Dx and Management
Feline Bronchitis and Asthma

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HUMAN ASTHMA
HISTORY

- “My auntie told me not to run, he explained, ‘on account of my asthma.’ ‘Assmar?’”
- “That’s right. Can’t catch me breath. I was the only boy in our school what had asthma,” said the fat boy with a touch of pride. “And I’ve been wearing specs since I was three.”

FELINE ASTHMA
HISTORY

“cats with increased airway mucus, airway inflammation, labored breathing and wheezing…”

“ammoniacal odors excited the symptoms”.


FELINE ASTHMA
Defining Features

1. spontaneous cough and/or wheeze
2. airway inflammation
3. airway hyper responsiveness
FELINE BRONCHITIS

1. A disease that causes cough daily for 2 months …..other causes of cough have been ruled out

2. A disease of chronic airway inflammation including neutrophilic infiltration of the airway wall, hypertrophy and hyperplasia of the mucus secreting apparatus, and mucus hypersecretion

Is it Bronchitis or Asthma/ Does it Matter?

• Dogs with chronic bronchitis, if left untreated, mostly just cough
• Cats with chronic bronchitis, if left untreated, may get much worse
• There is an anatomic reason for that
WHAT IS HAPPENING IN THE ASTHMATIC AIRWAY?

- The lung is the vital organ,
- The airways are tubes
- Airway reflexes protect the lung:
  - airway muscle contracts
  - airway mucus is released
  - coughing begins
    that’s it!

ASTHMA IS ON THE RISE

- At least 11% of all children in USA
  - 35%! in many overcrowded cities
  - #1 reason for hospitalization
  - #1 reason for emergency visits
  - #1 reason for absence from school
  - #2 cause of death
WHAT ARE THE “TRIGGERS FOR ASTHMA?”

- DUST MITES
- FEL D1
- COCKROACH “STUFF”

WHAT ARE THE “TRIGGERS” FOR ATOPIC ASTHMA?

Fel D1 is the cloned protein that causes human asthmatic responses

The primary source is the cat’s anal glands!!

...French Derm meeting 1998
Design:
- retrospective analysis
- 393 homeless children
- July-September 1998
- NYC shelters

Results:
- 38% were asthmatic
- 9% properly medicated

Guestimate:
- cockroaches?
FELINE BRONCHIAL DISEASE

ASTHMA  BRONCHITIS

AIRWAY EOSINOPHILS AND MACROPHAGES FROM A CAT WITH ASTHMA

EOSINOPHILS DOING LUNCH
Treating Asthmatic Cats

Targeted therapy

Go after IgE?

rHuMab-E25

Omalizumab

"Xolair"

Is the placebo effect real?

You bet it is!

Table 1

<table>
<thead>
<tr>
<th>Rating</th>
<th>Anti-IgE</th>
<th>Placebo</th>
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<tbody>
<tr>
<td>Excellent</td>
<td>26%</td>
<td>8%</td>
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<tr>
<td>Good</td>
<td>44</td>
<td>35</td>
</tr>
<tr>
<td>Mod</td>
<td>20</td>
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<tr>
<td>Poor</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>Worse</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

DIAGNOSIS OF CAT ASTHMA

1. history of cough/wheeze
2. acute dyspnea with complete resolution
3. signalment - Siamese overrepresented
4. Rule out other causes of symptoms
   Physical exam (exp effort/crackles/wheeze)
   Chest radiographs
   Response to therapy
   Bronchoscopy? Cytology? Culture?
Flexible bronchoscopy and bronchoalveolar lavage in 68 cats (2001-2006).

Abstract

BACKGROUND: Bronchoscopy is an important tool for identifying an underlying etiology for respiratory disease in cats. However, the procedure is challenging because the airways are small and prone to bronchospasmation.

HYPOTHESIS: Bronchoscopy and bronchoalveolar lavage (BAL) are appropriate and safe diagnostic procedures in the cat.

ANIMALS: Forty-eight cats.

METHODS: Flexible bronchoscopy was performed in all cats with the cats under propofol induction with jet ventilation. The procedure was reviewed for BAL, volumes instilled and recovered and for the number and type of complications with the use of 3 flexible bronoscopes < 5.0 mm outer diameter. The BAL procedure was compared among species by using a 3-way analysis of variance. Complication rates were compared by using off-reject analysis. Significance was set at P < .05.

RESULTS: Clinical diagnoses included inflammatory airway disease in 48 of 68 cats, pneumonia in 13 of 68, neoplastic disease in 8 of 68, and other conditions in 4 of 68 cats. Mean lavage volumes instilled for the 3 scopes were 2.92 ± 0.95 mL/kg (range, 0.77-3.20 mL/kg). Mean protein content recovered for the 3 scopes was 51 ± 23% (range, 0-141%). SAE and card were adequate for cytologic assessment (> 300 cells/trichrome) in 61 of 68 cats (91%), and in 97 of 120 samples (81%) instilled. Complications occurred in 38% of procedures; however, these were mild in 34% of cats, 3% of cats died or were euthanized after the procedure. Complications were not associated with fluid volume instilled or recovered, and could not be related to the underlying disease process.

CONCLUSIONS AND CLINICAL IMPORTANCE: Flexible bronchoscopy with BAL was well tolerated in most cats examined.
Because Many of You Are So Busy............

BEFORE STEROIDS

AFTER STEROIDS
FELINE BRONCHIAL DISEASE

ASTHMA

BRONCHITIS

Asthma and Heartworm Infestation
Are Not Similar At All

This is feline heartworm disease
This is feline asthma

Implications for Reduction in Airway Diameter

\[ p/pg + u^2/2u + x = H \] (pressure decreases as velocity increases)

\[ F = DP + 4/8 h L \] (flow is directly proportional to radius\(^4\))

OR:
1. a 50% reduction in airway radius = a 16-fold reduction in the volume of air that flows across that airway.
2. relatively small amounts of mucus, edema, or bronchoconstriction can cause a dramatic fall in airflow.
3. small changes in airway diameter can result in dramatic changes in airflow.
4. therapy that results in relatively small increases in airway size may cause a dramatic improvement in clinical signs.
INHALED DRUGS FOR RESPIRATORY DISEASE

Not absorbed
No systemic side effects!!

♦ What are the drugs?
♦ What is involved for the owner?
♦ Is it practical?

INHALED STEROIDS

- Pulmicort
- Beclovent / Vanceril
- Aerobid
- Azmacort
- Advair (Flonvent and salmeterol)
- Flovent
  - Longest half life
  - Most potent
  - Least likely to be systemically absorbed when swallowed

DOES THE STUFF EVEN GET INTO THE AIRWAYS?

Investigation of pulmonary deposition of a nebulized/radiopharmaceutical agent in awake cats.
Department of Veterinary Clinical Sciences, College of Veterinary Medicine, University of Missouri, Columbia, MO.

OBJECTIVE: To determine whether conscious, unanesthetized cats inhale a nebulized radiotracer administered via a face mask and whether this tracem would reach the lower airways.

ANIMALS: 20 healthy adult cats.

PROCEDURE: Technetium Tc 99m-diethylenetriaminepentaacetic acid (99mTc-DTPA) was nebulized into a spacer and administered to the cats via a face mask. By use of a gamma camera, images were immediately obtained to determine the distribution of 99mTc-DTPA within the pulmonary airways. Images obtained by use of a gamma camera revealed that all 20 cats had inhaled 99mTc-DTPA from the face mask. In each cat, deposition of the radiopharmaceutical agent was evident throughout the lung fields.

CONCLUSION AND CLINICAL RELEVANCE: Awake cats that were not used in the application of a face mask did inhale substance from such a device. Aerosolization of medications may be a feasible route of administration for cats with lower airway disease.
THE TROUBLE WITH METERED DOSE INHALERS

PULMONARY FUNCTION IN AN AWAKE KITTIE

MONGO  JIM
Data to Support Use of Inhaled Medications / Steroids

- Reinero CR et al AJVR 2005 — effects of drug treatment on inflammation and AHR in cats with experimentally induced asthma
- Kirschvink N et al JVIM 2005 - Bronchodilators in bronchoscopy-induced airflow limitation in allergen-sensitized cats
- Kirschvink N et al JFMS 2006 - Inhaled fluticasone reduces bronchial responsiveness and airway inflammation in cats with mild chronic bronchitis
- Reinero CR et al JVIM 2006 - Inhaled flunisolide suppresses the hypothalamic-pituitary axis but has minimal systemic immune effects in healthy cats
COMPLICATIONS

1. Can’t train to use (12-15%)
2. Ocular irritation 16 (5%)
3. Hair loss 6 (2%)
4. Cough when administering 29 (10%)
5. Growth retardation?
6. Thrush (candidiasis)?

WHY NOT JUST USE BRONCHODILATORS?
MUCUS PLUG

ACETYL CYSTEINE
1. Derivative of cysteine
2. Breaks disulfide bonds
3. Cat mucus in inflamed airways have increased proportion of sialic acid residues

INDICATIONS FOR ALBUTEROL
1. Symptoms less than 2X weekly without other therapy
2. Acute cough, wheeze, increased respiratory rate or effort
Which spacer / mask to use
Does it matter?

AEROKAT WITH VALVE

AEROKAT LAB TESTING
How Should We Interpret Results From Studies Using an Experimental Model of Feline Asthma?

1. BAL eosinophilia is normal in a subset of normal cats
2. BAL eosinophilia / inflammation can be dissociated from pulmonary function
3. Human and feline asthma is likely profoundly multifactorial
4. Cats with experimentally induced “asthma” are NOT clinically symptomatic

WHAT ARE REASONABLE EXPECTATIONS?

- Humans with asthma or bronchitis still cough
- Humans with asthma still wheeze
- Humans with asthma still get hospitalized
- Humans with asthma still need oral steroids
ACUPUNCTURE

The Expert Panel does not recommend the use of acupuncture for the treatment of asthma (Evidence B). Acupuncture involves the superficial insertion of thin needles along acupuncture points or acupoints on the body. (Acupressure is an alternative method of stimulating the same acupoints.) Two Cochrane database systematic reviews (Linde et al. 2000; Macarey et al. 2004) of 7 and 11 randomized trials (with 174 and 324 participants, respectively) using real acupuncture and sham acupuncture to treat asthma or asthma-like symptoms found no statistically significant or clinically relevant effects for acupuncture compared to sham acupuncture. Both reviews concluded that adequate evidence to make recommendations about the value of acupuncture in asthma treatment is lacking. A meta-analysis of 11 RCTs published in the period 1975-2000, comparing real acupuncture with placebo acupuncture, found no evidence of an effect of acupuncture in reducing asthma symptoms (Martin et al. 2002).

CHIROPRACTIC

The Expert Panel concludes that there is insufficient evidence to recommend the use of chiropractic or related techniques in the treatment of asthma.

Chiropractic therapy and other forms of spinal or bodily manipulation or massage have been reported anecdotally to benefit patients who have asthma. Systematic reviews of chiropractic techniques in asthma (Babon and Mier 2004) and related therapies, such as the Alexander technique (Denis 2000), found few randomized, controlled studies. Those studies, where available, showed mixed results, with perhaps some benefit in symptoms or health-related quality-of-life measures but no definitive improvement on more objective measures of asthma outcomes.
HOMEOPATHY AND HERBAL MEDICINE

The Expert Panel concludes that there is insufficient evidence to support effectiveness of homeopathy and that more clinical trial and observational data are necessary.

The Expert Panel concludes that there is insufficient evidence to recommend herbal products for treating asthma. Furthermore, because herbal products are not standardized, one must be aware that some may have harmful ingredients and that some may interact with other pharmaceutical products that the patient may be taking (Evidence D).

Homeopathy deals with the use of diluted substances which cause symptoms in the undiluted form. A systematic review of homeopathy for asthma included 44 RCTs. The trials were of variable quality and used different homeopathic treatments, which limit the ability to reliably assess the possible role of homeopathy in asthma (McCamey et al. 2004).

A variety of herbal products have been used alone and as adjunctive therapy for asthma with positive results in small trials that have not been duplicated (Gupta et al. 1999; Khayyal et al. 2003; Lee et al. 2004; Utrata et al. 2002). The National Center for Complementary and Alternative Medicine of the National Institutes of Health encourages the development of well-designed clinical trials to assess with clarity the role of herbal products.