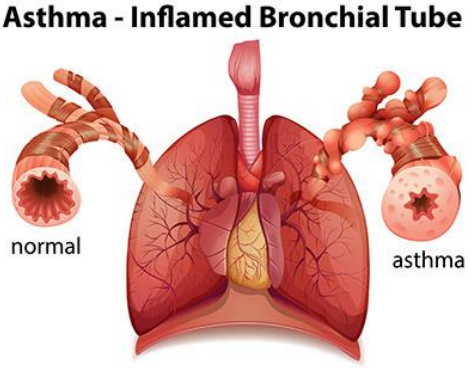
FELINE ASTHMA

Asthma is an inflammatory respiratory disease that causes narrowing of the lung's airways. More than 80 million cats currently live in American homes, and veterinary epidemiologists estimate that 800,000 or more of these animals – one percent or so of the nation's domestic feline population – suffer from acute or chronic asthma. Although this condition – the most commonly diagnosed respiratory disorder in cats – is not curable, veterinary researchers are making progress in understanding its causes and devising methods for its effective treatment.

Asthma is a disease characterized by contraction of the small airways of the lungs. These airways can also become clogged or closed off by the accumulation of mucous. (Cats produce a particularly thick and sticky mucous in their lungs compared to dogs or humans.) Narrowed airways means less air, and thus oxygen, makes it into the lungs and on into the bloodstream.



The narrowing of the airways occurs when a cat's immune system overreacts to the presence of an allergen and responds by releasing chemical messengers that cause inflammation and swelling of the sensitive lining of the bronchi, as well as contraction of the surrounding muscle.

Allergens may include tobacco smoke, dusty kitty litter, vapors from household cleaning solutions or sprays, pollen from trees, weeds or grass, mold and mildew, dust mites, smoke from fireplaces and candles, and even some foods. A study in Europe years ago revealed that 80% of respiratory disease in pets occurred in households with smokers.

The thick mucous that accumulates in an asthmatic cat's lungs can trap bacteria. It also prevents the cilia, the tiny hairs that line the respiratory tract, from sending bacteria, debris and pollen back up and out, to be coughed up and swallowed like a normal airway can do. Bacterial infections of the airways (i.e. bronchopneumonia) are a common complication experienced by asthmatic cats.

An Asthma Attack in Detail:

- First, excess mucus forms. Then the airway walls swell with inflammation and can actually ulcerate. Finally, the airway muscles go into spasm, which leads to constriction.
- Airway constriction leads to inability to draw a deep breath, intolerance to exercise, coughing, and musical sighing sounds called wheezes. Not all these symptoms may be apparent at the same time. Sometimes a low-grade chronic cough is the only symptom.
- An acute asthmatic crisis can arise at any time and can be a life-threatening event. Asthmatic airway constriction can happen spontaneously or as a type of allergic reaction.
- When it comes to treatment, relieving and preventing airway constriction is essential.

Symptoms:

A typical asthma attack occurs as follows: "The cat is at rest, not doing anything at all, or else it's playing and suddenly stops. Its breathing becomes more rapid, and the cat starts trying to take in air with its mouth open. Its chest and abdomen move up and down abnormally, the breathing is shallow and rapid. And if you listen closely you may be able to detect a wheezing sound as the cat exhales." Some cats will also cough.

Dr. Goldstein classifies the severity of asthma attacks in the following four categories: (1) mild (the symptoms occur intermittently – but not daily – and they do not interfere with the cat's lifestyle); (2) moderate (the symptoms do not occur daily, but when they do, they are more severe and debilitating, and they interfere with the cat's activities); (3) severe (significantly debilitating symptoms occur daily); and (4) life-threatening (bronchial constriction results in potentially lethal oxygen deprivation, which causes normally pink tissues, such as the lips and nose, to turn blue).

Not sure whether your cat's symptoms fit the description of asthma? Visit www.fritzthebrave.com, a website dedicated to cats with asthma. There are videos on the site of cats with asthma symptoms.

At this point you have an emergency situation, and veterinary care is mandatory. In fact, he points out, veterinary counsel should be sought at the earliest stage. If the initial mild signs are ignored the condition can rapidly progress to the more severe stage. Then the cat may die unless emergency treatment is immediately obtained.

Diagnosing Asthma

The first diagnostic step is a thorough physical exam, during which the veterinarian will initially use a stethoscope to locate the specific source of the wheezing while also attempting to rule out any heart or lung problems that may be causing the respiratory difficulties.

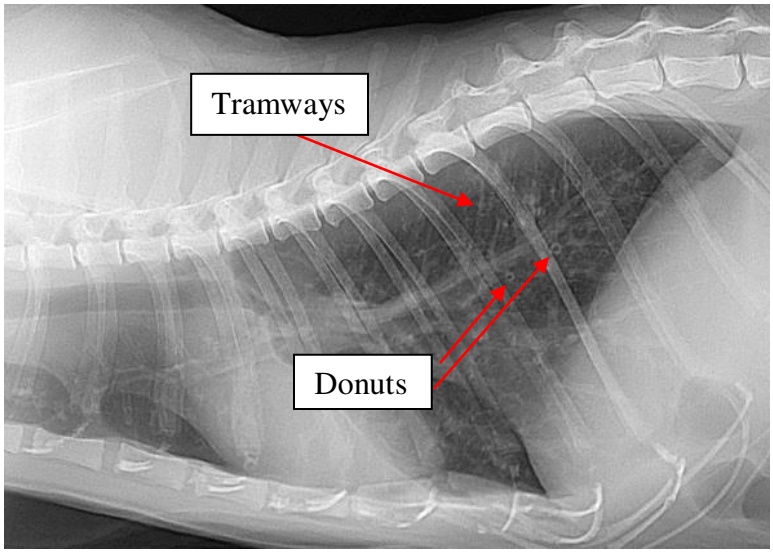
Next, the cat's blood may be tested to look for a suspiciously high concentration of white cells called eosinophils, which are associated with an allergic response. Heartworm disease can also be a cause of asthma-like symptoms.

Lungworm is not a common parasite but can be an underlying cause of airway inflammation. Stool sample testing or deworming may be recommended for cats with wheezing or coughing.

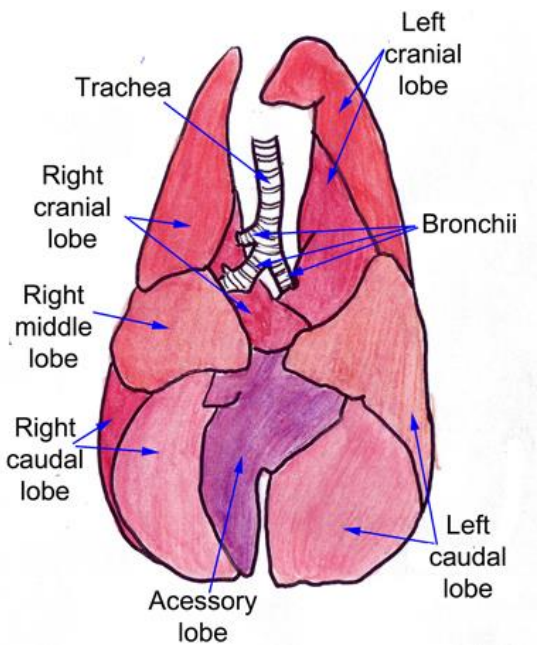
Asthma can be difficult to diagnose when it's mild or in the early stages. Chest x-rays (i.e. radiographs) are our best diagnostic tool but, unfortunately, some cats with asthma have normal radiographs. Radiographic signs will be more dramatic if the cat is having an asthma attack when the picture is taken or if symptoms are severe or chronic.

Classically, the chest radiograph will show what is called air-trapping. This means that the small airways have constricted to the extent that inhaled air cannot be exhaled. The lungs are larger in appearance than normal as they are over-inflated. The diaphragm may seem flattened due to this over-inflation.

Inflammation and mucus build up within airways, causing their walls to appear thickened in the radiograph. The terms used for such airway appearance are donuts, named for the appearance of the airways when viewed in cross-section. When viewing the airway from the side they look like double parallel lines, sometimes referred to as tramways. You may hear your veterinarian use these terms as they are classical findings in airway disease.



The right middle lung lobe is the first lobe to branch off ventrally (toward the breastbone) from the main bronchus. Airway contaminants such as pollen, along with mucous, tend to flow down to this lung lobe. Thus the right middle lobe is often the worst affected and may even collapse or shrink down into a non-functional part of the lung. On a lateral view, like the radiograph above, the right middle lung lobe is obscured by the heart Two x-ray views are usually needed in order to see all of the lung lobes. In a ventral-dorsal view with the cat laying on its back, the right middle lobe can easily be seen, as in the diagram below.



If bronchopneumonia is present, the alveoli, or air sacs, may also be inflamed or full of mucous. It can be difficult to tell how bad the asthma is until the infection has been treated. Radiographs may need to be repeated after antibiotic therapy.

Procedures that collect cells from the lower respiratory tract may be helpful to reach a diagnosis in patients with normal radiographs. This can be done by inserting a small tube into the trachea (the windpipe), or by using a fiber optic scope during a bronchoscopy, and collecting fluid and cells from the lower airways.

Often a type of white blood cell called an eosinophil is abundant in the secretions of an asthmatic patient. Eosinophils occur in normal feline respiratory secretions, too, but usually not as abundantly. The fluid can also be cultured to determine what bacteria are present in the airways and what antibiotic will work best to treat it. The most common bacterial infection in cat lungs is caused by *Mycoplasma*, so our antibiotic choice is usually aimed at this specific infection. A culture may be needed if infection persists after antibiotic treatment.

Response to therapy as a diagnostic test: One important asthma feature is that the airway constriction is reversible. In an emergency situation, a small dose of epinephrine (adrenalin) can reverse an asthmatic crisis in as little as 15 minutes. Response to injection with an airway dilator such as terbutaline usually occurs within 30 minutes. Response to a long-acting corticosteroid injection (such as methylprednisolone acetate/DepoMedrol) generally yields a positive response within 48 hours. When a cat comes into a veterinary hospital with difficulty breathing we may administer these drugs immediately, even before we know for sure that asthma is present.

Sometimes diagnostic tests leave room for question and we have to simply go with medical treatment for asthma and regard response to therapy as evidence that the diagnosis is correct.

Treatment Options

It is critical to realize that the underlying problem in the airway is inflammation. Inflammation is responsible for the constriction. Corticosteroid medications have been the cornerstone of therapy to resolve inflammation. These can be given orally, by injection, or via metered dose inhaler. Usually treatment is started with either an oral corticosteroid (such as prednisolone) or a long-acting injection called DepoMedrol. Steroids are inexpensive, and a good response to them helps confirm the diagnosis of asthma.

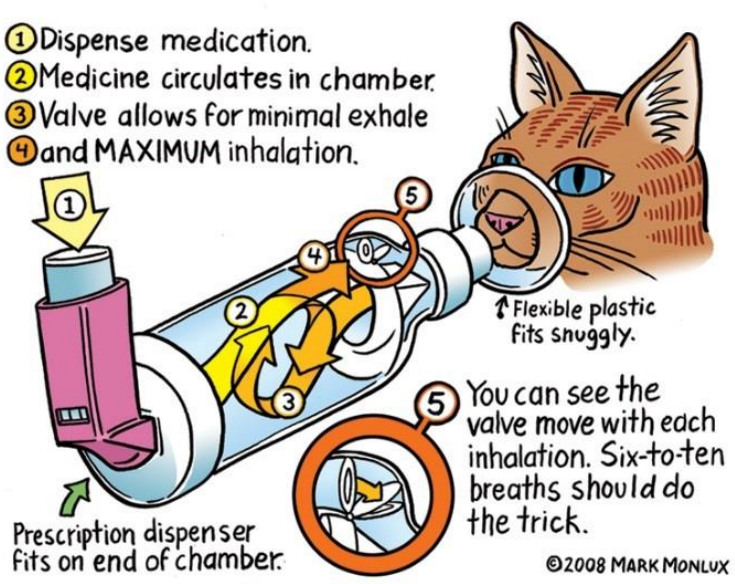
If the response to oral corticosteroids is good, they may be continued long term, supplemented with some of the other medications mentioned below, or used only during asthma flare-ups. Long-term corticosteroid use has side effects, though cats tend to be resistant to these problems. If giving pills is too difficult, especially in a cat who is stressed and having some trouble breathing, monthly DepoMedrol can be given for 2-3 months. DepoMedrol injections can only be given periodically and for no more than 3 months in a row. If given repeatedly your cat will be at high risk of developing diabetes. When using oral corticosteroids, we taper the dose over time, to find the minimum dose needed to control symptoms.

Not every cat can be on steroid drugs. Heart disease and diabetes, for example, may make systemic steroids dangerous. Inhalant steroids and other asthma drugs may be used when systemic steroids are not an option.

Asthma Inhalers for Cats

Human asthmatics have enjoyed the benefits of portable inhalers for years. These handy devices deliver medication locally to the airways, thus minimizing drug side effects to the rest of the body while maximizing desired response. Special inhaler chambers and masks are made for cats and work very well. Cats usually become accustomed to inhalers quickly. The setup is the same as for young children. The inhaler cartridge is attached to the mask, and the mask goes over the cat's face. One puff with the inhaler fills the mask and the cat simply takes 7 to 10 breaths from the mask.

Corticosteroid inhalers, usually fluticasone (Flovent™), are typically used twice daily long term. Airway dilator inhalers such as albuterol are used for flare-ups. We can prescribe metered dose inhalers for these drugs from a regular human pharmacy. Flovent™ is fairly costly. It is less expensive from Canadian pharmacies but we have had problems with shipping and customer service from these places, so be careful and do your homework if you order from them.



Pediatric equipment is generally available from most human pharmacies but a device created specifically for cats, called the Aerokat, works best. It comes with an appropriately sized face mask. You can see or buy the Aerokat device at www.aerokat.com.

Video of the use of asthma inhalers can be found at www.fritzthebrave.com. This website was originally set up by one family devoted to their asthmatic cat. It has grown into a detailed instructional site for both pet owners and veterinarians.

Cats generally start on a combination of oral prednisone and the metered dose inhaler. Once they improve they are usually maintained on only the metered dose inhaler, with oral steroids and albuterol used only for flare-ups. Most cats tolerate the inhalers well. For those that don't we can try to maintain their health on oral medications alone but they don't tend to do nearly as well as cats receiving fluticasone.

Other medications that might be helpful include:

Airway Dilators: Relieving inflammation with corticosteroids is the first line of treatment but some cats do better when receiving an oral or inhalant bronchodilator as well. In fact, the albuterol inhaler cartridges contain a similar drug in a different form. It makes sense that if constriction is an important feature of this disease that eliminating constriction would be therapeutically helpful.

Terbutaline (Brethine®) and theophylline are the airway dilators commonly used in the management of asthma. Terbutaline is available orally or as an injectable. Some veterinarians encourage owners to keep a bottle of injectable terbutaline at home in case of a crisis and we would show you how to give it. If you are interested in this, let us know. Theophylline is an oral medication usually given once a day at bedtime.

Allergic reaction is a big component of asthma. Corticosteroids such as prednisolone relieve inflammation and calm the allergic reaction that can trigger asthma. Another way to treat allergies, including allergic bronchitis in dogs and asthma in cats, is with medication called allergen, or immunotherapy.

Allergen is formulated according to your cat's specific sensitivities. We take blood serum and send it to be tested for a variety of inhalant allergens (an allergen is a substance that triggers the allergic reaction) such as specific pollens, molds and mildews, mites and fleas, etc. We look at common allergens that are specific to the region in which you live.

Based on allergy test results, we can prescribe medication to bind to the allergens that your pet is sensitive to.

Until recently, this could be done only with periodic allergy injections (which, for many cats, may be easier to administer than an oral medication), usually administered once a week. However, we do now have the option of oral allergy treatment as well. This entails a few drops or a quick spray into the side of the mouth or under your pet's tongue every day. Over time your cat will build up a specific immune tolerance to the allergens that trigger his or her allergic reaction.

Cyproheptadine: One of the biochemicals involved in the asthma inflammation cascade is called serotonin. It is directly involved in constriction of the airways in cats. Cyproheptadine is an anti-serotonin medication. It is often used in cats who need extra help beyond their steroids or who are having problems that prevent steroid use. Side effects of cyproheptadine include increased appetite and sometimes tranquilization. Many cats are able to have their asthma managed with this medication alone and no corticosteroids at all.

Antihistamines: Histamine is an inflammatory substance released during allergic response. Histamine has been thought to be involved in the airway constriction mechanism and antihistamines are widely prescribed to asthmatic cats. Recent research, however, indicates that a certain receptor in the feline airway (called H3) receptor leads to a dilation response to histamine instead of a constriction response. This could be why antihistamines have not been found to be of dramatic assistance in managing feline asthma. More research in this area is currently needed. Antihistamines have largely fallen out of favor compared to other medications.

Zamflurkast (Accolate): This newer medication has received a lot of attention in the human medical arena. It is meant to supplement other treatments and perhaps reduce the "requirement" of steroids needed to manage asthma. It is still fairly experimental in cats but many anecdotal reports have been favorable. It is an inhibitor of chemical mediators called leukotrienes.

Cyclosporine: Cyclosporine use for asthma is relatively rare. Cyclosporine is an immunomodulator often used in organ transplant patients. It has been used occasionally in cats where adequate suppression of inflammation has not been possible with combinations of the other medications or when the cat is unable to take corticosteroids for other reasons. Cyclosporine should not be prohibitively expensive since cats, being small, require relatively small doses but blood levels of cyclosporine may be periodically recommended, which increases the expense of this treatment significantly.

Minimizing exposure: Minimizing irritants in the air is always helpful to an asthmatic cat.

- Do not allow cigarette smoke in the cat's environment
- Use dustless cat litter
- Do not use topical or spray insecticides if possible
- Regularly replace air filters in your home

We have a handout on reducing mold, mildew and dust mites in the home that you may want to read.

It is important to realize that asthma can culminate in a respiratory crisis that can become life threatening if ignored. If your cat has labored breathing outside of our normal office hours, a trip to an emergency clinic is in order. Monitoring your cat's resting respiratory rate (RRR) can help to alert you when trouble is brewing. To get this number, count how many breaths your cat takes in 15 seconds and multiply be four. This gives you the number of breaths your cat takes per minute. Normal is between 8 and 35 breaths per minute. Get a respiratory rate a couple of times a day until you have your cat's normal rate. Then you can monitor for changes. If your ca normally has a resting respiratory rate between 20 and 25 but today you are getting 35 breaths per minute, that would be concerning.

Coughing, wheezing or any other symptoms your cat shows when his or her asthma is acting up should be monitored. Also keep an eye on the amount of effort your cat is putting into breathing. If your cat begins to breathe with an open mouth or if you see excessive abdominal movement during respiration (and your cat is not purring), you may have an emergency situation. Contact us or an emergency clinic immediately.

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