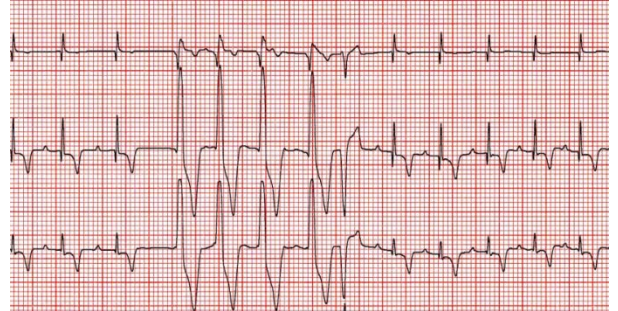


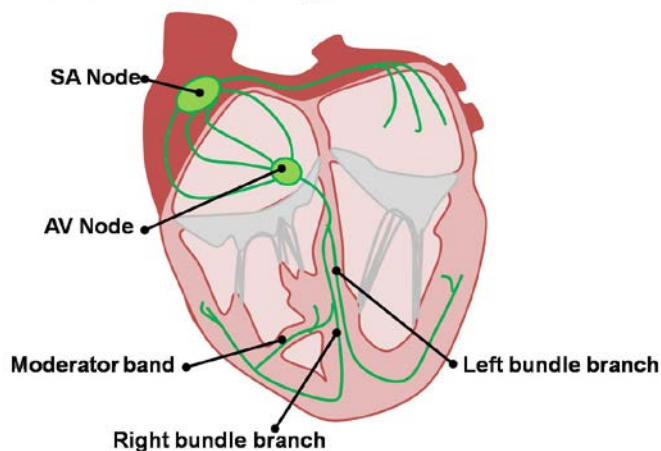
## Cardiac arrhythmias (dysrhythmias)

### Understanding the electrical activity of the heart

The heart is like a house in some ways. Visible with the naked eye, the heart muscle and valves are like the walls and doors of your home. Hidden inside the walls of your home is electrical wiring. Similarly, the electrical tissue of the heart is hidden within the muscle walls of the heart, out of sight. The heart muscle serves to pump blood around the body. The electrical tissue triggers, and ultimately regulates, the pumping function of the muscle itself.



### **Cardiac Conduction System**



Under normal circumstances, heart rate and rhythm are dictated by electrical activity in the *sinoatrial (SA) (sinus) node*, a small region of tissue in the right atrium. Impulses from this node stimulate the upper cardiac chambers (atria) before traveling to the *atrioventricular (AV) node*. After passing through the atrioventricular node, the impulses enter the lower cardiac chambers (ventricles) and stimulate contraction of the heart muscle.

Abnormal function of normal conduction tissue, or development of abnormal electrical activity in non-specialized heart muscle cells can lead to abnormal heart rhythms, known as *arrhythmias (dysrhythmias)*. Cardiac arrhythmias cause the heart to pump too fast (*tachyarrhythmias*) or too slow (*bradyarrhythmias*) and can lead to exhaustion of the heart muscle, lethargy, syncope (fainting), and even sudden death. They can occur secondary to primary structural heart disease, but can also occur in association with significant non-cardiac illnesses due to various hormonal and metabolic changes that occur during times of illness.



*Holter monitor*



*Obtaining an electrocardiogram in a dog*

Since the electrical tissue of the heart cannot be seen with the naked eye, the typical diagnostic tests (radiographs, echocardiogram) used to evaluate the visible structure of the heart do not provide much information about its electrical activity. Electrocardiography (ECG, or 'EKG') and ambulatory monitoring (Holter or event monitoring) are required to evaluate abnormalities of the cardiac conduction system when they occur.

The most common *tachyarrhythmias* (rapid heart rates) in dogs and cats include:

- Supraventricular tachycardia (SVT) (from the atria, or upper cardiac chambers)
- Atrial fibrillation (AF) (chaotic rhythm from the atria)
- Ventricular tachycardia (VT) (from the ventricles, or lower cardiac chambers)

Treatment with medication (antiarrhythmics) is often necessary to control these rapid rhythms.

The most common *bradyarrhythmias* (slow heart rates) in dogs and cats include:

- Sick sinus syndrome (SSS)
- Atrioventricular (AV) heart block (first, second, or third degree)

In some cases, no treatment is necessary for abnormally slow cardiac rhythms. In many cases, treatment with medication or implantation of a cardiac pacemaker is necessary to correct these abnormally slow rhythms, particularly when they are causing significant clinical signs (symptoms). Pacemaker implantation in dogs is a common procedure with a high rate of success, which can significantly improve quality and quantity of life in patients in which it is required.

Prognosis

- In dogs and cats with primary structural heart disease as the cause for their arrhythmia(s), prognosis is entirely dependent on the nature of the arrhythmia, the type of underlying structural heart disease present, and the available treatment options. Your pet's cardiologist will discuss prognosis with you in detail at the time of diagnosis.
- In dogs and cats with cardiac arrhythmias secondary to non-cardiac illnesses (of any kind), the arrhythmias may require treatment in the short-term, but generally resolve once the underlying non-cardiac illness has been resolved with treatment.

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