosteroids:**

Fluticasone propionate (‘Flixotide’) or *Beclomethasone bipropionate* (‘Becotide’, ‘Qvar’) as inhaled medications. They have virtually no systemic effects (especially Fluticasone). In cats they can occasionally cause airway irritation. (See above for treatment regimens).

Prednisolone 0.25-2 mg/kg PO q12h, then taper off slowly.

Corticosteroids are very effective at reducing airway inflammation, and in prolonged dosing may reduce airway hyper-responsiveness. Short-term high-dose therapy should be avoided as a rebound hyper-responsiveness may result.

- **Anti-serotonergics:** *Cyproheptadine* ('Periactin') 0.1-1.0mg/kg PO q8-24h
Given that feline mast cells release high concentrations of serotonin, a number of clinicians have been using anti-serotonergic drugs to treat refractory cases of 'feline asthma'. While cyproheptadine has been used successfully to control a number of difficult cases, it has a considerable appetite stimulatory effect that can be unhelpful. It can also cause drowsiness and inco-ordination. This drug is not licensed for veterinary use.
- **Leukotriene receptor antagonists:** *Zafirlukast* ('Accolate') 5-10mg/cat PO q12 h.
In humans, a number of other anti-inflammatory drugs have come into use, including the leukotriene receptor antagonists. While, in cats, experimental data suggests that this group of drugs is unlikely to give major benefits, the author has found them to be useful in some cases. They often need to be given for four weeks before their full effect is seen. These drugs are not licensed for veterinary use.
- **Antibiotics:** Cats with chronic bronchopulmonary disease are very susceptible to opportunistic airway infections. Whenever infection is found it should be treated. Ideally, selection of antibiotics should be made on culture and sensitivity. However, empirical choices include doxycycline, penicillins, and fluoroquinolones. Treatment for 4-6 weeks is often required. Recommended treatment for mycoplasmosis is doxycycline 5mg/kg PO q12h.
- **Mucolytics:** *Bromhexine* ('Bisolvon') 3mg/cat IM/day, or 1mg/kg PO/day.
While the author has rarely found mucolytics to be beneficial, some authors recommend them to help ease respiratory tract congestion.



Figure 20. Oral anti-inflammatory drugs: Anti-serotonergic cyproheptadine 'Periactin', corticosteroid 'Prednisolone' and leukotriene receptor antagonists Zafirlukast 'Accolate'.

Acute decompensation:

This requires very prompt intervention. It is important to keep restraint to a minimum, and increase the oxygen concentration of the air the cat is breathing (oxygen tent or box).

Rapidly acting drugs include;

Methylprednisolone Na succinate @ 50-100mg/cat SQ, IM, IV

Dexamethasone @ 0.2-2.2 mg/kg SQ, IM, IV

Terbutaline @ 0.01 mg/kg SC, IM, IV q4h (is also absorbed very rapidly PO)

Aminophylline @ 5 mg/kg IV q8-12 hours (is also absorbed very rapidly PO).
This is painful when given IM or SC.

In severe respiratory distress;

Adrenalin @ 0.1ml of a 1:1000 solution SC, IM, IV or via ET tube

Atropine @ 0.015 mg/kg IV, 0.04 mg/kg SC – will block vagal bronchoconstriction and reduced bronchial secretions, but increases heart rate and can cause cardiac arrhythmia.

Some drugs can be administered via an inhaler or in nebulised air. Unfortunately, administration via nebulised air can result in their therapeutic concentrations taking a longer time to be reached. e.g. Salbutamol (two doses every 30 minutes for up to 2-4 hours) and/or Fluticasone (see above).

2. *Bacterial bronchopneumonia:*

Treatment of bacterial bronchopneumonia usually includes a protracted course of antibiotics. Ideally, antibiotics should be selected by culture and sensitivity. Useful broad-spectrum antibiotics include amoxicillin, cephalosporins, doxycycline, trimethoprim-sulpha, and aminoglycosides. Combinations of these drugs may be required. Oxygen enriched environment, fluid therapy, airway humidification, bronchodilators, and daily coughage may also be helpful.

3. *Lungworm infection:*

In mild cases supportive therapy may be sufficient. In more severe cases intervention may be needed. The first choice of treatment is Fenbendazole @ 50mg/kg/day PO for 10-21 days as this has minimal toxicity. In addition to this it is advisable to give bronchodilators (see above), antibiotic cover to prevent secondary infection of the damaged lung tissue, and an anti-inflammatory dose of glucocorticoid to reduce the inflammation that tends to arise as the cat's immune system removes the dead and dying worms. Alternatives to fenbendazole are ivermectin (0.4 mg/kg SQ), and levamasole (25-30 mg/kg divided into 8 hourly doses and given on alternate days for 5 treatments). Care should be taken when using levamasole as it can be very toxic to cats (and tastes very bitter).

AeroKat Spacers can be obtained from:

Martin Foley, Vice President, Advanced Product Design,
Trudell Medical International, 725 Third Street,

London, Ontario,

Canada N5V 5G4

Phone: +1 519 455 7060 ext 2203

Fax: +1 519 455 6478

Email: MFoley@trudellmed.com

www.aerokat.com

Other helpful sites for owners and vets are:

<http://www.felineasthma.org>

<http://groups.yahoo.com/groups/felineasthma/>

References and further reading

Boothe, D.M. and McKiernan, B.C. (1992). Respiratory therapeutics. *Veterinary Clinics of North America: Small Animal Practice* **22**: 1231-1258

Corcoran, B.M., Foster, D.J. and Luis Fuentes, V. (1995). Feline asthma syndrome: A retrospective study of the clinical presentation in 29 cats. *Journal of Small Animal Practice* **36**: 481-488

Dye, J.A. (1992) Feline bronchopulmonary disease. *Veterinary Clinics of North America: Small Animal Practice* **22**: 1187-1201

Dye, J.A., McKiernan, B.C., Rozanski, E.A., Hoffmann, W.E., Losonsky, J.M., Homco, L.D., Weisiger, R.M. and Kakoma, I. (1996). Bronchopulmonary disease in the cat: historical, physical, radiographic, clinicopathologic, and pulmonary function evaluation of 24 affected and 15 healthy cats. *Journal of Veterinary Internal Medicine* **10**: 385-400

Hawkins, E.C., Kennedy-Stoskopf, S., Levy, J., Meuten, D.J., Cullins, L., DeNicola, D., Tompkins, W.A. and Tompkins, M.B. (1994). Cytologic characterization of bronchoalveolar lavage fluid collected through endotracheal tube in cats. *American Journal of Veterinary Research* **55**: 795-802

Lecuyer, M., Dube, P-G., DiFruscia, R., Desnoyers, M. and Lagace, A. (1995). Bronchoalveolar lavage in normal cats. *Canadian Veterinary Journal* **36**: 771-773

Mandelker, L. (2000). Experimental drug therapy for respiratory disorders in dogs and cats. *Veterinary Clinics of North America: Small Animal Practice* **22**: 1087-1099

McCarthy, G. and Quinn, P.J. (1989). Bronchoalveolar lavage in the cat: cytologic findings. *Canadian Journal of Veterinary Research* **53**: 259-263

Moise, N.S., Wiedenkeller, D., Yeager, A.E., Blue, J.T. and Scarlett, J. (1989). Clinical, radiographic, and bronchial cytologic features of cats with bronchial disease: 65 cases (1980-1986). *Journal of the American Veterinary Medicine Association* **194**: 1467-1473

Padrid, P.A. (2000). Feline asthma – diagnosis and treatment. *Veterinary Clinics of North America: Small Animal Practice* **30**: 1279-1293

Padrid, P.A., Feldman, B.F., Funk, K., Samitz, E.M., Reil, D. and Cross, C.E. (1991). Cytologic, microbiologic and biochemical analysis of bronchoalveolar lavage fluid obtained from 24 cats. *American Journal of Veterinary Research* **52**: 1300-1307