Cardiology: when to worry

Dangerous arrhythmias: getting and interpreting the ECG in the heat of the moment

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Dangerous ventricular tachycardia is one that compromises perfusion with systemic hypertension. Most commonly, the rate of this type of ventricular tachycardia is greater than 200 bpm; however, the underlying myocardial function is a major determinant of the risk posed. A normal myocardium can tolerate a much faster arrhythmia than a heart with poor systolic function. The electrocardiogram (ECG) characteristics of ventricular tachycardia include a wide QRS complex that is either monomorphic or polymorphic (several morphological shapes). The beat intervals are often constant, but this is not always the case. Reasons that ventricular tachycardia develops in an emergency situation include Boxers with arrhythmogenic right ventricular cardiomyopathy, Dobermanns with dilated cardiomyopathy or any dog with myocardial disease (particularly myocarditis). Understanding the importance of the rate with these arrhythmias will be discussed.

Dangerous supraventricular tachycardias include orthodromic atrioventricular reciprocating tachycardia (OAVRT), which uses an accessory pathway and is usually identified in young large-breed dogs. This particular arrhythmia can be life threatening with extremely rapid heart rates. Fortunately, this is an uncommon arrhythmia. Other causes for a supraventricular tachycardia include focal atrial tachycardia, atrial flutter or atrial fibrillation. The ECG characteristics of supraventricular tachycardias include a narrow QRS complex in most cases. Tolerance for these arrhythmias also depends on the underlying myocardial disease. Focal atrial tachycardia, OAVRT and atrial flutter with 2:1 atrioventricular nodal conduction are most often characterized by a constant beat-to-beat interval. Atrial flutter with variable atrioventricular nodal conduction and atrial fibrillation will have irregular beat-to-beat intervals.

In the treatment of these emergency arrhythmias it is important to assess the primary problem that will

cause death, and that is degeneration of the rhythm to asystole or ventricular fibrillation. Additionally a major consideration of these rhythm disorders is poor perfusion. As well as supporting myocardial function, circulatory support and oxygenation are vital. Preventing deterioration to ventricular fibrillation is paramount. Ventricular tachycardia may be treated with lidocaine, sotalol, amiodarone or cardioversion. Depending on the specific diagnosis of supraventricular tachycardia, treatment would include thoracic thump, vagal manoeuvre, sotalol, diltiazem or beta-adrenergic blockers.

Once the animal is stabilized further examination is important to understand the underlying disease. This examination will include further electrocardiographic study, ideally a baseline 24-hour Holter recording, echocardiography and a troponin I concentration to rule out myocarditis are indicated.

KEY LEARNING OBJECTIVES

- To interpret the key features for diagnosis of ventricular and supraventricular arrhythmias
- To know the treatment options for tachyarrhythmias in the emergency situation
- To be able to develop a follow-up plan for treatment management

MULTIPLE CHOICE QUESTIONS

1. Which of the following breeds is most likely to have arrhythmogenic right ventricular cardiomyopathy?
(A) Golden Retriever (C) Boxer
(B) Dobermann (D) Great Dane
2. Which of the following medications can be given orally with a response expected within 2 hours to control ventricular tachycardia?
(A) Lidocaine (C) Digoxin
(B) Mexiletine (D) Sotalol
3. Which of the following arrhythmias is most likely to respond to a thoracic thump?
(A) Ventricular tachycardia
(B) Atrial fibrillation
(C) Focal atrial tachycardia
(D) Orthodromic atrioventricular reciprocating tachycardia (OAVRT)

Bradyarrhythmias: when to worry

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Sinus node dysfunction indicates abnormal depolarization from the sinus node complex and, if clinical signs are

present, the disorder is called sick sinus syndrome. The latter disorder is most common in Miniature Schnauzers, West Highland White Terrier, Dachshunds, Boxers and Cocker Spaniels. Sinus node function will deteriorate with age; however, the decrease in activity of the older patient may not require a rate response that would be needed for an active young dog. Chronotropic incompetence may be manifested by the inability to increase to a maximum heart rate, inability to maintain an increased heart rate commensurate with the amount of exercise,

Guest (guest)

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