Irish Wolfhound Pneumonia Protocol

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DIAGNOSIS

Irish Wolfhounds have a higher incidence of pneumonia than most breeds.

Symptoms

- ❑ Early symptoms may be subtle.
- ❑ Cough and fever may or may not be present.
- ❑ Lethargy and anorexia are usually present.
- ❑ The hound may be reluctant to lie down.
- ❑ Distinctive for the hound to hold the head forward and elevated and pant (see photo shown below).

Photo credit Edita Beresova

Exam

- ❑ Audible respiratory sounds are usually coming from the upper airways (nose and throat), while pneumonia requires listening with a stethoscope.
- ❑ Early in pneumonia the clinical exam may show normal breath sounds and need to be repeated.

Testing

- ❑ Early x-rays may be normal and need to be repeated.
- ❑ Tracheal wash is often recommended for diagnosis, however this requires sedation and results are often inconclusive. The results may not be available for a few days.

TREATMENT

Irish Wolfhounds with untreated pneumonia can become severely ill in hours.

- ❑ The usual organisms for bacterial (responds to antibiotics) canine pneumonia have been documented and beginning broad spectrum antibiotics to cover these organisms in a timely manner (even before x-rays) is required.
- ❑ A combination of two antibiotics to cover the usual bacteria causing canine pneumonia is recommended.
- ❑ Ceftiofur (Naxcel®) and clindamycin (Antirobe®) are recommended by the IW Health Group.
- ❑ Amoxicillin/clavulanic acid (Clavamox®) and enrofloxacin (Baytril®), a fluoroquinolone, is a well-tolerated and effective therapy recommended on the Veterinary Information Network. Ciprofloxacin (another fluoroquinolone) is NOT RECOMMENDED as it is not well absorbed by some dogs. Enrofloxacin (Baytril®) and clindamycin (Antirobe®) is recommended by the International Society for Companion Animal Infectious Diseases.
- ❑ A macrolide like azithromycin (Zithromax®); cephalosporins like ceftiofur (Naxcel®) or cephalexin (Keflex®); and tetracyclines, like doxycycline, can also be considered as part of the therapy combination as long as the combination collectively covers the gram-negative, gram-positive and anaerobic organisms known to cause canine pneumonia.

OTHER SUPPORTIVE CARE

- ❑ If oral antibiotics are tolerated your hound will hopefully avoid hospitalization.
- ❑ If your hound is not drinking, he will likely need subcutaneous or IV fluids.
- ❑ Coupage (patting chest with cupped hands) and sitting in a steamy bathroom with your hound may be helpful.
- ❑ Cough suppressants are not recommended but medications to thin mucus such as N-acetylcysteine (Mucomyst®) may be helpful.
- ❑ The hound should begin to clinically improve within a few days. It may be slow, but he should not be getting worse. If he is not improving, consider changing the antibiotic or undergoing bronchoscopy to provide a specific diagnosis. Also consider fungal pneumonia which will not respond to antibiotics.

OTHER CONSIDERATIONS

- ❑ Treatment stopped too soon often leads to recurrent pneumonia. Usual duration of treatment is to treat another two weeks after all signs of infection gone but if it is recurrent pneumonia, 4-6 weeks of antibiotics may be helpful.
- ❑ If pneumonia is recurrent, further health evaluation is needed urgently.
- ❑ Please see "Causes and Risk Factors for Pneumonia" *Harp & Hound* Autumn 2018, Page 55-56.

Causes and Risk Factors for Pneumonia

BY MELANIE MERCER DVM

In a Swedish study published in 2017 [1], the most common causes of death In Irish Wolfhounds were: 1- Cancers (24%), 2- Cardiac disease (18%), and 3- Respiratory Disease (16%). Thirty-seven percent of the dogs in this study had experienced at least one episode of pneumonia during their lifetime and fifty-three percent of those dogs had more than one episode of the disease. Most importantly, the occurrence of this disease had a statistically significant effect on lifespan in our breed, shortening it by an average of 175 days. Pneumonia is a significant problem in Irish Wolfhounds. However my impression from clinical veterinary practice is that it is NOT similarly a problem in mixed breed dogs or in most other breeds of dogs, and this underlies much of the reason that the average general practitioner is slow to diagnose the condition and may not treat it as aggressively as is recommended by the Irish Wolfhound Health Group or the Irish Wolfhound Foundation.

Most importantly, the occurrence of this disease had a statistically significant effect on lifespan in our breed, shortening it by an average of 175 days. Pneumonia is a significant problem in Irish Wolfhounds.

Respiratory infections may involve either the upper or lower respiratory system. An infection of the upper part of the respiratory system is above the lungs and may affect the throat, pharynx, nasopharynx, sinuses, larynx, and the upper portions of the trachea. These are rarely life threatening. Lower respiratory infections involve the lower portion of the trachea and the lungs (the bronchi, bronchioles, and alveoli), and produce decreased lung sounds, crackles, or wheezes when listening with a stethoscope. Audible wheezes, gurgles, and congestion heard without a stethoscope are generally coming from the upper airways. Pneumonia is any inflammation of the lungs and airways that causes breathing difficulties and a deficiency of oxygen in the blood due to the accumulation of fluid and debris inside the alveoli (the smallest portion of the airway where the transport of oxygen occurs into the blood stream) or a thickening of the tissues between the alveoli. Not every dog who coughs has pneumonia and not every dog with pneumonia coughs. Pleurisy, inflammation of the lining around the lungs, may occur as a complication of pneumonia.

The body has evolved some ingenious defense mechanisms to protect itself from injury and infection.

- **Aerodynamic filtration** - the nasal passages are designed to mechanically filter out larger particles, and warm and moisten the air as it enters the respiratory system. Smaller particles are deposited lower in the airways captured in a mucous covering on the mucosa.
- **Physical barriers to aspiration** - The larynx allows passage of air into the trachea while preventing the entrance of food or fluids. When swallowing, the epiglottis, a leaf-shaped flap of elastic cartilage, folds over to prevent blockage of the airway. Other portions of the larynx, the arytenoid cartilages, flex partially open and closed during respiration.
- **Cough reflexes** - These reflexes are mediated primarily by the vagus nerve. Receptors in the epithelium of the respiratory tract are sensitive to both mechanical and chemical stimuli. The bronchi and trachea are so sensitive to light touch that slight amounts of foreign matter or other causes of irritation initiate the cough reflex. Coughing removes the foreign material from the respiratory tract before it reaches the lungs. Coughing can only expel material from the trachea and major bronchi.
- **Tracheobronchial secretions and mucociliary transport system** - This system removes materials deposited in the lower 2/3 of the airway system. Foreign material, including viral and bacterial particles, which become trapped in the mucous secretions are propelled by cilia, small hair-like structures that produce a wave like motion. This produces a steady movement of foreign materials up the airway.
- **Cellular inflammatory response.** Alveolar macrophages ingest and inactivate inhaled particles, especially at the alveolar and small airway levels. Viral infection of the lungs depresses bactericidal activity of the macrophages
- **Local and systemic immunity.** Specialized cells located throughout the respiratory system act directly against viruses and bacteria and produce antibodies, proteins that identify and destroy virus and bacteria as well as fight infection. The tonsils have especially high concentrations of these cells.

When the normal defenses are overwhelmed or undermined and the lining of the alveoli becomes inflamed, normal gas exchange is compromised, air movement into and out of the lung tissue is decreased and hypoxia (low blood oxygen levels) may occur.

CAUSES OF PNEUMONIA

Primary viral, bacterial, and fungal infections occur, but pneumonia may complicate ANY pulmonary disease process. In wolfhounds, when we think of cases of pneumonia, we are primarily thinking of disease caused by bacteria, but it is uncommon for healthy dogs to develop these without underlying causes.

- **Infections** caused by viruses, such as influenza or distemper virus, fungal

infections, or even parasitic infections may damage the lung tissue and lead to secondary infections caused by bacteria.

- **Suppression of the immune system** increases the risk of infections by any organism. This immunosuppression may be caused by other infections, drug usage, or other severe metabolic disease.
- **Cancer** of any portion of the respiratory system
- **Prolonged recumbency** causes lung tissue on the lower side of the body to not be fully inflated. It is important to regularly turn patients who cannot get up on their own. This can cause collapse of the small airways and alveoli, increasing risk of infection. It is further complicated by any loss of consciousness or abnormal mental status, increasing risk of aspiration.
- **Anesthesia** stops the swallow reflex and relaxes the muscles at the entrance to the stomach that leads to gastric reflux. It also suppresses the cough reflex.
- **Trauma** may cause compromise of blood flow to the lungs and inflammation, providing conditions favorable to bacterial growth
- **Any compromise** of the physical defense mechanisms of the respiratory system. These may be acquired or congenital (present from birth) and these may have a heritable genetic component.
    - **Ciliary Dyskinesia** is a defect in the activity of the cilia, small hairs that sweep mucous and trapped debris out of the airways. This may be a primary genetic disorder passed as an autosomal recessive trait, but this system can also be depressed by noxious substances and may be depressed by some viruses for as long as a year. Primary Ciliary Dyskinesia, or PCD, can only be definitively diagnosed by electron microscopy on samples of respiratory epithelium or spermatozoa and is therefore uncommonly made.
    - **Laryngeal paralysis**, or LP, is an inherited congenital condition not reported in the Irish wolfhound. Acquired LP may be associated with hypothyroidism, but analysis does not support a causal relationship. Dogs diagnosed with LP should be tested for thyroid function, but treatment of this condition does not result in resolution of symptoms. LP may be the earliest sign of progressive generalized neurologic dysfunction, and while a definitive cause has not yet been found, an inheritable condition may be present in these individuals. Stridor, a harsh noise when breathing caused by failure of the arytenoid cartilages to relax, is the most obvious clinical sign.
- **Anatomical abnormalities**
- **Regurgitation**, vomiting or problems swallowing can lead to aspiration.
    - **Megaesophagus** involves a decrease in normal muscle function and dilation of the esophagus, which causes retention of food without passage into the stomach and leads to a significant increased risk of aspiration. It can present as a congenital condition or in an adult-onset form associated with a variety of conditions including myasthenia gravis.
    - **Gastric** reflux occurs when stomach contents back up from the stomach into the lower esophagus. This is the primary mechanism by which anesthesia is a risk factor for aspiration pneumonias. Overproduction of stomach acid, the presence of hiatal hernias, and obesity make this condition much more likely.
- **Damage** to the respiratory epithelium from smoke inhalation, chemicals, or near drowning.

In any case of an individual dog who suffers from more than one episode of pneumonia in its lifetime or in cases where closely related dogs show this problem, it is imperative that we not only look closely for predisposing causes, but also consider that there is an inheritable risk factor in the line and plan future breedings accordingly.

[1] Occurrence of cardiorespiratory diseases and impact on lifespan in Swedish Irish Wolfhounds: a retrospective questionnaire-based study. Orleifson et al. *Acta Veterinaria Scandinavica* 2017; 59: 53.

Photo courtesy of Beth Renstrom