Differentiating Ventricular Tachycardia and other Wide Complex Tachycardias

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Ventricular tachycardia (VT) accounts for 80 percent of wide complex tachycardias (WCTs). Note, in patients with a prior MI this number jumps to 90%. However, in the remaining 10-20% of WCTs differential diagnosis may include a number of supraventricular tachycardias (SVT) with or without a pre-existing or rate-dependent bundle branch block. We need to make every effort to identify and treat the correct rhythm. This is a short synopsis of how to best determine what rhythm you have using a 12-lead EKG, and a few treatment guidelines.

Using a 12 lead to differentiate VT from SVT

Characteristics to consider:

1. Regular rate?
   - Slight irregularity points to VT
   - Marked irregularity points to Atrial Fibrillation with aberrancy or polymorphic VT
   - Extreme regularity points to SVT

2. Axis deviation?
   - Extremely right axis is usually VT (-90° to 180°)
   - Very rare in SVT

3. QRS duration?
   - QRS>160 milliseconds points to VT
   - QRS<160 milliseconds points to SVT

4. Concordance?
   - When concordance is present in V1-V6, i.e. all QRS complexes are monophasic with the same polarity, VT is strongly suggested

5. AV dissociation?
   - The presence of AV dissociation (i.e. p waves are not consistent with QRS complexes) suggests VT
6. Paced?
   • A fast paced rhythm may mimic VT, always check for the presence of a pacer on physical exam

7. “Good rabbit/bad rabbit” in V1?
   • A “bad rabbit” will have a higher left ear than right ear and is indicative of a ventricular rhythm. A “good rabbit” will have a higher right ear and is probably SVT or atrial fibrillation with an aberrancy.

FYI: In Med Evac’s Flight Guidelines refer to page 232 of the reference section for protocol on differentiating and treating VT vs SVT.

Treatment

   • If a patient is unstable do not delay treatment to figure out VT vs SVT, treat immediately and presume VT if unsure of rhythm
   • If unable to determine the rhythm always presume VT because those treatments (amioderone, procainamide, lidocaine or cardioversion) are also safe for SVT. Do not presume and treat for SVT if unable to determine the rhythm because some treatments for SVT (adenosine, calcium channel blockers or beta blockers) may precipitate cardiac arrest in a patient with VT.

Case Study

Med Evac is called to an outlying hospital for a 50s male in reported VT. Pt presented to the ED with his only complaint being that his AICD had fired x6 at home. His medical history does not include an MI but he did have an ablation procedure for Afib one week ago. When you arrive cardioversion has been attempted and several diltiazem boluses have been given. The patient is alert and oriented and his BP on their monitor is 125/60s. His K is 2.9 and Mg is also low. Below is the EKG they hand you:
Using the steps outlines above you can determine what rhythm this likely is,

1. Regular? No, marked irregularity → points to Afib
2. Axis deviation? No extreme right axis → not VT
3. QRS duration? Approximately 140 milliseconds → not VT
4. Concordance? Not present → not VT
5. AV dissociation? Unable to tell (no p waves visible)
6. Paced? Pt does have an AICD, unknown if it is also a pacemaker. EKG does not appear to have pacer spikes.
7. “Good rabbit/bad rabbit” in V1? Left ear is higher → Good rabbit → points to AFib with aberrancy.

Conclusion: Likely Afib with aberrancy, especially considering the patient’s history of Afib.
Sources


