Bacterial Pneumonia in Dogs and Cats

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KEYWORDS

• Bacterial pneumonia • Lower respiratory tract infection • Canine • Feline
• Lower airway disease

KEY POINTS

- Bacterial pneumonia is recognized much more commonly in dogs than in cats.
- Viral infection followed by bacterial invasion is common in young dogs, whereas aspiration pneumonia and foreign body pneumonia seem to be more common in older dogs.
- Clinical signs can be acute or chronic and do not always reflect a primary respiratory condition.
- Definitive diagnosis requires detection of intracellular bacteria in airway cytology or clinically significant bacterial growth from an airway sample, although relevant clinical findings are often used.
- Treatment requires identification of underlying diseases associated with pneumonia, appropriate antibiotic therapy, and control of airway secretions.

INTRODUCTION

Bacterial pneumonia remains one of the most common clinical diagnoses in dogs with either acute or chronic respiratory disease. New research suggests a complex relationship between viral respiratory diseases and development of bacterial pneumonia in dogs. Over the past decade, much has been discovered about the convoluted interplay between host and environmental factors that leads to this complex of diseases. In cats, bacterial pneumonia is less commonly identified than inflammatory feline bronchial disease.

CLASSIFICATION OF BACTERIAL PNEUMONIA

Aspiration

Aspiration pneumonia results from the inadvertent inhalation of gastric acid and/or ingesta and remains a common cause of bacterial pneumonia, accounting for roughly 23% of clinical diagnoses in a study of human patients admitted to the intensive care

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unit.[1] Although inhalation of gastroesophageal material is a common theme, different factors lead to the development of this phenomenon. Risk factors that have been identified for the development of aspiration pneumonia include esophageal disease, refractory vomiting, seizures, prolonged anesthesia, and laryngeal dysfunction (**Table 1**).[2]

In a healthy animal, physiologic and anatomic features reduce the chance of aspiration. During a normal swallow, fluid and food are propelled caudally in the oropharynx and through the upper esophageal sphincter by contraction of the oral cavity and tongue. At the same time, the epiglottis retracts to cover the laryngeal aditus and protect the trachea from particulate inhalation. Adduction of the arytenoid cartilages then contributes to further occlusion of the upper airways. Any process impeding these primary defenses or inhibiting the normal swallowing reflexes increases the likelihood of aspiration.

Aspiration injury results from inhalation of either sterile, acidic gastric contents (resulting from vomiting or gastric regurgitation) or of septic material from gastric or oral secretions. Irritation induced by acid inhalation promotes a local environment in which bacterial colonization can develop and lead to bacterial pneumonia. The severity of disease varies depending on the quantity and nature of the material aspirated as well as the length of time between the event and its diagnosis. Conscious patients with intact airway reflexes tend to cough and prevent massive aspiration injury. Animals under anesthesia or with reduced airway reflexes because of neurologic disorders are less likely to cough in response to the aspiration event and are, therefore, more likely to develop diffuse pulmonary infiltrates and acute lung injury. In many instances aspiration injuries occur under general anesthesia and the presence of a cuffed endotracheal tube does not prevent inadvertent aspiration.

Canine Infectious Pneumonia

Infectious, or community–acquired, pneumonias in dogs commonly begin with viral colonization and infection of the upper respiratory tract (canine respiratory coronavirus, herpesvirus, pneumovirus, and parainfluenza virus, among others).[3] Often, such diseases are acute and self-limiting, but in a subset of dogs inflammation associated

Table 1
Factors associated with aspiration pneumonia

Gastrointestinal disease • Refractory vomiting caused by systemic or metabolic disease • Pancreatitis • Intussusception • Foreign body obstruction • Ileus	Anesthesia • Prolonged anesthesia • Postprocedural upper airway obstruction
Esophageal disease • Megaesophagus • Esophageal motility disorder • Hiatal hernia • Esophageal stricture • Esophagitis	Neurologic disease • Polyneuropathy • Myasthenia gravis • Seizure • Conditions leading to prolonged recumbency
Cricopharyngeal dyssynchrony Muscular dystrophy Oropharyngeal dysphagia Laryngeal disease	Breed • Bulldog • Golden retriever • Pug • Cocker spaniel • English springer spaniel

Data from Refs.[11,21,22]; with permission.