

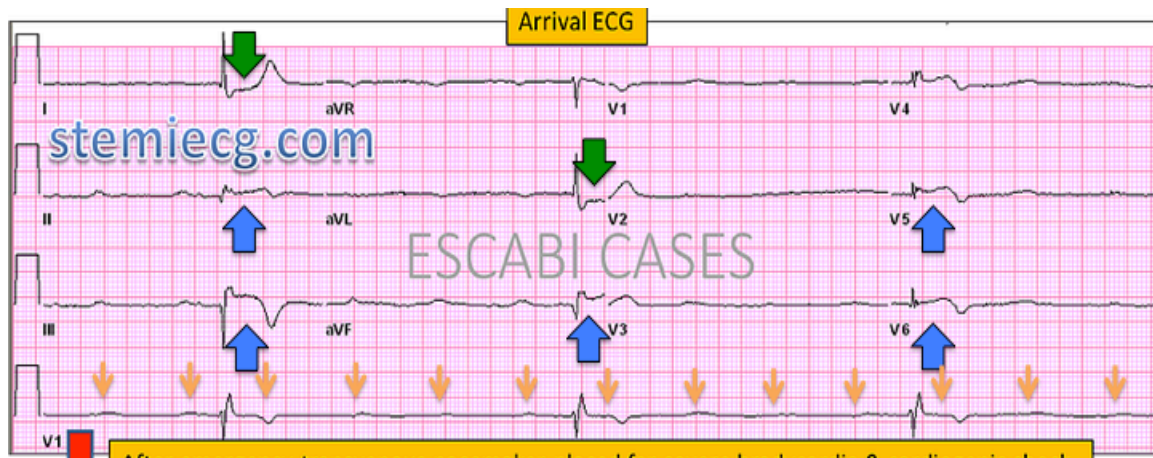
## Answers:

1. STEMI? Yes.
2. Wall territory extension? Inferior, lateral and right ventricle (RV) involvement.
3. Coronary artery occlusion? Proximal RCA.

This is a patient presenting with an acute inferior & lateral wall STEMI with severe life threatening complications including a complete atrioventricular (AV) block and cardiogenic shock related to RV infarct.

## ECG Findings:

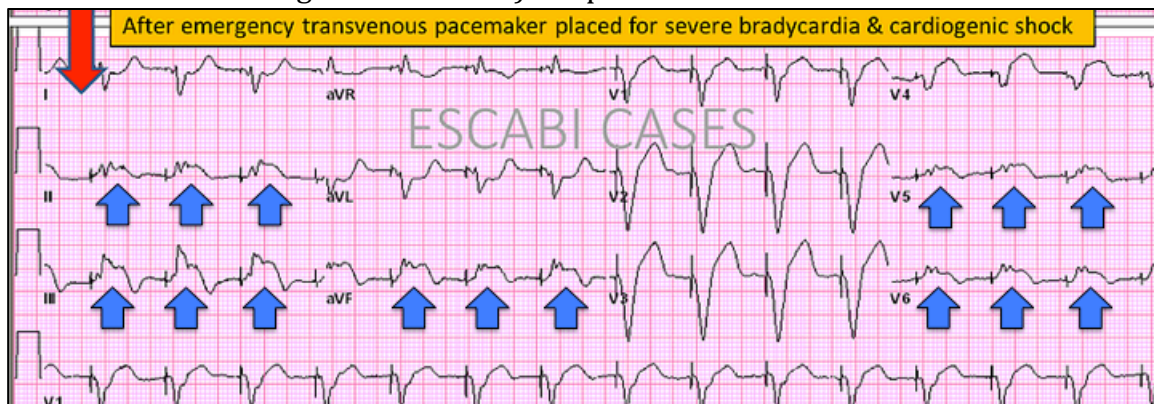
- ✓ STEMI criteria: >1mm of STE in at least 2 contiguous leads (other than V2-3).
- ✓ Blue arrows on inferior leads: L-II, L-III & aVF indicative of inferior STEMI
- ✓ Blue arrows on lateral contiguous leads: V-5 & V-6 indicative of lateral STEMI
- ✓ Green arrows showing high lateral reciprocal ST segment depressions, related to inferior STEMI and suggestive of RCA occlusion.
- ✓ STE more pronounced in L-III compared to L-II, may also favor proximal RCA occlusion with RV involvement.
- ✓ Complete AV block as can be seen on lead V1 on the lower long rhythm strip of the 12-lead ECG. The atrial beats (orange arrows) are completely dissociated from the thin QRS complexes, with a slow junctional escape rhythm at 30/min. This complete AV block in the presence of an acute inferior STEMI favors a proximal RCA occlusion.
- ✓ RV STEMI should be confirmed with a right-sided ECG.
- ✓ Concomitant posterior STEMI cannot be determined, because there are no QRS complexes on the lead V2-V3 for the assessment of reciprocal ST segment depressions (STD), although lead V1 shows no STD. Posterior STEMI, may accompany inferior STEMI, depending on the coronary dominance (the coronary that supplies the PDA; mostly from the RCA in 70-80% of the population with right coronary dominance).



Immediate ECG after emergent transvenous pacemaker was placed.

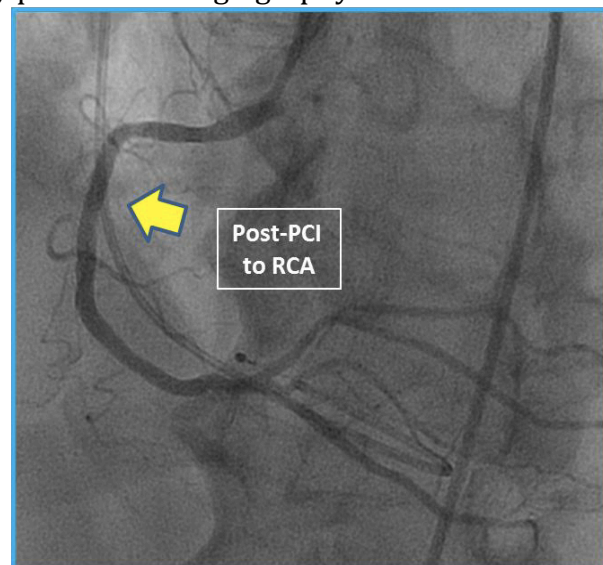
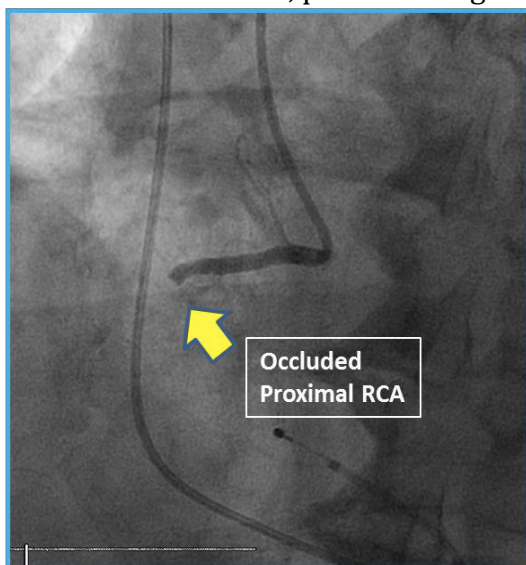
**ECG Findings:**

- ✓ Ventricular pacing 100%
- ✓ STE in the inferior and lateral leads of >1mm concordant to the QRS vector (the strongest Sgarbossa's criteria for diagnosis of STEMI in LBBB, refer to Case #12-14 of STEMI ECG Patterns Webpage).
- ✓ STE in the anterior precordial leads (V1-V4) with ventricular pacing, are expected repolarization abnormalities related to pacing from the RV (similar to LBBB). STE of >5mm in leads where the QRS vector is negative (predominant S-wave) would also favor STEMI changes (weakest Sgarbossa's criteria for diagnosis of STEMI) not present here.



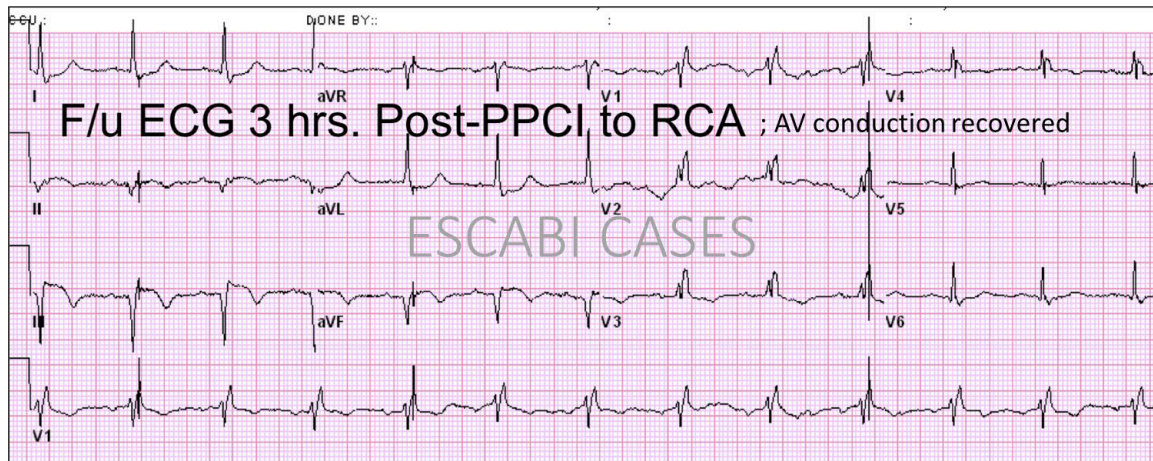
**Coronary Angiography Findings:**

- ✓ Proximal RCA was occluded 100% prior to PCI.
- ✓ Second image is the post-PCI results after proximal RCA stenting with excellent results.
- ✓ You can also observe the presence of a temporary transvenous pacemaker lead in the RV, placed emergently prior to the angiography.



### **ECG Findings:**

After performing PPCI to his occluded proximal RCA, his AV conduction gradually and spontaneously recovered with normal AV conduction 1:1.



### **Teaching points:**

1. In the presence of an acute inferior STEMI, do not forget to perform a right-sided ECG (R V4-V6) to r/o the concurrence of right ventricle involvement.
2. RV arterial blood supply is 100% from the RCA. Inferior STEMI with RV involvement is related to proximal RCA occlusion and higher risk for hemodynamic compromise, arrhythmia complications and mortality.
3. The AV nodal artery branch is supplied from the RCA in 80% of cases and higher risk AV conduction complications. However, AV conduction block is mostly related to ischemia and heightened parasympathetic activity, and tend to improve with reperfusion and time. More permanent damage as related to AV node necrosis is less frequent in view of AV node dual arterial blood supply.
4. High (second or third) degree AV block associated with inferior wall MI is located **proximal** to the His bundle in 90% of patients. For this reason, complete heart blocks often results in only a modest and usually transient bradycardia with junctional or escape rhythm rates above 40 beats per minute (but may be as low as 30/min as in current case). The QRS is usually narrow in this setting. Rate is usually stable and asystole is uncommon.
5. Although high grade AV block in patients with an inferior MI is usually transient, it is associated with increased in-hospital mortality.
6. Benefit from anticipating and preparing for complications related to RV infarct is important and prudent. Avoid the use of nitrates to prevent decrease in preload and subsequent risk of cardiogenic shock.
7. RV infarction with high degree AV block and hemodynamic compromise may benefit more from temporary AV sequential pacing. Compared to only ventricular pacing.