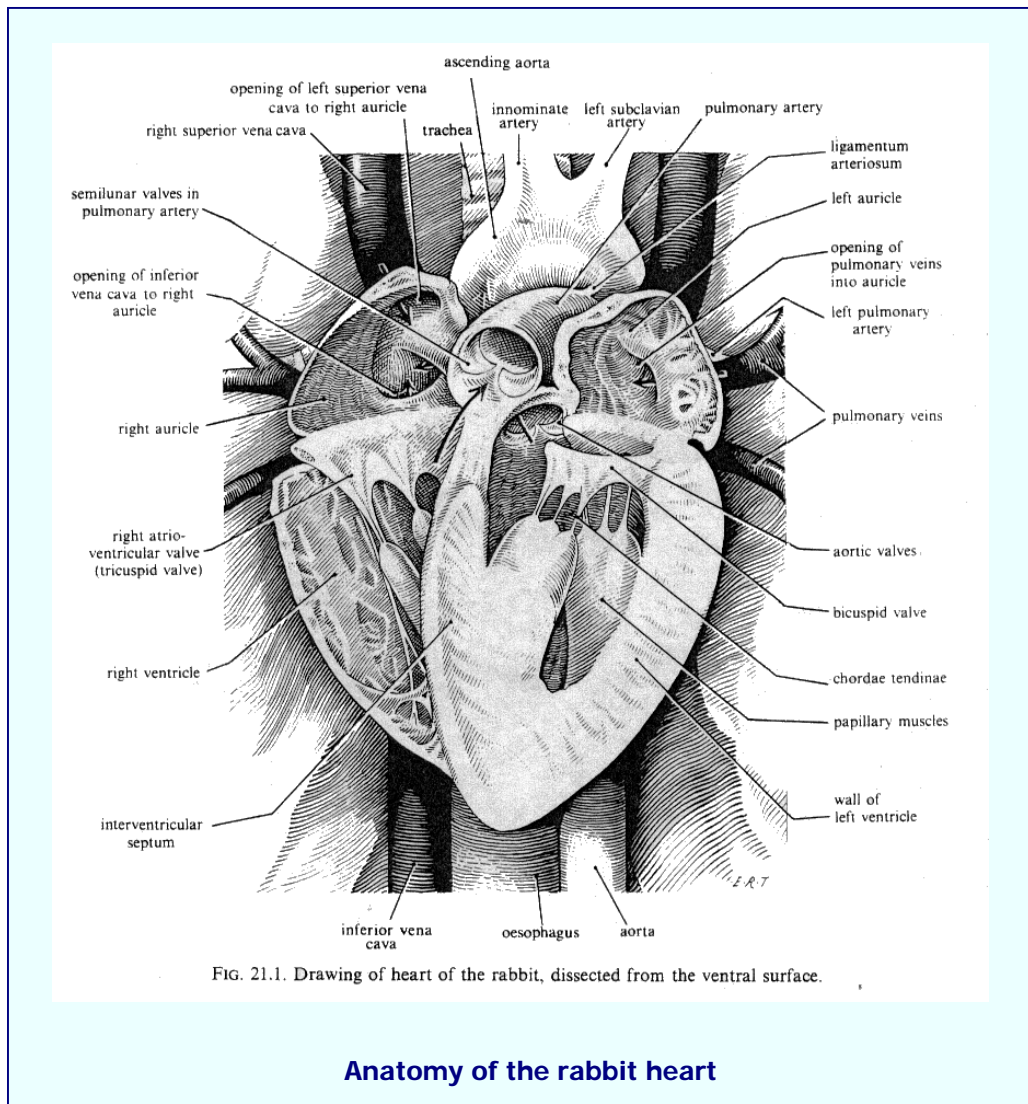


## *Congestive heart failure in rabbits*

*Esther van Praag, Ph.D.*

The heart is located in the thoracic cavity, its apex (tip of the heart) is directed backwards, and slightly to the left; the base is directed forwards. Like other small animals, the rabbit heart is formed by 4 chambers, 2 atria and 2 ventricles separated by inter-auricular and inter-ventricular septa, but it also possesses some anatomical and physiological particularities.

For details, see: [Cardiology and techniques to detect cardiac diseases in rabbits.](#)



Atria are thin walled chambers that receive blood, while the ventricles are thick walled muscular structures that pump the blood out of the atrium, back into the blood system.

When the left ventricle is not able to pump the blood out of the left atrium, or when the mitral valve is not working properly, the blood will accumulate in the lungs (left sided-heart failure). These become congested, leading to pulmonary edema

(accumulation of fluids). As a consequence, the oxygen uptake and its movement from the lungs to the

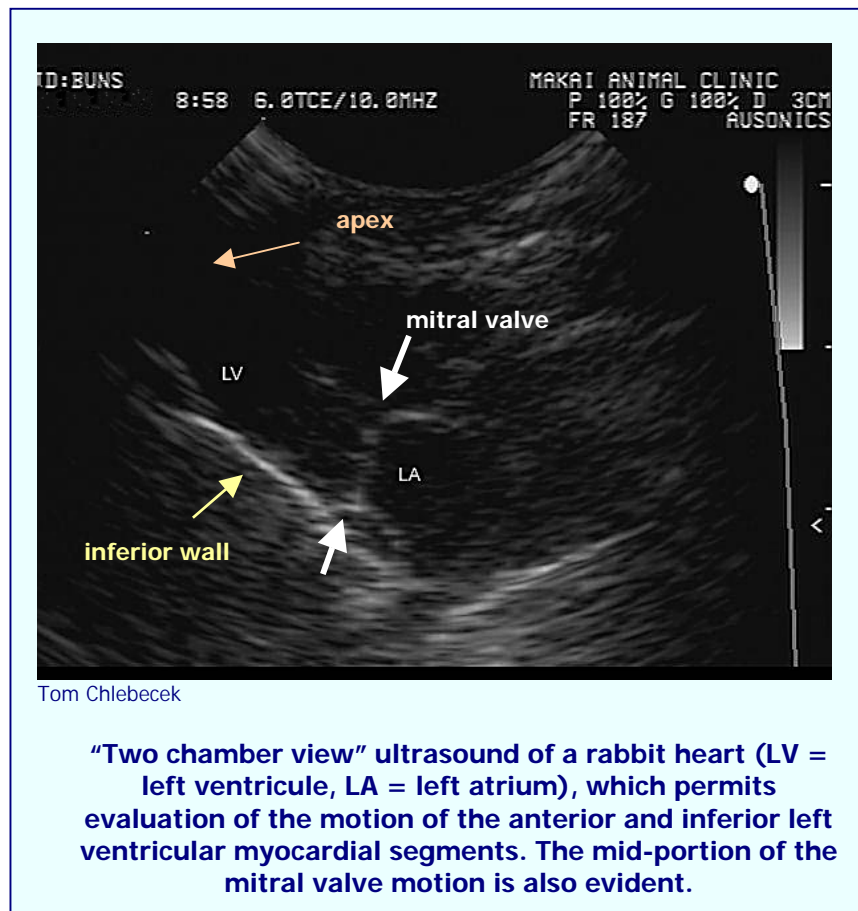
heart will be impaired, causing tiredness. It is often accompanied by labored breathing (dyspnea).

When the right ventricle is not able to function properly, or the tricuspid valve is defective, the blood pressure will rise, leading to fluid accumulation in body tissues, mainly the abdomen and the lower body parts.

### Causes

The main cause for congestive heart failure is a malfunctioning of the left ventricle. Regularly it also is caused by a lack of movement or a diet deficiency (vitamin and mineral deficiencies) in rabbits. Further causes leading to this disorder include:

- arrhythmia (abnormal heart beat),
- bicuspid or mitral valve defect, either of congenital origin, or caused by an infection (viral or bacterial), or other diseases,
- coronary disease,



- myocardia related disorders, inflammation or cardiomyopathy,
- anemia or low red blood cell count
- lung diseases, e.g. pneumonia

### Symptoms

External symptoms of congestive heart failure include tiredness, weakness, loss of appetite, confusion, persistent coughing or wheezing, dyspnea.

Various clinical tests (see: [Cardiology and techniques to detect cardiac diseases in rabbits](#)) will often reveal an enlarged heart, increased heart rate, arrhythmia, and the presence of (lung) edema.

### Treatment

The treatment of congestive heart failure will not heal the problem, but helps keeping it under control. It includes the treatment of the underlying disease (e.g pneumonia, treated with appropriate antibiotics), and the inset of medication that will prevent further deterioration of the heart function.

Acute treatment of congestive heart failure consists of oxygen administration and rest in a quiet place. The use of diuretics will help relieve the sodium and fluid retention. Nitrate-based drugs (e.g. nitroglycerin) will help reduce the strain on the heart. Sometimes, therapeutic pleurocentesis is needed in a rabbit suffering from pleural effusion and severe dyspnea. The cause(s) should be investigated, by means of echocardiography (ultrasound) for instance.

In rabbits, long-term management of congestive heart failure includes the use of:

- angiotensin converting enzyme (ACE) inhibitors (e.g. enalapril) smoothen the blood vessels so that blood can flow more easily through them or give rest to the heart, in the hope that it will decrease in size and respiration will become easier. Enalapril has a slight little advantage over the other available drugs.
- diuretics (e.g. furosemide) help reduce fluid buildup in the body. Increased excretion of water and sodium will reduce the symptoms of heart failure. Their dosage is based on the body weight. Indeed, too much will lead to dehydration and potential kidney failure, while too little will not bring the expected relief or improvement of the symptoms. The side effects of diuretics may be a low potassium blood level.
- inotropic agents (e.g. digoxin) are used to stimulate a stronger heart beating and slightly increase the amount of blood pumped out of the left ventricle at each contraction. In rabbits, they are used to control



subacute and chronic disorders of the myocardium, supraventricular arrhythmia, or valve regurgitation (leakage of blood from the ventricle back into the atrium during systole). These drugs should only be used if a regular monitoring of the hydration state, body weight, appetite, and serum levels of electrolytes, BUN, and creatine is possible.

#### Acknowledgement

Many thanks to Tom Chlebeczek, DVM, (Makai Animal Clinic, Kailua, HI), and to Frossie Economou, for giving the permission to use the ultrasound picture.

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