EC Gee What Do I Do Now? Case-based Discussions Part 1

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Abstract

This presentation is intended to provide case presentations of various tachyarrhythmias including information on tools to make an accurate ECG diagnosis, case stabilization and therapy, and disease prognosis. Step-by-step case management details will be provided to help practitioners understand how best to work through these and similar cases, and specifics on treatment options (both in-hospital and chronic medications) will be provided.

Keywords: arrhythmia, tachycardia, treatment

Supraventricular tachycardia

- The definition of a supraventricular tachycardia (SVT) is one that originates above the atrioventricular (AV) node, thereby using the specialized conduction system in the ventricles to achieve ventricular depolarization

- This means that the QRS complexes should be normal in duration (i.e. narrow QRS complexes)
 - ** a notable exception is when you have BOTH SVT and bundlebranch block CONCURRENTLY – this causes abnormally wide QRS complexes and many be confused with ventricular tachycardia**
- One type of SVT is atrial fibrillation
- Treatment is aimed at slowing the heart rate
 - Two types of treatment exist: 1) Rhythm control; 2) Rate control
 - Rhythm control: these therapies convert the rhythm from SVT to normal sinus rhythm
 - Amiodarone is an oral class III anti-arrhythmic that has been shown to convert SVTs such as atrial fibrillation into normal sinus rhythm
 - Usually given as a loading dose: ~10 mg/kg PO BID
 for 5 days, then ~ 5 10 mg/kg PO q24h
 - Nexterone is an injectable version of amiodarone
 - 2mg/kg IV bolus (followed with CRI 0.8mg/kg/hr for 6 hrs, and then followed by 0.4 mg/kg/hr for 18 hours)
 - Rate control: these therapies limit the function of the AV node, so that fewer supraventricular impulses traverse the AV node
 - Causes fewer ventricular depolarizations, i.e. fewer heart beats
 - Typically rate control works faster than rhythm control
 - And so is preferable in an acute emergency situation

- Diltiazem is an oral or injectable calcium channel blocker
 - 0.2 mg/kg IV bolus
 - Repeat in 5 min if the heart rate is not better.
 - Then begin 0.5 mg/kg IV doses
 - repeat dosing in 5 min if no improvement
 - Should see some effect with 3-4 doses
 - Then start oral diltiazem XR ~2-3 mg/kg PO BID
- Other drugs such as beta-blockers and digoxin can be given, but each have side-effect profiles that make them less than ideal (and so I prefer diltiazem)

Ventricular tachycardia

- The definition of a ventricular tachycardia (VT) is one that originates below the AV node, thereby not using the specialized conduction system in the ventricles to achieve ventricular depolarization
 - This creates "wide and bizarre" QRS morphology
 - QRS complexes are wider than normal due to not using the specialized conduction system (impulses spread cell by cell)
 - QRS complexes do not have the "normal" pattern of the spread of depolarization, so they will look sometimes very different than the typical sinus QRS

- Treatment is given if one or both of the following conditions are met: 1) the VT is having a negative hemodynamic impact on a patient; 2) the characterization of the VT has inherent risk of sudden death
 - Usually if a patient either has low blood pressure, or is collapsing, or seems weak during the VT, we can reasonably conclude that the VT is having a negative hemodynamic impact on the patient
 - If we observe the following characteristics of a VT, then we should worry that this rhythm may be inherently life-threatening:
 - Multiform QRS complexes
 - Frequent ventricular premature complexes / VT
 - Very fast VT rate (~250 bpm or above)
 - R-on-T phenomenon
 - The vast majority of dogs with VT respond to lidocaine, so that should be your first choice
 - Lidocaine, 2 mg/kg IV bolus
 - Can be repeated multiple times
 - Sedation such as butorphanol (0.2 mg/kg) can help minimize the impact of sympathetic tone on the VT, which may help stabilize the rhythm