Journal Club Synopsis

Block 9: March 11, 2015

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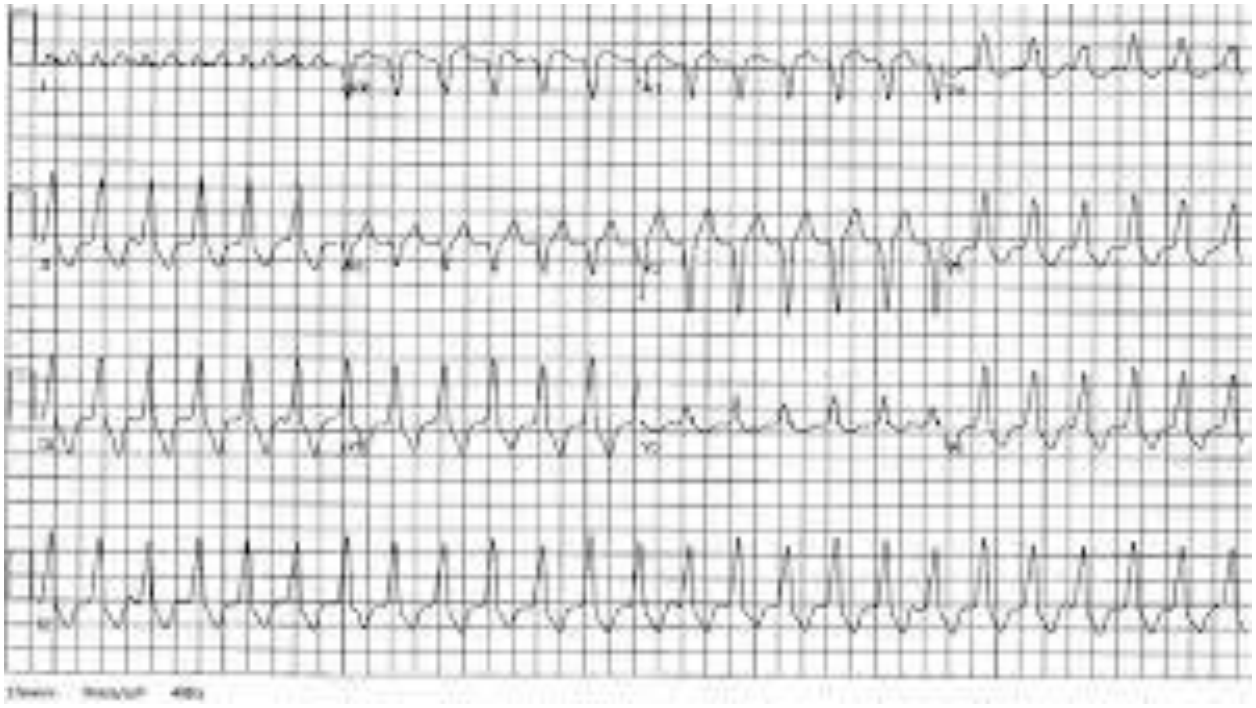
Scenario: 64 y/o woman comes into your hospital complaining of palpitations. Vitals are BP 11/85, HR 210, RR 24, O2 sat 95% on RA, temp is normal. EKG shows:



Pt is awake, alert and talking to you. You place IV, O@ monitor. What do you want to do next?

Introduction:

When a stable patient presents to the ED with a wide complex tachycardia everyone wants to figure out what the underlying rhythm is to try to determine the best course of treatment. Is it V-tach, A-fib with RVR and aberrancy, Wolf-Parkinson-White, SVT with aberrancy?

Over the years several algorithms have been developed to try and help sift out the various causes including Brugada, Bayesian, Griffith, Vereckei, and lead II R-wave-peak-time (RWPT). Often when talking to our Cardiology consultants they will quote these algorithms in an

attempt to help us decide between v-tach and the other less deadly rhythms. How reliable are these algorithms and how do the hold up to use in the ED? Should we be using them to guide our clinical practice?

The purpose of this Journal club is to explore the various algorithms clinical relevancy and come to a decision on how to approach these patients when they present to our emergency department.

Article 1: Brady, William et al. Wide QRS Complex Tachycardia: EKG diagnosis. *American Journal of Emergency Medicine.* 1999. 17: 376-381.

This article was the oldest and signaled the beginning of the effort to separate v-tach from other rapid or aberrant and less deadly rhythms. It suggested that EKG features including ventricular rate, frontal axis, QRS width and QRS morphology along with the presence of fusion beats could help to determine if the patient had v-tach. Three cases were presented. #1 a 34 y.o male with palpitations while playing tennis. Stable vitals with HR of >240 and a regular wide complex tachycardia on the EKG. PT was given a lidocaine bolus and infusion but the patient had a syncopal event and was cardioverted. Pt was later dx with PSWT with wide QRS. #2 a 56 y/o man with recent MI and weakness and palpitations. Stable vitals with pulse of 170. EKG showed wide complex tach with irregularity and variation of the RR interval. Pt was later dx with a-fib with aberrancy and given a cardizem drip. #3 68 y/o woman with h/o of angina and CAD after a witnessed syncopal event. Pt was conscious but confused. BP 75/P, HR 180, RR 36. EKG showed wide complex monomorphic rhythm with rate of 170 and pt was cardioverted back into sinus rhythm. After reviewing these cases the authors concluded that although there are signs like young age, that point towards PSWT and things like h/o MI, CAD, older age, CHF that suggest VT these are by no means absolute and when actual identification is not possible the clinician should assume the rhythm to be v-tach and the patient treated accordingly.

Article #2: Jastrzebski, Marek et al. Comparison of Five Electrocardiographic Methods for Differentiation of Wide QRS Complex Tachycardias. Europace 2012. 14. 1165-1171

The aim of this article was to compare the sensitivity, specificity and diagnostic accuracy for the diagnosis of ventricular tachycardia in five electrocardiographic methods for wide QRS complex tachycardia differentiation, specifically the Brugada, Bayesian, Griffith, aVR and r-wave-peak-time algorithms. They sat down a bunch of cardiologists and retrospectively reviewed 260 WCT from 204 patients with proven diagnoses. The sensitivity, specificity, diagnostic accuracy and likelihood ratio were all calculated. Griffith was the most sensitive but had a lower specificity it still missed 6% of v-tach and Brugada fared the best when including both SN and SP but still

missed 11%. Bayesian missed 11 % and aVR missed 13%. RWPT missed the most at 40%. The authors conclude that none of the newer methods are superior to the previously used Brugada algorithm. Several of the algorithms were laborious and required a magnifying glass making them unhelpful in an ED setting.

Article #3: Kaiser, Elisabeth et al. Differential Diagnosis of Wide QRS Tachycardias: Comparison of Two Electrocardiographic Algorithms. Europace. 2015. pp 1-6.

This article aimed to compare the Brugada and Vereckei algorithms to differentiate ventricular tachycardia from supraventricular tachycardia. 51 patients were registered during EPS induced regular WCT. Each was split into the two algorithms and randomly distributed to observers who followed the 4 steps of each algorithm. Sensitivity, specificity, percentage of incorrect diagnosis and step by step +/- Likelihood ratios were calculated. Sensitivity was 89 and 90.1% respectively. Incorrect classifications were 27 and 24 %. The first step of Vereckei was 76% positive for V-tach probability and was supposed to be a potential quick assessment for potential ventricular tachycardia. This study is very concerning for a 24-27% miss rate for a very deadly diagnosis and would likely not be able to be used in the ED.

Bottom Line: Although we would all like to have an algorithm that would help us distinguish the less deadly SVT, A-fib with RVR and aberrancy and WPW from the very deadly ventricular tachycardia none of these algorithms is sufficient. In emergency medicine there is no room for a miss rate of 11% for the Brugada which seems to be the most clinically useful or the 6% for the Griffith which is the most sensitive at ruling in v-tach. We should be aware of these algorithms and their names so that when we are talking to our cardiology consultants we understand their studies and are aware of their lack of acceptability for Emergency Department management of our patients. Bottom line is that is you have a patient with the potential for a life threatening diagnosis and you cannot separate it from one that is less threatening, treat it like the deadly condition it is likely to be and move on. If you are proven wrong later congratulations you have still saved the patient. If you treat is like it is SVT or a-fib and you are wrong the treatment may kill the patient you were desperately trying to save. Just treat it like v-tach with amioderone, procanimide, lidocaine (if you are JB) or “just light them up.”