

# Respiratory Physiology, Diagnostics, and Disease

## CONTENTS

VOLUME 37 • NUMBER 5 • SEPTEMBER 2007

### Preface

**xi**

Lynelle R. Johnson

### Airway Physiology and Clinical Function Testing

**829**

Andrew M. Hoffman

The advent of pulmonary function testing in small animals has opened the door to new interpretations of old diseases. This article reviews the salient features of airway pathophysiology in dogs and cats that relate to the interpretation of newly developed airway function tests.

### Respiratory Defenses in Health and Disease

**845**

Leah A. Cohn and Carol R. Reinero

Every breath holds the potential to introduce infectious organisms and irritating particulates into the respiratory tract. Despite this continuous exposure, the lungs usually remain sterile. Further, potential pathogens are distinguished from innocuous particulates, thus sparing the respiratory tract from damaging inflammation. The article reviews the complex defenses used to protect the respiratory tract and also discusses the implications of failed defense systems.

### Approach to the Respiratory Patient

**861**

Carrie J. Miller

Several challenges arise when evaluating a dog or cat with respiratory disease. The history can span a long period, and some owners may have a difficult time in recognizing or describing respiratory abnormalities. A good history and thorough physical examination are essential when evaluating the respiratory patient. There are some noninvasive diagnostics that can aid in the diagnosis of respiratory disease; however, other more invasive tests often require anesthesia, which can be a potential hazard with a respiratory patient. This article focuses on reviewing the function of the respiratory system and how best to identify and diagnose cats and dogs with respiratory disease by implementing a thorough history and physical examination as well as appropriate diagnostic testing.

**Advances in Respiratory Imaging****879**

Eric G. Johnson and Erik R. Wisner

Although conventional radiography is still the first diagnostic imaging approach to respiratory disease, CT is proving to be invaluable as an adjunctive procedure in characterizing nasal and thoracic pathologic findings. CT eliminates superimposition of overlying structures and offers superior contrast resolution as compared with conventional radiography. These advantages allow for more precise characterization and localization of lesions and are invaluable for guiding rhinoscopic, bronchoscopic, and surgical procedures.

**Update on Canine Sinonasal Aspergillosis****901**

Dominique Peeters and Cécile Clercx

Sinonasal aspergillosis is a frequent cause of nasal discharge that occurs in otherwise healthy, young to middle-aged dogs. A local immune dysfunction is suspected in affected animals, and the role of increased interleukin-10 mRNA expression in the nasal mucosa of affected dogs is currently under investigation. Despite recent advances in imaging techniques, the “gold standard” for diagnosing the disease is direct visualization of fungal plaques during endoscopy or observation of fungal elements on cytology or histopathologic examination. Treatment can be challenging; however, the use of topical enilconazole or clotrimazole through noninvasive techniques has increased the success of treatment and decreased the morbidity and duration of hospitalization.

**Canine Eosinophilic Bronchopneumopathy****917**

Cécile Clercx and Dominique Peeters

Eosinophilic bronchopneumopathy (EBP) is a disease characterized by eosinophilic infiltration of the lung and bronchial mucosa, as demonstrated by examination of bronchoalveolar lavage fluid cytologic preparations or histologic examination of the bronchial mucosa. Although the precise cause of EBP is unknown, a hypersensitivity to aeroallergens is suspected. The diagnosis relies on typical history and clinical signs, demonstration of bronchopulmonary eosinophilia by cytology or histopathologic examination, and exclusion of known causes of lower airway eosinophilia. Most dogs display an excellent response to oral corticosteroid therapy; however, side effects of this treatment can be limiting. New therapeutic approaches are being studied, including the use of aerosol therapy, cyclosporine, or drugs interfering with T helper 2 immune response.

**Interstitial Lung Diseases****937**

Carol R. Reinero and Leah A. Cohn

Several noninfectious nonneoplastic interstitial lung diseases (ILDs) have been recognized in dogs and cats. Overall, these ILDs are poorly

characterized in dogs and cats, although awareness of the conditions based on descriptions of clinical case series may be increasing. Lung biopsy remains crucial to the diagnosis, characterization, and classification of ILDs. Histopathologic findings can help to guide clinicians in selecting appropriate therapy and providing an accurate prognosis to pet owners. Only with definitive recognition of these pulmonary conditions can our knowledge of the clinical course and response to therapy be improved.

## **Cardiac Effects of Pulmonary Disease**

949

Fiona E. Campbell

Pulmonary hypertension (PHT) is the primary cardiac consequence of pulmonary disease. It develops as alveolar hypoxia of pulmonary disease, coupled with vasoactive and mitogenic substances released from pulmonary endothelial and vascular smooth muscle cells damaged by the primary disease process, mediates arterial vasoconstriction and vascular remodeling to raise pulmonary vascular resistance. Independent of the underlying pulmonary disease, PHT produces clinical signs of respiratory distress, exercise intolerance, syncope, and right heart failure. Diagnosis of PHT is made by estimation of pulmonary artery pressures by means of continuous-wave Doppler echocardiographic assessment of tricuspid or pulmonic regurgitant flow velocity. Treatment of PHT is directed at the underlying pulmonary disease but may also aim to attenuate pulmonary artery pressure and limit the clinical sequelae of PHT. No treatments are of proven benefit in veterinary patients; irrespective of the nature of the inciting pulmonary disease, the prognosis is often grave.

## **Advances in Respiratory Therapy**

963

Elizabeth A. Rozanski, Jonathan F. Bach, and Scott P. Shaw

Effective respiratory therapy depends on obtaining a definitive diagnosis and following established recommendations for treatment. Unfortunately, many respiratory conditions are idiopathic in origin or are attributable to nonspecific inflammation. In some situations, disorders are controlled rather than cured. Recent advances in pulmonary therapeutics include the use of new agents to treat common diseases and application of local delivery of drugs to enhance drug effect and minimize side effects.

## **Medical and Surgical Management of Pyothorax**

975

Catriona M. MacPhail

Pyothorax is the accumulation of septic suppurative inflammation within the pleural cavity. The cause and source of infection in dogs and cats often are unknown. Management of these cases can be challenging, because controversy exists over the best method for treatment. Reported outcomes and recurrence rates vary widely.

**Nutritional Considerations for Animals  
with Pulmonary Disease****989**

Scott J. Campbell

Recent publications in the human and veterinary literature have indicated that patients with pulmonary disease require specific nutritional consideration to ensure that optimal benefit is derived with nutrition support. Although additional research is needed in this area, preliminary recommendations can be made using information from the scant studies performed thus far in veterinary medicine and from information extrapolated from the human literature. These recommendations are likely to provide significant clinical benefit to patients with pulmonary disease. This article aims to provide the reader with a summary of the available information and links to other relevant sources.

**Index****1007**