http://www.onehealthinitiative.com/

"*One Health is the collaborative efforts of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, plants and our environment.*"

"*One Health implementation will help protect and/or save untold millions of lives in our generation and for those to come.*"

"*Between animal and human medicine there are no dividing lines--nor should there be.*" Rudolf Virchow, MD (the father of cellular pathology)

April 12, 2013 – Posted One Health Initiative website NEWS page

Prominent Physician and Veterinarian Jointly Discuss "One Health" Human-Animal Comparative Medicine Presentations – RE: Asthma

By **Frank Adams, MD, FCCP** and **Ann Hohenhaus, DVM, DACVIM**

***Drs. Frank Adams**, a physician http://www.adamsmd.com/PatientPortal/MyPractice.aspx?UAID={615E3AE9-8B58-48AC-B39F-1753B798DB1E}&TabID={1} **;** http://www.siriusxm.com/doctorradio, and **Ann Hohenhaus** http://www.amcny.org/node/20, a veterinarian, are both One Health supporters. Together, in this article provided exclusively to the **One Health Initiative website** [submitted April 7, 2013], they collaborated on One Health oriented clinical asthma presentations for human and animal patients with clarification comments.

People and their pets share many things besides their home and a walk in the park. Both might have leaky heart valves. A pet cat might transmit to a close family member a fungal infection called ringworm. Both cats and people can be diagnosed with asthma and both species might be treated with Flovent®, a corticosteroid inhalant aerosol medication, but do people and their cats really have the same disease?

Clinical Presentation#1: *Miss Albright and her cat Spartapuss were both coughing. Spartapuss couldn't seem to catch his breath during one of these coughing episodes; subsequently, his veterinarian diagnosed asthma based on thoracic radiographs and the results of bronchoalveolar lavage (*a diagnostic medical procedure in which a bronchoscope is passed through the mouth or nose into the lungs and fluid is expelled into a small part of the lung and then recollected for examination*).*

Comment:

Dr. Hohenhaus (veterinarian)
Paroxysms (sudden recurrences or intensification of symptoms) of coughing, wheezing and severe respiratory distress typify the clinical signs of a cat with asthma. These signs result from airway hyperreactivity induced by the presence of white blood cells known as eosinophils, infiltrating the airways. The eosinophillic infiltrate is visible on radiographs (x-ray pictures) as a peribronchial pattern. The arrival of eosinophils into the airway is provoked by T helper cells, members of the immune system. In cats, this cellular milieu results in increased mucus production, airway edema and narrowing due to the eosinophilic infiltrates.

Cats with asthma may also suffer from acute airway narrowing due to smooth muscle constriction. Pulmonary function testing is rarely performed in cats as it requires a cooperative patient, i.e. a human who can follow instructions, the antithesis of a feline patient. The pulmonary function of a handful of cats with asthma has been studied and it demonstrates obstruction with both increased resistance and decreased dynamic lung compliance.

Clinical Presentation #2:
Miss Albright presented to her physician with cough. Physical exam revealed wheezing and LAB analysis showed elevated Immunoglobulin E (IgE) which is a class of antibody that has only been found in mammals. *Chest radiographs(x-ray pictures) revealed bronchial wall thickening and hyperinflation. Pulmonary function tests documented reversible obstructive dysfunction diagnostic of asthma.*

Comment:
Dr. Adams (physician)
Human asthma is a chronic inflammatory disorder of the airways producing airway hyper responsiveness and airflow obstruction resulting in respiratory symptoms (shortness of breath, wheezing, cough). Our understanding of human airway inflammation followed the discovery of special immune cells called Th1 and Th2 helper cells in animal models of allergic inflammation. As in animals, a predominance of inflammatory mediators known as Th2-cytokines occurs in the majority of people with asthma, resulting in eosinophilic infiltration and inflammation [similar to cats].

However, the effector cells in humans with asthma are slightly different than cats with asthma. Increased numbers of eosinophils can be found in the airways of most, but not all people with asthma. Current understanding suggests that the eosinophil is only one of several effector cells in this complex disease and that its role may change in different phases of the illness.

Human asthmatics who do not have eosinophilic infiltration are generally not allergic individuals. Non-allergic asthma appears to be related to other factors such as the environment (pollution, tobacco), drugs (aspirin or other non-steroidal anti-inflammatory drugs [NSAIDs] like ibuprophen) and infection. Respiratory viral infections, especially when they occur in infancy from respiratory syncytial virus (RSV), are associated with the development of asthma.

Clinical Presentation #3:
Miss Albright responded to a brief course of prednisone followed by a regimen of Singulair®, Flovent®, and as needed use of albuterol (a drug to relieve bronchospasm).

Comment:

Dr. Adams (physician)

Similarities in the treatment of human and animal asthma abound since both illnesses are characterized by swollen, inflamed airways. Bronchodilators are needed for immediate relief of bronchospasm and corticosteroids are essential for their potent anti-inflammatory effect. Mediators of inflammation, (leukotrienes) are important in human asthma and anti-leukotriene medications, such as Singulair® may be helpful for many patients.

*Pulseoximetry (*a non-invasive method allowing the monitoring of the oxygen saturation of a human or cat's blood hemoglobin) *showed Spartapuss did not need oxygen therapy, but needed daily corticosteroid treatment with Flovent® through a mask and spacer (*an add-on device used to make it easier when administering aerosolized medication from a metered-dose inhaler) *specifically designed for cats. The cat also received a bronchodilator, aminophylline. Unlike his owner, he did not receive therapy with Singulair®, an anti-leukotriene.*

Comment:
Dr. Hohenhaus (veterinarian)
Treatment of acute cases of feline asthma involves oxygen therapy, usually administered in a specially designed oxygen cage using bronchodilators and corticosteroids. Once stabilized, the feline asthma patient can be managed with either oral bronchodilators and corticosteroids or the inhaled versions of these drugs given via a specially designed feline face mask and spacer. Because inflammation is an important component of feline asthma, the role of proinflammatory leukotrienes in this disease have been investigated; however, the increased levels of a particular leukotriene (LTE4) have not been found in the urine or bronchoaveolar lavage fluid suggesting antileukotriene therapy is not appropriate in cats with asthma.

Although a cure for asthma in cats and humans is beyond our reach at this time, control of this increasingly common disease can be accomplished with combinations of a bronchodilator and anti-inflammatory medications. Comparative medical interdisciplinary collaborations (One Health) are instructive and potentially useful to help us better understand the nature and management of asthma.
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