

# Pulmonary Edema

- Pulmonary edema is an accumulation of fluid in the lungs.
- Many veterinarians use results of chest radiographs (x-rays) to confirm a diagnosis of pulmonary edema.
- In most cases, medication can resolve pulmonary edema, but the long-term outcome depends heavily on the underlying cause.

### What Is Pulmonary Edema?

Most lung tissue is made up of tiny clusters of air “balloons,” called *alveoli*. Each air balloon is lined by a thin layer of cells in contact with very small blood vessels. When you breathe, air fills the alveoli, and the cells lining the alveoli and the small vessels next to them take in oxygen from inhaled air and release carbon dioxide into the exhaled air.

When alveoli become filled with fluid, space that is normally available for oxygen uptake and carbon dioxide elimination becomes limited. *Edema* is a very general term that refers to fluid accumulation in the body, so the term *pulmonary edema* refers specifically to fluid that accumulates within the lungs.

Generally, the fluid that accumulates in the alveoli comes from surrounding blood vessels and tissues that have changed so that they “leak” into the lungs. Pulmonary edema can have many causes. Some types of trauma (such as strangulation, electrocution, or severe head injury) can result in pulmonary edema. The condition can also be associated with medical conditions like heart failure and cancer.

### What Are the Clinical Signs of Pulmonary Edema?

Depending on how much fluid has accumulated in the lungs, the clinical signs of pulmonary edema can be very mild or severe. Clinical signs may include the following:

- Coughing
- Difficulty breathing, or rapid breathing
- Weakness and collapse

- Blue lips and tongue (a condition known as *cyanosis* that occurs when the body lacks oxygen)

Because many medical conditions can cause pulmonary edema, some clinical signs may be associated with the underlying cause of the edema. For example, other injuries may be associated with a traumatic event that caused pulmonary edema.

### How Is Pulmonary Edema Diagnosed?

Obtaining a medical history and performing a physical examination are the first steps in diagnosing pulmonary edema. When your veterinarian examines your pet, he or she will listen to your pet’s chest with a stethoscope to determine whether the “air sounds” in the lungs and airways sound normal. Your veterinarian will also use the stethoscope to check your pet’s heart for heart murmurs (abnormal noises in between heartbeats) or changes in rhythm and heart rate.

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Many veterinarians use results of chest radiographs (x-rays) to confirm a diagnosis of pulmonary edema. Once pulmonary edema is diagnosed, your veterinarian may recommend additional testing to determine the nature of the fluid and look into possible underlying causes for the edema.

### What Are the Treatment and Outcome for Pulmonary Edema?

Treatment for pulmonary edema can involve several goals:

- **Stabilize the patient:** If the patient is having significant trouble breathing or is otherwise unstable, oxygen therapy and other treatments may be necessary to stabilize the pet. Because

## Common Conditions

pulmonary edema can set the stage for the development of pneumonia, antibiotics are sometimes given along with other treatments.

- **Treat the edema:** In most cases, medications can be administered to resolve the edema. If the fluid accumulation is severe, hospitalization may be recommended so that the patient can be supported and monitored as treatment is progressing. Your veterinarian may recommend repeating chest x-rays periodically to monitor how well the edema is resolving.
- **Address underlying illnesses:** The underlying cause for the pulmonary edema (for example, heart failure) may need to be managed with

additional medications, monitoring, and follow-up diagnostic testing.

The outcome for a pet with pulmonary edema can depend heavily on the cause of the edema. For example, if a pet has heart failure, the edema may return unless the heart failure is treated effectively. In this case, heart failure is a chronic illness, so there is always the chance that the pulmonary edema can return. In contrast, if pulmonary edema results from a traumatic event (such as a head injury or strangulation), it can be treated and not return as long as the patient recovers from the initial trauma.