

Student's Corner

Become a Sherlock Holmes in ECG

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Series 6 :

“Poor man’s EPS and CAG”

Routine ECG of 60 years old hypertensive on Amlodipine and Telmisartan.

Questions :

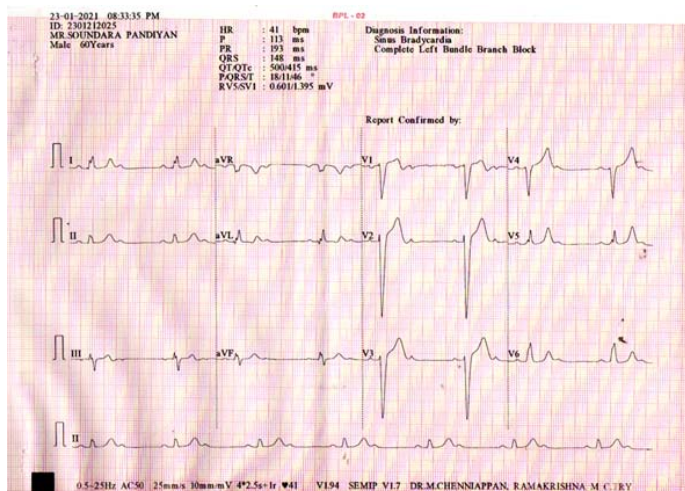
- (1) Describe all ECG changes
- (2) Why is this clue?
- (3) What are practical implications?

ECG Findings:

ECG shows basic bradycardia with complete Left Bundle Branch Block (LBBB). A small wave after each T wave can be an ‘u’ wave or blocked ‘p’ wave. The configuration of this wave in V1 as well as the distance of this wave from the T wave are suggestive of ‘p’ wave. So the blocked ‘p’ wave can be blocked Atrial Premature Beat (APB) or the sinus ‘p’ wave which is blocked. As there is no significant prematurity and change in the configuration of this blocked ‘p’ wave it is likely to be blocked sinus beat. So, this ECG shows 2:1 AV block. When some ‘p’ waves are conducted and some ‘p’ waves are blocked, this is second degree AV Block. However, it cannot come under type 1 or type 2 second degree AV block as there are no two successive PR intervals before the blocked ‘p’ to decide about whether PR interval is constant or gradually prolonging. This makes 2:1 block as a separate entity of second-degree AV Block. Once second-degree AV block is diagnosed, the site of block is to be determined. For example, in type 1 second degree in AV Block the block is in supra His level (AV node) and in type 2 second degree AV block it is in Infra His level (Bundle branches, fascicles). For 2:1 block, the site of block is decided by PR interval and QRS width. There can be three sites of block (Table 1).

Table 1 — 2:1 AV block - localisation

Site	PR Interval	QRS
AV Node (Supra HIS level)	Prolonged	Normal
HIS bundle	Normal	Normal
Infra HIS level	Normal	Wide (BBB)



As this ECG shows 2:1 AV Block with wide QRS (LBBB) the site of block is at Infra His Level of bundle branches and or fascicles. Because of LBBB, all the sinus ‘p’ waves have to be conducted through Right Bundle Branch (RBB) only. But this RBB is conducting only alternate ‘p’ waves indicating partial disease in itself. Hence, this is Bilateral Bundle Branch Block (BBBB). In addition, LBBB shows homophasic ST T changes (ST and T in the same direction of QRS) in anterolateral and high lateral leads. These signs represent subtle sign of CAD.

The Clue :

As this 2:1 AV block is with wide QRS, the site of block can be diagnosed as infra His AV block from the surface ECG itself without the requirement of electrophysiological studies (EPS). In the presence of LBBB, diagnosis of CAD is difficult as simple tests like exercise ECG may be misleading. So, most often MSCT CAG or regular CAG may be required to diagnose or exclude CAD. The homophasic ST T changes in this ECG in anterolateral and high lateral leads indicate the presence of CAD without more advanced tests as previously mentioned. Because of these reasons the clue of “**Poor man’s EPS and CAG**” is given.

Practical Implications :

The presence of advanced AV Block in infra His level manifesting as BBBB will require Permanent Pacemaker Implantation after appropriate evaluation and treatment for CAD.

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