

## Cardiac arrhythmias

You've found a promising sport horse for the upcoming competitive season, but during the prepurchase examination, your veterinarian detects an arrhythmia in your prospective horse's heart. How can that be? While the discovery of a cardiac arrhythmia is usually a surprise for the horse owner as well as the purchaser, it's a common scenario for veterinarians. Cardiac arrhythmias are often discovered as an incidental finding during regular physical examinations for prepurchase exams, during investigations of unrelated diseases, or while exploring a suspected primary cardiac problem. Once it's detected, it's up to your veterinarian to determine whether a cardiac arrhythmia is benign or clinically significant.

Cardiac arrhythmias — abnormalities of the heart rate, rhythm, or conduction patterns — are more common in horses than in any other large animal species. Almost 25 per cent of horses with no evidence of heart disease may have cardiac arrhythmias that can be discovered during a regular physical examination or with an electrocardiogram (ECG).

An arrhythmia can be considered benign and be deemed a normal finding; however, investigation is necessary to rule out a primary cardiac disease or a secondary non-cardiac disease — both are possible causes of the condition. Arrhythmias in horses may be brought on by excitement, fever, toxemia, colic, electrolyte imbalance, congenital defects, myocarditis and valvular heart disease.

### Physical and cardiac examination

A good general examination is instrumental in detecting arrhythmias. It will include cardiac auscultation — listening to the horse's heart with a stethoscope — the veterinarian listens for any of the following: fast or slow heart rate, an irregular heart rhythm, long pauses, or extra sounds.

A second important component of the exam is an electrocardiogram (ECG) which records the electrical activity of the heart muscle and provides useful information about cardiac function, heart rate and rhythm. When arrhythmias are found, they should always be evaluated in terms of the physical exam as well as the animal's medical and health history.

### Types of cardiac arrhythmias

The two primary concerns for the horse owner and the veterinarian are whether a cardiac arrhythmia may have

hemodynamic (forces involved in blood circulation) implications and/or its potential for triggering further cardiac complications and death. One important goal for the clinician is to determine whether the arrhythmia is occurring due to a normal variation in autonomic tone (for example, "physiologic arrhythmias"), due to a primary cardiac disease, or secondary to an underlying non-cardiac condition.

Here are the most common cardiac arrhythmias found in large animal species:

- **Sinus tachycardia** (a fast heart rate) can be caused by an increase in body temperature due to conditions such as fever or toxic conditions of the heart. In adult horses, the normal range is 26 to 50 beats per minute while the normal range is 60 to 80 beats per minute for foals.
- **Sinus bradycardia** (slow heart rate) may be found in normal horses when they are at rest. It may also occur in anesthetized or severely ill patients.
- **Sinus arrhythmia** (a change in the heart rate) may occur as a result of numerous circulatory conditions. This condition is commonly associated with lack of feed intake in cattle.
- **Atrial and ventricular premature contractions** (premature beats) may be significant depending on the frequency of their occurrence, the presence of other clinical signs related to cardiac disease or poor performance, and the association with other types of arrhythmias. They can be detected in normal horses and may occur in the immediate post-exercise period; therefore, an ECG during and after exercise is recommended for exploring this condition in horses.

## Cardiac arrhythmias

• **Atrial tachycardia** is not common in horses but is more common in cattle affected with gastrointestinal disease.

• **Atrial fibrillation** (erratic rhythm) is the most common cardiac arrhythmia in horses and is associated with poor performance and exercise intolerance. Atrial fibrillation (AF) may not be present at rest but may appear under exercise conditions and is characterized by a higher heart rate than is expected for the level of exercise.

Many horses with AF have no evidence of underlying cardiac disease. The AF may result from electrolyte imbalances. For example, a sudden appearance of AF may be associated with transient potassium depletion in racehorses that were administered furosemide. If left untreated, however, AF can lead to cardiac diseases.

Before any treatment for AF begins, cardiac disease and other underlying noncardiac diseases should be diagnosed, addressed, and corrected whenever possible. An ECG and an echocardiogram should be used to rule out cardiac disease as AF can be caused by atrial enlargement due to valvular disease or ventricular failure. A complete blood count, biochemistry panel, and blood-gas analysis can detect possible underlying diseases and any electrolyte and/or acid-base abnormalities.

Quinidine is commonly and successfully used to treat AF. In animals with chronic AF or with atrial enlargement, digoxin is administered as a pretreatment. Careful monitoring with physical examinations, cardiac auscultation, and ECGs should continue throughout the treatment process.

**Ventricular tachycardia** (VT) may develop due to a number of conditions including myocarditis, sepsis and electrolyte imbalances. The symptoms in large animals can vary greatly. Common clinical signs in horses include exercise intolerance, weakness, loss of consciousness and respiratory distress. In some specific cases, if VT is left untreated, congestive heart failure may develop in days or weeks. Anti-arrhythmic drugs such as lidocaine, quinidine, and bretylium tosylate can be used for treatment.

**Ventricular fibrillation** constitutes a serious emergency. If uncorrected, it is ultimately fatal. VF is very easy to diagnose using an ECG.

### Conduction disturbances

Conduction disturbances indicate problems with the heart's natural pacemaker which triggers the contractions of the heart muscle and co-ordinates the function of the atria and/or problems with the conductive system of the heart. Second-degree AV block is the most common kind of arrhythmia detected in horses and is even more common in fit horses. Sometimes this arrhythmia is considered benign, but in other cases, it can also be indicative of cardiac disease.

### Summary

Cardiac arrhythmias are common in large animals and probably even more common in horses than in other species. When your veterinarian detects a problem, the crucial steps are to:

- recognize the type of arrhythmia
- define its significance
- determine whether it's due to a primary cardiac problem secondary to an underlying non-cardiac disease, or a physiologic issue.

A thorough and systematic physical examination — along with electrocardiography, echocardiography and clinical pathologies — are essential tools in achieving a definitive diagnosis and determining a treatment approach. For horses, it's also necessary to evaluate the animal during and after exercise.

Cardiac arrhythmias that warrant anti-arrhythmic therapy relate to decreased cardiac output and hemodynamic instability — predisposing the horse to developing more severe and life-threatening cardiac arrhythmias.

*Marqués, Fernando. "Cardiac arrhythmias in large animal species: is it worth worrying about?" Large Animal Veterinary Rounds. 8(5), 1-6. Original article summarized by Lynne Gunville.*

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