

Second-Degree Heart Block

(Second-Degree Atrioventricular Block, Mobitz Type I)

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
- In order to pump blood to the lungs and body, the heart must work in a coordinated fashion; the normal control or “pacemaker” of the heart is the sinoatrial (SA) node, which starts the electrical impulse to begin the coordinated contraction of the heart muscles—the electrical impulse causes the atria to contract, pumping blood into the ventricles; the electrical impulse moves through the atrioventricular (AV) node and into the ventricles, causing the ventricles to contract and to pump blood to the lungs (right ventricle) and the body (left ventricle)
- The normal heart rate for dogs varies based on the size of the dog; however, the general range is 60–120 beats per minute (with smaller dogs having faster normal heart rates)
- The general range for normal heart rates in cats is 120–240 beats per minute
- An electrocardiogram (ECG) is a recording of the electrical impulse activity of the heart; the normal ECG is a tracing with P, QRS, and T waves; the P waves are the first upward deflection of the ECG tracing that looks like a “bump” in the tracing; the P waves are a measure of the electrical activity of the atria; the QRS looks like an exaggerated “W” with the Q wave being a short, downward deflection, the R wave being a tall, spiked upward deflection, and the S wave being another short, downward deflection; the QRS is a measure of the electrical activity of the ventricles; finally the T wave may be an upward or downward deflection of the ECG tracing; the T wave is a measure of ventricular recovery prior to the next contraction
- “Second-degree heart block” or “second-degree atrioventricular block” refers to failure of one or more P waves (but not all P waves) to be conducted—Mobitz type I second-degree heart block occurs when atrioventricular transmission progressively is delayed prior to a blocked P wave

ECG Features

- Time between the P wave and the R wave (known as the “PR interval”)—becomes progressively longer prior to the appearance of a P wave that is not followed by a QRS complex
- Heart rate and QRS complexes—usually are normal

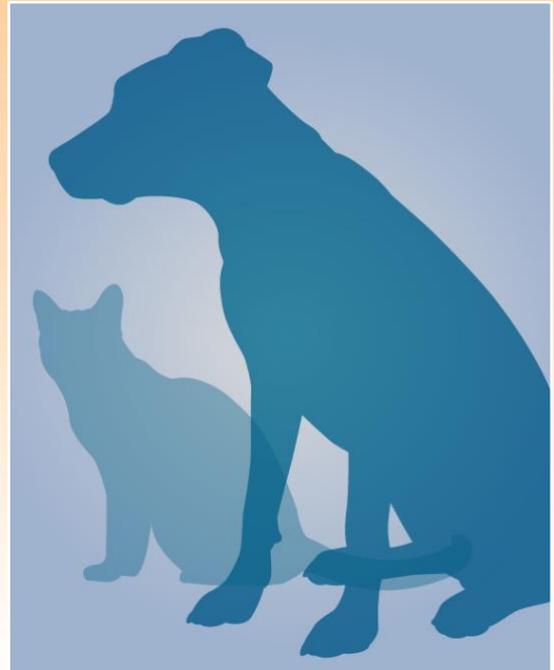
SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs
- Cats—uncommon

Mean Age and Range

- Usually occurs in young, otherwise healthy young dogs as a manifestation of high vagal tone; “high vagal tone”



refers to the vagus nerve—the vagus nerve provides nervous stimulation to the heart, lungs, throat, voice box, windpipe, and gastrointestinal tract; when it is stimulated (known as “vagal tone”), it has various functions, including slowing the heart

- Occasionally occurs in older dogs with abnormally strong vagal tone; studies have shown that this pattern is in 64% of healthy adult dogs and 100% of healthy puppies 1-2 weeks of age
- Rarely noted in old dogs with deterioration of the electrical impulse conduction system (known as “degenerative conduction system disease”)

SIGNS/OBSERVED CHANGES IN THE PET

- Most affected pets do not have clinical signs
- If drug-induced second-degree heart block (Mobitz type I), may have a history of clinical signs related to drug toxicity—lack of appetite (known as “anorexia”), vomiting, and diarrhea with digoxin; weakness with calcium channel blockers or β -adrenergic antagonists
- If heart rate is abnormally slow, fainting (known as “syncope”) or weakness may occur
- May have signs of more generalized heart muscle disease or other non-heart disease
- May have a change in heart sounds heard when listening to the heart with a stethoscope (known as “auscultation”); pauses noted after progressively softer first heart sounds

CAUSES

- Can be noted in normal pets
- Increased vagal stimulation resulting from non-heart diseases, usually leads to a rhythm disturbance, possible arrest
- Medications (such as digoxin, β -adrenergic antagonists, calcium channel blocking agents, propafenone, amiodarone, α_2 -adrenergic agonists, or opioids)

RISK FACTORS

- Any condition or procedure that raises vagal nerve tone

Treatment

HEALTH CARE

- Treatment usually is unnecessary
- Treat or remove underlying cause(s)

ACTIVITY

- Unrestricted

DIET

- Modifications or restrictions only to manage an underlying condition

SURGERY

- None, unless necessary to manage an underlying condition

Medications

- Only as needed to manage an underlying condition

Follow-Up Care

PATIENT MONITORING

- Typically not necessary

Key Points

- Any treatment is directed toward reversing or eliminating an underlying cause