

Student's Corner

Become a Sherlock Holmes in ECG

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Series 7 :

“Aim High to Diagnose and Treat”

This is the ECG of 69 years old known hypertensive with recent onset breathlessness. No syncope.

Questions :

- (1) Describe all ECG changes
- (2) Why is this clue ?
- (3) What are Practical Implications ?

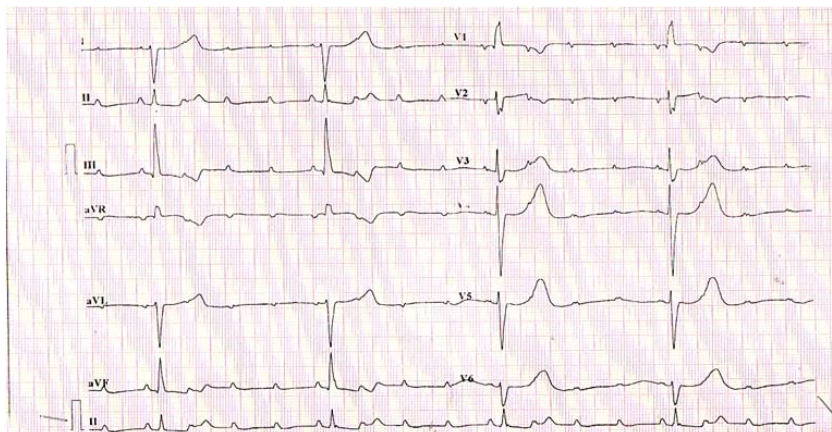
Answers :

(1) ECG FINDINGS :

This ECG shows Bradycardia with wide QRS complexes. The atrial rate is about 100/mt and ventricular rate is about 30/mt. Whenever atrial rate is more than ventricular rate with bradycardia one should suspect Atrio Ventricular Block (AVB). If two or more successive P waves are blocked, as in this ECG, Complete Heart Block (CHB) or High Degree AVB (HDAVB) should be suspected. The most important differentiating point between HDAVB and CHB is the presence of complete Atrio Ventricular Dissociation (AVD) which indicates CHB, where there is no fixed relationship between P and QRS throughout the ECG. But in this ECG, there is definite fixed P–QRS relationship (constant PR interval) for all the beats throughout the ECG and in the rhythm strip. So, this is HDAVB where every fourth P wave is conducted to the ventricles with constant PR. In addition, patient has complete RBBB, Left Posterior Fascicular Block (LPFB). So, the only conducting fascicle is Left Anterior Fascicle (LAF) which is also partially blocked as it blocks 3P waves and conducts only the 4th P wave. The combination of RBBB, LPFB with partial block in LAF makes it a Trifascicular Block.

The other ECG findings are :

- (1) Tall Broad T wave with Prolonged QT(?Recent SA Attack)
- (2) Progressive decrease in R wave amplitude from V4-V6 (Probable Anterolateral MI–ALMI)
- (3) In V1, the terminal negative complex of P is



1mv STD;25mm/sec.

prominent and there are bifid P waves in anterior chestleads – (possible Left Atrial Abnormality)

The summary of all ECG findings:

- (1) Brady cardia (Atrial Rate >Ventricular Rate)
- (2) High Degree AVB with 4:1 conduction
- (3) RBBB, LPFB, HDAVB-Trifascicular block
- (4) Broad T with Prolonged QTc (?SA Attack)
- (5) Probable ALMI
- (6) Possible Left Atrial Abnormality

CLUE:

Most often this ECG will be diagnosed as CHB. The important clue is the absence of AV Dissociation in the presence of fixed PR for conduction beats—which makes it a HDAVB. Because of this, “Aim high to diagnose” is given for suspecting High Degree AVB. Breathlessness in the presence of ALMI and LAA may indicate Heart Failure (HF), most often with preserved Ejection Fraction (HFpEF). This patient definitely requires a Permanent Pacemaker Implantation. Because of the possibility of HFpEF, one should always plan a Dual Chamber Pacemaker as the stiff ventricle needs atrial support. In single chamber pacemaker, there is Atrio Ventricular dissociation where atrium and ventricles are beating independently. So, pacing must include Higher chamber (Atrium) also. So, you have to also “Aim High for treatment”. Because of both the above reasons, the clue of “Aim high to diagnose and treatment” is given.

PRACTICAL IMPLICATION:

In addition to dual Chamber Pacemaker, patient requires management for CAD and appropriate treatment for HF especially for HFpEF.

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