

# Sinus Bradycardia

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## BASIC INFORMATION

### Description

Bradycardia is a heart rate that is slower than normal for the size of the animal and for the activity being performed. If the slow heart-beat originates from the normal location (sinus node) in the heart, it is called a *sinus bradycardia*. The rhythm of the slow heart rate may be regular or irregular.

Dogs' heart rates can fall as low as 20 beats per minute if they are sound asleep, and cats' heart rates are also reduced during sleep. More active and physically fit animals also have slower resting heart rates. Heart rates are usually higher in smaller and younger animals. Your veterinarian will take these factors into consideration when determining whether your animal's heart rate is too slow.

### Causes

The most common cause of sinus bradycardia is increased vagal tone. The vagus nerve can be stimulated by gastrointestinal, respiratory, neurologic, and eye diseases, as well as head trauma. Other diseases that can cause sinus bradycardia include hypothyroidism (low thyroid hormone levels), low body temperature, and increased blood potassium levels from various conditions. Certain drugs (narcotics, beta-blockers, calcium channel blockers, digoxin) can also cause sinus bradycardia.

Occasionally sinus bradycardia is associated with underlying heart diseases, such as problems in the conduction system of the heart, advanced heart failure, or other heart problems.

### Clinical Signs

Most animals have no clinical signs from the sinus bradycardia but have signs of their underlying disease. Occasionally dogs show weakness, exercise intolerance, or fainting. Cats may be quieter than usual. Some animals have signs of heart disease, such as lethargy, decreased appetite, increased breathing rate and effort, or coughing. On physical examination, the animal's heart rate is slower than normal.

### Diagnostic Tests

An electrocardiogram (ECG) will reveal whether your animal has a sinus bradycardia or a more pathologic abnormal rhythm (arrhythmia). Once a diagnosis of sinus bradycardia is made, an atropine challenge test may be done to determine whether increased vagal tone is the cause. The test is positive if the bradycardia disappears (heart rate speeds up) after atropine is given. If it is positive, further tests may be recommended based on the clinical signs.

If the test is negative, then more tests are usually performed to look for a cause. These may include routine laboratory tests, hormonal assays, and chest and abdominal x-rays. If heart disease is detected, an echocardiogram (heart ultrasound) is usually recommended.

## TREATMENT AND FOLLOW-UP

### Treatment Options

Often, if the sinus bradycardia disappears with the atropine challenge test, further therapy for the slow rate is not needed. However, treatment of the underlying cause of the sinus bradycardia is usually required.

If the sinus bradycardia is causing clinical signs and does not disappear with atropine, certain drugs (such as propantheline bromide, albuterol, terbutaline, or theophylline) may be tried. These drugs may or may not work to speed up the heart rate. Side effects include erratic results, anxiety, excessive panting, decreased appetite, vomiting, diarrhea, and constipation. If the drugs do not help and the animal is having signs from the slow rate, referral may be recommended to a veterinary specialist for possible insertion of a pacemaker.

### Follow-up Care

Repeated ECGs are used to monitor the animal's heart rate and response to therapy. A Holter monitor, which is a 24-hour, continuous ECG recording device, may be recommended in some patients to make sure that the heart rate increases adequately during routine activities.

If a pacemaker is implanted, then monthly ECGs are usually done by your veterinarian, and recheck visits with the specialist are scheduled at 3, 6, and 12 months during the first year to make any necessary adjustments.

### Prognosis

Since sinus bradycardia usually develops from diseases that increase vagal tone, the prognosis depends on what disease is present and how the animal responds to therapy. If the sinus bradycardia is not causing problems in these cases, the prognosis is excellent.

If the sinus bradycardia requires either medical therapy or placement of a pacemaker, prognosis depends on the response to the therapy. Medical management of patients with clinical signs from the bradycardia may be successful for only 6-12 months, after which a pacemaker may be needed. Prognosis after pacemaker implantation is excellent, with most animals living years longer. Eventually, however, heart function may worsen or the animal may develop other cardiac diseases that affect the prognosis.