Student's Corner

Become a Sherlock Holmes in ECG

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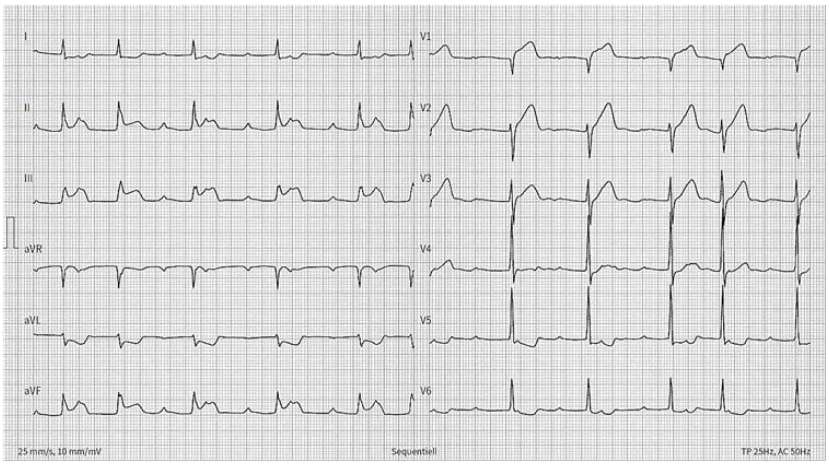
Series 2 :

"Block everywhere"

65 years male with cardiogenic shock.



Questions :

(1) Describe all ECG changes.
(2) Describe all the blocks in this ECG (clue).
(3) What are practical implications ?

Answers :

(1) ECG FINDINGS :

This ECG with Cardiogenic Shock shows acute total occlusion of Right Coronary Artery (RCA) due to red thrombus resulting in inferior sub epicardial injury (ST elevation) which is more in LIII than LII (RCA lesion). In addition, this ECG shows ST elevation in V1, V2 with more elevation in V1 suggestive of Right Ventricular Myocardial Infarction (RVMI). In anteroseptal MI ST elevation progressively increases from V1-V4 whereas in RVMI ST elevation from V1 – V4 decreases. There is no discordant ST segment depression between V1 and V2, ruling out Posterior Wall Myocardial Infarction (PWMI). There is reciprocal ST depression in L1 and avL. V5,V6 do not show ST segment elevation which indicates left coronary dominance.

The following 3 points are diagnostic of complete heart block in this ECG.

(a) Bradycardia
(b) Atrioventricular dissociation
(c) Atrial rate faster than the ventricular rate.

In this Complete Heart Block except in inferior leads the QRS is narrow because of supra His CHB due to AV nodal disease due to RCA occlusion. The reason for wide QRS in LII, LIII, avF is because of intra infarction block. In Intra Infarction Block the QRS may be widened at the site of infarct because of significant delay in depolarisation through injured / infracted myocardium. Intra infarction block is a type of peri infarction block which can be focal or divisional. This QRS widening will not be typical of any Bundle Branch Block. There are three premature beats (2nd , 6th and 10th beat). Whenever you find a premature beat in the presence of complete AV dissociation due to block, sinus capture beat has to be excluded. Here the premature beats are preceded by a P wave which is falling in the previous ST segment and so they are unlikely to be conducted to ventricle due to absolute refractory period. So, these 3 premature beats are likely to be junctional premature beats.

(2) CLUE :

This ECG shows following blocks

1. Acute total block of RCA (STE LIII>LII).
2. Acute total block of Right Ventricular Branch (STE V1>V2).
3. Acute total block of Proximal RCA (RVMI).
4. Complete Atrio Ventricular block
5. Block of AV nodal Artery – (supra His CHB)
6. Intra infarction block (Wide QRS-inferior leads)

Because of the presence of multiple blocks in the ECG ; the clue of **"Block everywhere"** is given.

(3) PRACTICAL IMPLICATIONS :

Because the patient has Cardiogenic shock, the IWMI and RWMI due to proximal right coronary lesion, the best choice is primary PCI irrespective of FMC to PCI time. Till then, Cardiogenic shock should be treated with IV fluids which have to be adjusted according to BP and lung signs. After correction of volume if the BP is still low, noradrenaline / dopamine has to be started. If PCI is not affordable, or not available then thrombolysis with Tenecteplase should be tried. The last choice is thrombolysis with streptokinase. If the patient has symptoms and severe bradycardia with hemodynamic compromise, temporary transvenous pacemaker may be attempted. Although this patient has multiple blocks, he may have better outcome if immediate revascularisation is done and is successful.

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