Student's Corner

Become a Sherlock Holmes in ECG

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Series 6 :

"When QRS is Wide, Your Eyes Also Should Be Wide"

This is the ECG of 40 years patient who presents withchest pain and dyspnea. This is the first ECG taken for him and it is a routine ECG.

Questions :

(1) How will you approach this ECG?
(2) What are the practical implications?
(3) Why is this clue is given?

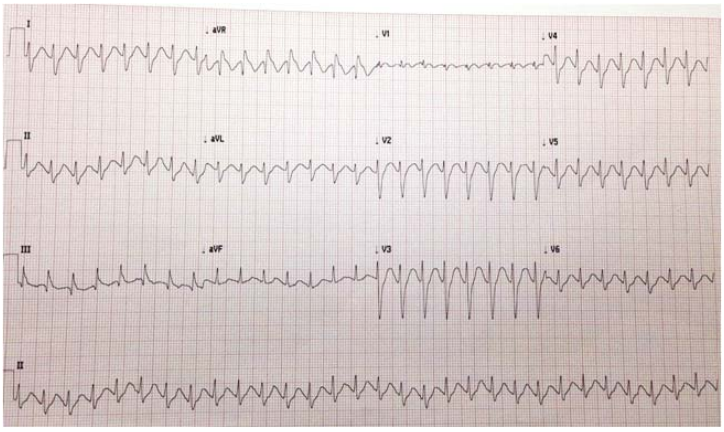

Fig 1 — This is the ECG of 40 years old female with confused state

Answers :

(1) This ECG shows wide QRS regular tachycardia. Once again common differentials are ventricular tachycardia, SVT with aberrancy and don't forget sinus tachycardia with basic intraventricular conduction disturbances such as Bundle Branch Block. Before diagnosing VT or SVT with aberrancy, in any wide QRS tachycardia always rule out sinus tachycardia with aberrancy as it may result in unnecessary anti arrhythmicdrugs, and shock which may lead on further complications not because of arrhythmia but because of treatment. Expand the Lead II or V1 (Fig 2) to see small slurs which appear on the downslope of T constantly with same PR interval which will confirm it is sinus tachycardia. Then let us look at what aberrancy it is. There are slurred S waves in V5, V6, LI and it looks like RBBB. But when you look at V1, there is no typical terminal delayed positivity to diagnose RBBB. So here we are dealing with wide QRS which is not probably due to classical Bundle Branch Block.

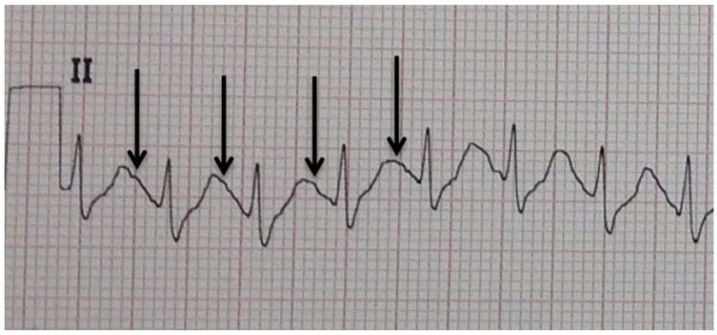

Fig 2 — Arrows Showing constant "blips" in the downslope of T indicating constant sinus P waves

The three important causes of wide QRS other than Bundle Branch Blocks are pre-excitation which is due to abnormal pathways like WPW syndrome, hyperkalemia and tricyclic antidepressant toxicity. Looking at our ECG WPW Syndrome and hyperkalemia are unlikely. So, we are dealing with ECG of tricyclic antidepressant toxicity. The 3 important ECG signs of TCA Toxicity are : (1) Sinus tachycardia, (2) Wide QRS more than 100msec. (3) Terminal R in avR more than 3mm. All the three signs are present in this ECG. Sinus tachycardia is due to inhibition of nor epinephrine reuptake, wide QRS is because of inhibition fast entry of Na during upstroke of action potential and terminal R wave is due to vulnerability of right bundle to get affected due to inhibition of Nafast entry.

(2) QRS duration of >160msec and R in avR>3mm predicts oncoming ventricular arrhythmia as well as seizures. The immediate treatment apart from basic resuscitation measures is intravenous soda bicarbonate whenever QRS is more than 100msec. All the other antiarrhythmic agents such as class IC drugs like flecainide, class II drugs like beta blockers, class III drugs like amiodarone and Class IV drugs like Calcium blockers are all contraindicated. The only drugs we can use in case of ventricular arrhythmias is IV Lignocaine and IV magnesium.

(3) The clue is given because whenever there is wide QRS rhythm either it is bradycardia or tachycardia, one should always look at the presence of p waves and their relationship to QRS. If there is constant relationship to QRS, and the P wave is not anormal, it is likely to be sinus tachycardia with BBB. If there is AV dissociation, if there is bradycardia it is complete heart block and if it is tachycardia, it is ventricular tachycardia. **So,we have to keep our eyes wide open in wide QRS rhythm to identify the P waves which are small blips and their relationship to QRS complexes.**

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