Arrhythmias

What is an arrhythmia?

The main purpose of the heart is to pump blood to the various cells and organs of the body, which require nutrients and oxygen carried in the bloodstream. Certain organs, such as the brain, are especially dependent on a constant and uninterrupted supply of blood in order to function properly. To meet such high demands, the heart must be extremely efficient. This requires interaction between the two components of the heart that enable it to perform its job.

The **muscular walls** of the heart's chambers contract (squeeze) to force blood forward. Within the walls, an **electrical conduction system** exists that controls these contractions. Electricity should flow in an orderly fashion along the specialized pathways that carry it through the heart, resulting in a rhythmic heart beat at a rate that is appropriate for a variety of situations (e.g. slower heart rates during sleep and faster rates during exercise).

An **arrhythmia** is an abnormality in the electrical system in the heart causing the heart to beat too quickly, too slowly, inefficiently due to abnormal conduction of electricity through the heart muscle, or some combination of the above. Depending on the type and severity of the arrhythmia, the result may be a temporary or sustained reduction in the effectiveness of the heart as a pump. The degree of ineffectiveness dictates whether or not there are symptoms associated with the arrhythmia.

The presence, type, and severity of symptoms secondary to an arrhythmia depend upon the severity of the arrhythmia, itself. If it occurs intermittently and lasts for only a brief period (e.g. 2-3 seconds), there may be no obvious outward signs of the arrhythmia. If it is intermittent but occurs for longer periods (e.g. several seconds or more) and significantly compromises the pumping efficiency of the heart, then weakness, fainting episodes, or even sudden death may occur. If it is constantly present, congestive heart failure may develop, signs of which may include intolerance to exercise, lethargy, coughing, increased rate or effort of breathing, and distension of the abdomen.

How is an arrhythmia diagnosed?

An arrhythmia is often first detected during **physical examination**, where an irregular heart rhythm may be heard using a stethoscope. An **electrocardiogram** (often abbreviated as **EKG** or **ECG**) is the diagnostic test used to confirm the arrhythmia, characterize its nature and severity, and determine if therapy is required. If severe symptoms are present (e.g. frequent fainting episodes), immediate therapy based on a brief electrocardiogram (e.g. 1-2 minutes) may be warranted. If an arrhythmia's true presence, severity, or relationship to symptoms remain in question, a more prolonged version of an EKG may be necessary. In this case, diagnosis may include use of a Holter monitor (a device worn for 24 hours) or an event monitor (worn for up to one month).

Two imaging tests are required to fully evaluate heart disease and rule out congestive heart failure. An **echocardiogram** (ultrasound examination of the heart) is used to identify structural (as opposed to electrical) abnormalities inside the heart. **X-rays** of the chest cavity provide a "big picture" view of the heart and allow assessment for heart *failure* through evaluation of the lungs. These tests are important because structural heart disease and congestive heart failure predispose to the development of arrhythmias, and can exacerbate arrhythmias that are already present. Treating them can make an arrhythmia easier to control. Blood work and urine analysis may also be necessary, depending upon whether or not heart failure is present and which medications are used.

How are arrhythmias treated?

If an EKG reveals an arrhythmia that is confirmed as being the cause of reported symptoms, or if its severity raises concern that symptoms or sudden death could occur, treatment is then recommended. Which type of therapy is appropriate depends upon the specific arrhythmia identified. In general, arrhythmias characterized by heart rates that are too fast are treated medically using antiarrhythmic agents. Arrhythmias characterized by abnormally slow heart rates may require implantation of a pacemaker. If structural heart disease or congestive heart failure are identified via echocardiogram or chest x-rays, respectively, specific treatment for these conditions is discussed.

Followup evaluation is critical to the successful management of arrhythmias. Repeating an EKG after beginning medical therapy is mandatory and ideally includes use of a Holter monitor if one was employed prior to therapy. As a seemingly paradoxical side effect, any antiarrhythmic medication can potentially *cause* or *worsen* arrhythmias. If this occurs or if there is an inadequate response to treatment, adjustment of therapy is necessary. Other tests such as chest x-rays and blood work may be required if congestive heart failure is present.

What is the prognosis? What should I watch for?

The long-term outcome for animals with arrhythmias is extremely variable and depends upon factors such as response to therapy, as well as presence or absence of concurrent structural heart disease or heart failure. That is, an animal with underlying structural heart disease and heart failure in addition to an arrhythmia may not do as well as one with an arrhythmia alone. An animal without structural disease with an arrhythmia that requires medical therapy or even pacemaker implantation may go on to live a normal life.

Once treatment is begun, it is important to continue to watch at home for symptoms that may be caused by arrhythmias. These most commonly include episodes of **weakness**, **collapse**, or **fainting**. Symptoms of heart failure include **coughing**, **lethargy**, weakness, **intolerance to activity or exercise**, **rapid or labored breathing**, **abdominal distension**, and **loss of appetite**. Finally, side effects of specific antiarrhythmic medications are discussed depending upon the medication(s) used. If any of the above are noted, please contact either your regular veterinarian or Dr Marshall at Veterinary Specialty Services as soon as possible to discuss an appropriate plan. If you feel that the problem should not wait and requires immediate attention, then an emergency visit is warranted.