

Congestive Heart Failure in Dogs and Cats

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What is Congestive Heart Failure?

Congestive heart failure (CHF) is the clinical syndrome of fluid retention due to severe heart disease. In dogs and cats, the fluid is retained in specific parts of the body, depending on the side of the heart that is diseased.

- If the left side of the heart is diseased (e.g. mitral valve disease, most dilated cardiomyopathies, hypertrophic cardiomyopathy, and most common congenital cardiac defects), fluid is retained mostly in the lungs or within the pleural cavity (the chest space around the lungs).
- If the right side of the heart is diseased, fluid is retained mostly in the belly or within the pleural cavity.



Photo courtesy of Deposit Photos

Why Does CHF Occur?

CHF occurs because the pressure in the veins and capillaries draining into the diseased side of the heart increases to the point that fluid leaks out of the veins and capillaries. The capillaries and veins that drain into the left side of the heart are those coming from the lungs, so fluid leaks into the lungs. The capillaries and veins that drain into the right side of the heart are those coming from the body, so fluid leaks into the belly (ascites) or creates swelling in the legs, the skin under the belly, etc.; swelling of the legs or the skin is uncommon in dogs and cats with right-sided CHF, but much more common in humans and horses.

It can be useful to think of this like a garden soaker hose. If water is flowing through the hose under low pressure, only a little bit of water leaks through the soaker hose. However, if we increase the pressure inside the hose, water starts to emerge from the soaker hose at a much greater rate and floods your garden. The same happens with the capillaries – under low pressure, only a little fluid leaks out of them (and is resorbed). But if the pressure is too high, a large volume of fluid leaks out into the surrounding tissue, and overwhelms the resorption mechanisms.

What Causes CHF?

CHF requires severe heart disease that increases the resting (diastolic) cardiac pressure. For example, diseases that cause leakage of valves (mitral or tricuspid valve disease) can result in CHF if the leak is big enough. Cardiomyopathies also cause the resting cardiac pressure to increase, and can result in CHF. Pericardial diseases can prevent the heart from relaxing and stretching properly, which can result in right-sided CHF. Heartworm disease can cause right-sided CHF. Many congenital defects that shunt blood can result in CHF (e.g. patent ductus arteriosus, ventricular or atrial septal defects).

Importantly, congenital diseases that obstruct outflow from the heart, such as pulmonic stenosis or aortic stenosis, do not normally cause CHF.

What Are the Clinical Signs of CHF?

This depends on the side of the heart that is diseased. Let's start with left-sided CHF, which causes pulmonary edema and, sometimes, pleural effusion. As fluid starts to deposit into animals' lungs, the amount of oxygen in the blood decreases because it can't be absorbed from the lungs. Human patients describe this as shortness of breath, initially during exertion, such as climbing stairs, and eventually even when stationary. However, animals cannot tell us if they are short of breath. Sometimes, owners will notice a decrease in exercise ability, such as not going as far on walks and getting winded on walks more quickly. However, many things can cause exercise intolerance. Therefore, we tend to look for an increase in breathing (respiratory) rate, especially when sleeping.

Coughing has been described as a feature of CHF in dogs, but there is some doubt as to whether CHF really causes coughing or not. Again, many dogs and cats cough for reasons other than heart disease. As the fluid continues to build up, dogs and cats will also show difficulty in breathing as well as a faster respiratory rate. This is especially true of cats, who can hide their disease until it becomes really advanced. Consequently, many cats see veterinarians with labored, open-mouth breathing that is almost gulping for air, which appears to have started all of a sudden. In dogs, the clinical signs can be more gradual and subtle.

With right-sided CHF, the most common presentation is a swelling of the abdomen (ascites), making the dog appear pregnant. The discomfort from a belly full of fluid results in difficulty getting comfortable or breathing comfortably when lying down. These dogs will even resort to sleeping in a sitting position at times! Appetite often decreases slightly because of the abdominal pressure.

If there is a buildup of fluid in the chest cavity, the animal might show difficulty in breathing.

How Do we Diagnose CHF?

The diagnosis of CHF relies on pairing the clinical signs of increased respiratory rate and difficulty in breathing with the severe heart disease that is responsible for these clinical signs. Many times, a murmur can be heard for the first time. The pet's heart rate will be elevated, their respiratory rate will be elevated. Some cats come in with a low body temperature because they are somewhat shocky from inadequate oxygen.

If veterinarians suspect CHF, they will generally take chest x-rays to see if there is evidence of (A) severe heart disease that appears as an enlarged heart; and (B) opacity (areas through which light does not pass) in the lungs consistent with pulmonary edema, or fluid in the chest cavity consistent with pleural effusion. If they are unsure or require additional information, they might perform or recommend a cardiac ultrasound. Those are often performed by specialists, typically veterinary cardiologists or radiologists, who have the necessary equipment.

How Do we Treat CHF?

Treatment is directed at both the underlying heart disease and the accumulation of fluid. If possible, the cause should be corrected. For example, closing a congenital shunt, such as a patent ductus arteriosus, will immediately correct the problem permanently. Repairing a leaking mitral valve will also correct the problem almost immediately, although this procedure is currently very expensive and performed by a limited number of surgeons.

The mainstay of medical treatment of left-sided CHF is the use of certain diuretics, such as furosemide or torseamide. Diuretics reduce blood volume and consequently reduce the pressure in the veins, forcing the fluid out into the lungs or the abdomen.

Other drugs that are commonly used to treat CHF include angiotensin-converting-enzyme inhibitors, pimobendan, thiazide diuretics, and spironolactone. These are much less effective than diuretics and should never be given as the only drugs for managing CHF. Indeed, if a dog or cat does not require a diuretic, they most likely do not have CHF.

The fluid buildup in right-sided CHF often requires repeated manual removal, using large catheters to make the patient feel better. In many dogs, this can be done as frequently as every week or two. Ideally, when coupled with medical treatment, the frequency of belly taps can be reduced somewhat.

How Do we Monitor CHF?

The most important thing to monitor with left-sided CHF is respiratory rate. Provided the respiratory rate when sleeping is in the normal range, we can be reasonably confident that we have good control of the CHF. When the sleeping respiratory rate starts to increase, adjustments in treatment might be necessary; a veterinarian will evaluate the patient to determine exactly what to do in such instances. (See monitoring videos below.)

Many veterinarians will monitor bloodwork to make sure that the medications being given are not causing problems with kidneys or elsewhere.

If a pet appears to destabilize after a period of control, additional x-rays might help better evaluate the situation.

What is the Prognosis?

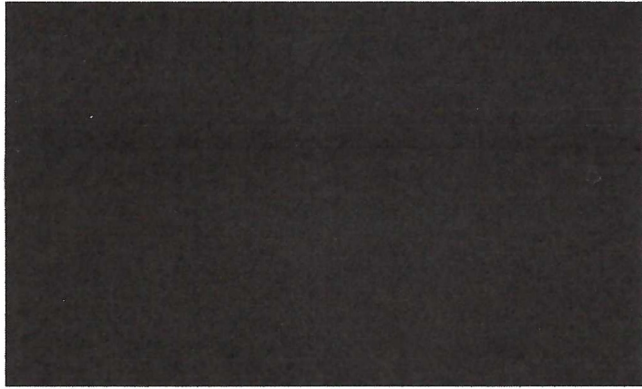
This depends somewhat on the underlying disease. With the more common diseases, such as mitral valve disease in dogs or hypertrophic cardiomyopathy in cats, once CHF is diagnosed and treatment instituted, survival is generally less than two years. With mitral valve disease, approximately 50 percent of dogs will succumb to their disease within 8 to 10 months, and only 20 percent live for 18 to 24 months. With hypertrophic cardiomyopathy survival data are less clear, but some older studies suggest that 50 percent of cats will succumb to the disease within 7 to 10 months. As is always the case, a few individuals will live longer than expected.

Canine Sleeping Respiratory Rate





Feline Sleeping Respiratory Rate



Canine Resting Respiratory Rate



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