Respiratory Case Challenges: Dogs Leah A. Cohn, DVM, PhD, DACVIM (Internal Medicine) University of Missouri Columbia, MO

Respiratory disease is common in dogs, and can result in a constellation of clinical signs. These clinical signs range from those that are irritating to owners (e.g., nasal discharge, stridorous panting, chronic hacking cough) to those which are life-threatening and require immediate medical attention.

The approach to a dog showing respiratory signs is to first localize the clinical signs to the region of the respiratory tract which is affected. From there, an appropriate list of differential diagnoses can be made. Those differential diagnoses will drive the diagnostic tests that need to be performed.

The origin of respiratory disease can often be localized by the clinical presentation of the dog to the nasal cavity/pharyngeal region; upper airways (larynx, trachea), lower airways (bronchi), pulmonary parenchyma, pleural cavity, thoracic wall or diaphragm. Sometime, non-respiratory disease can present with clinical signs suggestive of respiratory disorders, but these conditions are usually ruled out in a straightforward manner (e.g., diabetic ketoacidosis and anemia may alter respiratory pattern although they are not respiratory diseases). Classically, dogs with nasal disease have sneezing and nasal discharge (serous, mucoid, purulent, mucopurulent, sanguineous or hemorrhagic). Dogs with pharyngeal disease may have stertor or reverse sneezing. Dogs with upper airway disease often have stridor, cough or respiratory distress. Disorders of the lower airways usually present with cough, although in severe cases, respiratory distress may be appreciated. Dogs with pulmonary parenchymal disease may have systemic signs of illness (e.g., fever, lethargy, weight loss, anorexia) or localized signs of illness (e.g., cough, tachypnea, or respiratory distress). Disorders of the pleural cavity may also be associated with systemic signs of illness, a rapid shallow breathing pattern, or overt respiratory distress. Thoracic wall and diaphragmatic disorders are associated with increased respiratory effort and/or paradoxical breathing patterns.

Respiratory pattern offers excellent clues to disease localization. In general, obstruction of the airways cranial to the thoracic inlet result in inspiratory effort often associated with stridor. In general, obstruction of the airways caudal to the thoracic inlet results in expiratory distress, typically accompanied by wheeze. In general, pulmonary parenchymal disease causes effort on both phases of respiration and may be associated with adventitial sounds like crackles and/or wheeze, or with increased or decreased volume of bronchovesicular sounds. In general, pleural space disease results in inspiratory effort with diminished bronchovesicular sound. There are exceptions to every rule. For instance, restrictive pulmonary disease such as idiopathic pulmonary fibrosis may result in more inspiratory effort rather than a mixed phase effort since stiff, non-compliant lungs do not expand properly.

Cough generally results from airway irritation, usually in association with primary disease of the airways, lungs, or heart. Pleural disease causes cough only when there is extension of disease from the lung to the pleura or vice versa, for instance when bacterial pneumonia leads to pyothorax. Heart disease may cause cough either through congestive heart failure or simple mechanical compression of airways at the carina. Harsh cough is more often associated with airway disease (e.g., tracheal collapse, infectious tracheobronchitis) while soft cough is more often associated with lung disease (e.g., pneumonia, CHF). Parasites, including lungworm as well as heartworm, are important and common causes of cough. Lungworms may be difficult to diagnose due to their intermittent shedding. For this reason, empiric anthelmintic treatment aimed at regionally important lungworms is a reasonable step before beginning an extensive diagnostic evaluation of otherwise healthy, young dogs with a cough. Occasionally there are odd, non-respiratory and non-cardiac causes of cough. These include gastroesophageal reflux and medications such as ACE inhibitors.

Diagnostic tests should be performed in stabilized patients and ideally should start with the least invasive diagnostics. Basic evaluation such as CBC, serum biochemistry, and urinalysis seldom lead to a specific diagnosis but do provide valuable information about the animals overall health and may point to clues as to the respiratory disease. For example, acute respiratory distress in an animal with severe protein loosing nephropathy might be the result of pulmonary thromboembolism since antithrombin is lost along with albumin from the damaged glomerulus. Similarly, monocytosis might suggest fungal pneumonia while eosinophilia might suggest either parasitic, allergic, or idiopathic eosinophilic disease as a cause of pulmonary disease. The new tests of BNP offer aids to differentiation of heart disease from lung disease but results of these tests must be used in conjunction with the remainder of the clinical evaluation. Usually, imaging is required for evaluation of animals with respiratory disease. Radiographs are the mainstay of imaging, but in some cases special techniques are preferable. These might include CT scan (ideal for animals with nasal symptoms), fluoroscopy (useful in imaging tracheal collapse), or even ultrasound (typically not well suited to respiratory imaging, but useful when consolidated lung lobes or masses are present). Invasive techniques are also commonly required to obtain samples for cytologic and/or histopathologic evaluation and for microbial culture. Treatment will depend if the underlying disorder is infectious, inflammatory, anatomic (structural) or neoplastic.

In this lecture, dogs presenting to the University of Missouri Veterinary Medical Teaching Hospital for evaluation of a variety of respiratory diseases will be discussed in detail. Key points about each case will be presented.