# Lymphedema

*Kristi S. Lively, DVM, DABVP*

## BASIC INFORMATION

### Description

The lymphatic system is a network of vessels and lymph tissue that carries a protein-rich fluid called *lymph*. Lymphoid tissue is found in many organs, including the spleen, bone marrow, tonsils, and lymph nodes (glands). These organs play a role in the production and circulation of antibody-producing cells called *lymphocytes*, which are an integral part of the body's immune system. Lymph is not pumped through the body like blood is pumped by the heart. The contraction of nearby muscles helps lymph slowly move through the lymphatic vessels.

In addition to its immune properties, the lymphatic system also helps to drain excess fluid from tissues and helps to transport a fatty liquid rich in lymphocytes, known as *chyle*, back to the bloodstream. Disorders affecting the lymphatic system can cause abnormal fluid accumulation and tissue swelling, which is called *lymphedema*. Lymphedema can arise as a congenital (primary) or an acquired (secondary) condition. It is more common in dogs than in cats. English bulldogs, poodles, Labrador retrievers, and Old English sheepdogs are predisposed to the condition.

### Causes

Congenital lymphedema is caused by an inherited malformation of the lymphatic system. In these patients, normal lymph vessels or tissues may be completely absent or dramatically reduced. Secondary lymphedema can be caused by congestive heart failure, venous hypertension (high pressure in veins), trauma, inflammation, or infection. Some of these problems result in excessive fluid production that overwhelms the lymphatic drainage system. If damage occurs to the lymphatic system from trauma, surgery, radiation therapy, infection, or cancer, the ability to effectively transport fluid is also affected.

### Clinical Signs

Congenital lymphedema is often present at birth or develops in the first few months of life. Secondary lymphedema can occur any time during the animal's life. Swelling typically starts in one or more of the legs and may progress to affect other areas of the body. The swelling "pits" when touched, which means that the swelling indents when pressure is applied to it, and the indentation may persist for several minutes. The swelling is not usually painful and does not cause a fever unless a secondary infection occurs. Eventually, the pitting quality of the swelling disappears as scarring develops within the tissue.

### Diagnostic Tests

A number of diagnostic tests are needed to rule out more common causes of tissue swelling. A thorough history and physical examination may identify underlying heart disease, trauma, or evidence of infection. Laboratory tests are usually done to rule out diseases that cause loss of protein and to search for evidence of infection and cancer. Tests for heartworm disease, tick-borne infections, and other causes of vasculitis (vessel inflammation) may be recommended.

Fine-needle aspiration of the affected area or nearby lymph nodes reveals no cancerous or inflammatory cells, unless secondary infection has occurred. X-rays of the affected limb may be recommended if trauma is suspected. X-rays and/or ultrasound imaging of the abdomen and chest may be performed to evaluate the heart and screen for cancer.

If lymphedema is highly suspected, lymphangiography may be considered. In this procedure, dye is injected below the swollen areas, and the flow is observed through video x-rays (fluoroscopy) or a series of still x-rays. Lymphangiography is often performed at veterinary referral facilities.

## TREATMENT AND FOLLOW-UP

### Treatment Options

Unless a correctable underlying condition is diagnosed, lymphedema is not considered curable. Resting the animal and massage of the affected limb may improve lymph circulation. In some patients, the use of long-term pressure wraps and physical therapy are needed. Antibiotics are used to treat secondary infections. Surgery may be attempted in some cases, based on the results of lymphangiography. Medications, such as benzopyrones (coumarin, flavonoids, rutin), may be tried to reduce production of the protein-rich fluid. Diuretics, steroids, and other medications have little beneficial effect on lymphedema.

### Follow-up Care

Long-standing lymphedema may predispose the animal to infections in the swollen area. The affected site also undergoes eventual scarring and fibrosis. With long-term bandaging, complications are possible if the bandages are not applied and changed correctly.

### Prognosis

With respect to congenital lymphedema, generalized forms are usually lethal. Puppies, especially English bulldogs with severe lymphedema, often die soon after birth. Improvement or resolution of the edema may occur in those animals with involvement of only the rear legs.

Prognosis for secondary lymphedema depends on the underlying cause; it is not typically reversible. Focal lymphedema may be tolerated well, even without therapy.

***IF SPECIAL INSTRUCTIONS HAVE BEEN ADDED, THEY WILL APPEAR ON THE LAST PAGE OF THE PRINTOUT.***