ATRIAL FIBRILLATION AND ATRIAL FLUTTER

BASICS

OVERVIEW

• The heart of the dog or cat is composed of four chambers; the top two chambers are the right and left atria and the bottom two chambers are the right and left ventricles
• "Atrial" refers to the atrium (singular) or atria (plural) of the heart; "fibrillation" is very rapid contraction or twitching of heart muscle fibers, but not the entire muscle; "flutter" is rapid contraction of the heart muscle of the atria
• Atrial fibrillation—rapid, irregular heart rhythm involving the top two chambers of the heart (atria); two forms are recognized: 1) primary atrial fibrillation, an uncommon disease that occurs mostly in large dogs with no underlying heart disease, and 2) secondary atrial fibrillation, which occurs in dogs and cats secondary to underlying heart disease
• Atrial flutter is similar to atrial fibrillation, but the atrial rate is generally more rapid and is characterized by a regular pattern of saw-toothed flutter waves in the baseline of the electrocardiogram ("ECG," a recording of the electrical activity of the heart); the two lower chambers of the heart (ventricles) respond to the rapid atrial heart rate; the ventricular response is generally rapid, but may be regular or irregular

GENETICS

• No breeding studies available

SIGNALMENT/DESCRIPTION of ANIMAL

Species

• Dogs and cats

Breed Predilections

• Large- and giant-breed dogs are more prone to primary atrial fibrillation than are other breeds

SIGNS/OBSERVED CHANGES in the ANIMAL

• Generally relate to the underlying disease process and/or congestive heart failure (CHF) rather than the irregular heart rhythm (known as an "arrhythmia") itself
• Dogs with primary atrial fibrillation generally are asymptomatic, but may have mild exercise intolerance
• Coughing; difficulty breathing (known as "dyspnea"); rapid breathing (known as "tachypnea")
• Exercise intolerance
• Rarely fainting (known as "syncope")
• Patients with atrial fibrillation have an erratic heart rhythm that sounds like "tennis shoes in a dryer" when listening to the chest with a stethoscope (procedure known as "auscultation")
• Heart sounds when listening to the heart with a stethoscope sound like "Lub Dub;" the first heart sound is the "Lub" and the second heart sound is the "Dub;" first heart sound intensity in atrial fibrillation is variable; second heart sound only heard on some beats, not on every beat
• Third heart sounds (known as "gallop sounds") may be present
• Patients with atrial fibrillation have pulse deficits and variable pulse quality; the "pulse" is the rhythmic "throbbing" of the arteries as the heart beats—normally the artery "throbs" each time the heart beats so that the pulse and the heart rate are the same; pulse deficits occur when the pulse and heart rate do not match, with the number of pulses being lower than the number of heart beats—pulse deficits usually indicate serious disease as the heart is unable to pump adequate blood with each heart beat; "pulse quality" is a description of how the pulse feels—words used to describe pulse quality include "weak," "normal," and "bounding"
• Signs of congestive heart failure (CHF) often are present; CHF signs include cough; difficulty breathing (dyspnea); bluish discoloration of the skin and moist tissues (mucous membranes) of the body caused by inadequate oxygen levels in the red-blood cells (known as "cyanosis"); congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body's needs

CAUSES

• Long-term (chronic) disease of the heart valves
• Disease of the heart muscle (known as "cardiomyopathy")
• Congenital (present at birth) heart disease
• Digoxin toxicity; digoxin is a drug used in the treatment of some forms of heart disease
• Unknown cause (so called "idiopathic" disease)

RISK FACTORS

• Heart disease

TREATMENT

HEALTH CARE

- Consider quinidine or application of an electrical shock to the chest (known as "electrical cardioversion") to attempt to return the heart to normal rhythm for a dog with primary atrial fibrillation**;** the success rate is dependent on how long the atrial fibrillation has been present—patients that have been in atrial fibrillation for more than 4 months generally have a lower success rate and a higher rate of recurrence; additional medical treatment may be necessary
- Electric shock to the chest (electrical cardioversion) to attempt to return the heart to a normal rhythm requires special equipment, trained personnel, and general anesthesia
- Patients with fast (secondary) atrial fibrillation are treated medically to slow the ventricular rate; converting the atrial fibrillation to a normal rhythm would be ideal, but such attempts in patients with severe underlying heart disease or left atrial enlargement are generally futile because of a low success rate and high rate of recurrence
- If the animal is in congestive heart failure (CHF), treatment directed at the CHF will be necessary; such treatment may include diuretics to remove excess fluid from the body, such as furosemide or spironolactone; various heart medications to control heart rate and function, such as digoxin or diltiazem; and angiotensin-converting enzyme inhibitors (ACE inhibitors) to dilate blood vessels, such as enalapril or benazepril

ACTIVITY

- Restrict activity until the rapid heart rate (known as "tachycardia") is controlled

DIET

- Mild to moderate sodium (salt) restriction if animal is in congestive heart failure (CHF)

MEDICATIONS

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

- Digoxin, β-adrenergic blockers, and calcium channel blockers (such as diltiazem) frequently are used to slow heart rate

Dogs

- Digoxin—if digoxin is administered alone and the heart rate remains high, the veterinarian will check the digoxin level and adjust the dose; if the heart rate still remains high, the veterinarian may consider adding a calcium channel blocker or a β-adrenergic blocker
- Diltiazem
- High-dose oral quinidine can be used to convert primary atrial fibrillation into normal rhythm

Cats

- Diltiazem or atenolol are the drugs of choice in most cats
- If the heart rate is not slowed sufficiently with these drugs or if heart failure is present, digoxin can be added
- Propranolol may be used in some cases

FOLLOW-UP CARE

PATIENT MONITORING

- Monitor heart rate and electrocardiogram (ECG; a recording of the electrical activity of the heart) closely
- Heart rates in the hospital and those measured on the ECG may be inaccurate due to patient anxiety and other environmental factors; therefore, Holter monitoring (where the patient wears a "vest" in which a continuous, mobile battery-powered ECG monitor has been placed; the ECG recording is performed over several hours, giving a better overall picture of the heart rate and rhythm) provides a more accurate means for assessing the need for heart-rate control and/or the efficacy of medical therapy for heart-rate control

POSSIBLE COMPLICATIONS

- Worsening of heart function with onset of irregular heart beats (arrhythmia)

EXPECTED COURSE AND PROGNOSIS

- Primary atrial fibrillation with normal ultrasound evaluation of the heart—generally a good prognosis
- Secondary atrial fibrillation—associated with severe heart disease, so a guarded-to-poor prognosis

KEY POINTS

- Atrial fibrillation—rapid, irregular rhythm involving the top two chambers of the heart (atria); two forms are recognized: 1) primary atrial fibrillation, an uncommon disease that occurs mostly in large dogs with no underlying heart disease, and 2) secondary atrial fibrillation, which occurs in dogs and cats secondary to underlying heart disease

• Secondary atrial fibrillation is usually associated with severe underlying heart disease; goal of therapy is to lower heart rate and control clinical signs
• Sustained conversion to a normal heart rhythm is unlikely with secondary atrial fibrillation