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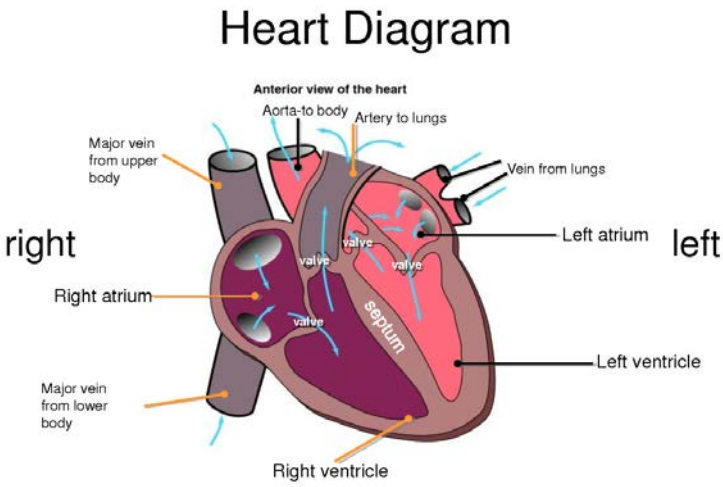
Heart disease and congestive heart failure

Basic structure and function of the heart



The canine and feline heart consists of four chambers. Its primary function is to pump blood and oxygen to the body. The *right atrium* and *right ventricle* provide blood flow to the lungs via the *pulmonary artery*, while the *left atrium* and *left ventricle* supply the remainder of the body via the *aorta*. The atrioventricular (AV) valves (*tricuspid*, *mitral*) separate the atria (upper chambers) from the ventricles (lower chambers) and prevent backwards flow of blood, or *regurgitation*, when the heart is pumping. Semilunar valves (*pulmonic*, *aortic*) prevent backwards flow of blood from the great arteries (*pulmonary artery*, aorta) back into the heart while it is filling. Heart disease in dogs and cats is usually caused by abnormalities of the heart valves, heart muscle, or electrical conduction system of the heart.

Circulatory system: the basics

Deoxygenated blood (lacking in oxygen) drains into the right side of the heart, and is then pumped into the lungs where the oxygen concentration increases again. This *oxygenated blood* then passes into the left side of the heart and is pumped to the rest of the body. Oxygen and other nutrients are delivered to the peripheral organs and tissues of the body by this *circulation of the blood*. Following oxygen delivery, the *deoxygenated blood* returns to the right side of the heart and the process begins anew.

What is a heart murmur, and what causes it?

A heart murmur is a sound (heard on physical examination by your veterinarian with the aid of a stethoscope) caused by turbulent blood flow in the heart or circulatory system. *A heart murmur is a general finding, not a specific disease diagnosis*. Most heart murmurs are caused by heart disease, but benign heart murmurs *(i.e. not associated with heart disease)* do occur. *Echocardiography* (cardiac ultrasound) is the definitive method of determing *the cause* of a heart murmur once it has been identified.

What is congestive heart failure (CHF)?

Congestive heart failure (CHF) is a syndrome of clinical signs (symptoms) caused by poor blood flow and circulatory congestion (leakage of fluid from the bloodstream into surrounding tissues). Heart failure can occur secondary to any form of heart disease, if significant enough. Left-sided heart failure results in leakage of fluid into the lungs (*pulmonary edema*) in both dogs and cats. Cats with left-sided heart failure also may develop fluid within the chest cavity (*pleural effusion*). Right-sided heart failure results in leakage of fluid into the abdomen (*ascites*) and/or chest cavity.

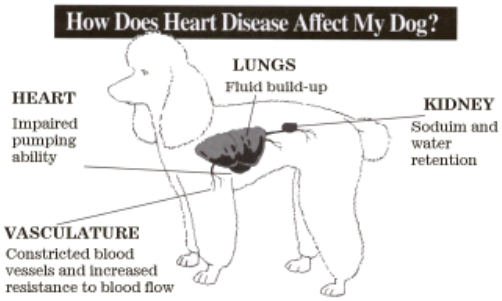
The most common clinical signs associated with left-sided CHF in dogs and cats include:

Dogs

- Elevated respiratory rate and/or effort
- Respiratory distress
- Coughing
- Exercise intolerance
- Collapse/fainting
- Lethargy

Cats

- Elevated respiratory rate
- Respiratory distress
- Lethargy
- Hiding behavior
- Decreased appetite



The most common clinical signs associated with right-sided CHF in dogs and cats include:

- Abdominal distension
- Lethargy
- Decreased appetite
- Exercise intolerance
- Elevated respiratory rate or effort
- Diarrhea
- Peripheral edema (fluid in the skin)

How is congestive heart failure diagnosed and treated?

Congestive heart failure is diagnosed by the detection of these clinical signs at home and physical examination findings by your veterinarian in combination with appropriate findings on some combination of radiographs (x-rays), ultrasound (of the chest or abdomen), and/or NT-proBNP testing (blood testing).

The goals of treatment for congestive heart failure are to improve quality of life and prolong patient survival. The targets of therapy include:

1) Correct or improve the primary structural or electrical cardiac problem, if possible
2) Resolve and control clinical signs (symptoms) by reducing circulatory congestion and improving cardiac function

Some pets may initially require hospitalization for 1-3 days, while others may be treated as outpatients if clinical signs are mild. The primary therapy for congestive heart failure is *diuretics* (e.g. *Furosemide (Lasix) or other diuretics)*. Diuretics increase the body's urine production to reduce circulatory congestion. Ascites and pleural effusion may need to be drained by a veterinarian. Other therapies commonly used include angiotensin-converting enzyme (ACE) inhibitors (eg *Enalapril, Benazepril*), Pimobendan (*Vetmedin*) and *Spironolactone*. As the disease progresses, additional medications may be necessary.

How long can my pet live with congestive heart failure?

The prognosis for pets with congestive heart failure is variable and dependent on the nature of the underlying heart disease, as well as response to therapy. Your pet's cardiologist will discuss the prognosis for your pet with you based on the specific nature of his/her condition.

A recent veterinary study documented a 74% improvement in survival time for dogs whose congestive heart failure treatment was under the guidance of a veterinary cardiologist working together with primary care veterinarians[1].

References:

1. Lefbom BK, Peckens NK. Impact of collaborative care on survival time for dogs with congestive heart failure and revenue for attending primary care veterinarians. J Am Vet Med Assoc. 2016 Jul 1; 249(1): 72-6.

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