

## **Case #31: Questions &**

### **Answers:**

1. Acute STEMI? Yes, clinical and ECG findings are indicative of an arrival RV STEMI. Followed by an ECG with an Accelerated Idioventricular Rhythm (AIVR).
2. Territory? Right Ventricle.
3. What is the Culprit Vessel? Proximal RCA (small non-dominant vessel).
4. Emergent Reperfusion? No. Not indicated, since chest pain resolution and AIVR rhythm both favor microcirculatory reperfusion.

### **ECG findings:**

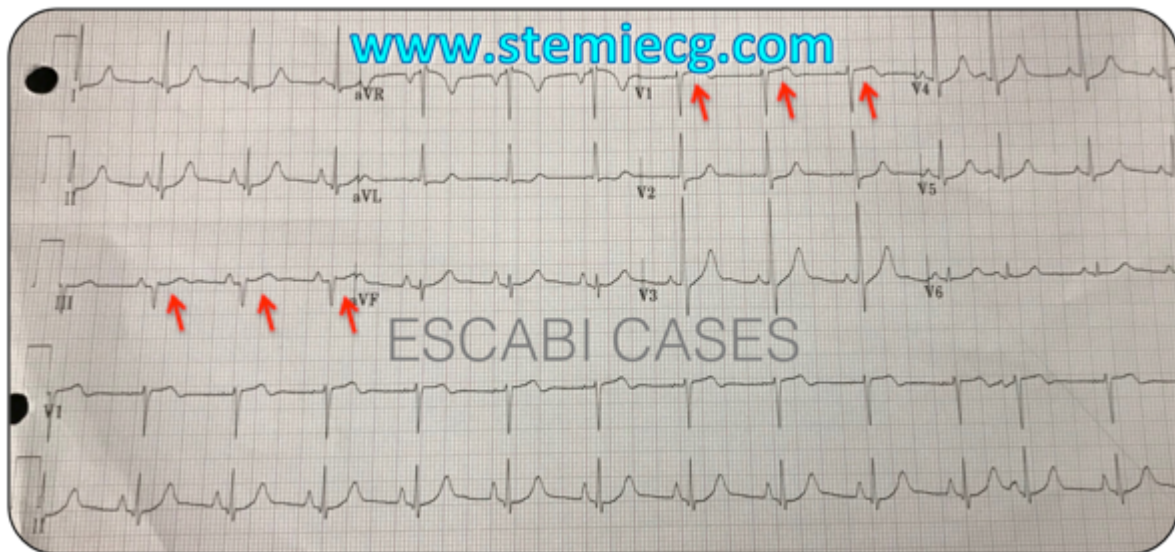
#### **Arrival ECG**

- Subtle (<1mm) right-sided STE in L-III and V-1 may be indicative of an occult or resolving RV STEMI (red arrows). Diagnostic criteria for ECG STEMI= >1mm in two contiguous leads (or >2mm on anterior V-2 & V-3 leads).
- L-III Q wave (>40ms), indicative of MI scar.
- An additional right-sided ECG confirms the diagnosis of a RV STEMI (not illustrated in this example). Right sided ECG: RV-4, RV-5 and RV-6 with >0.5mm in 2 contiguous right sided leads.

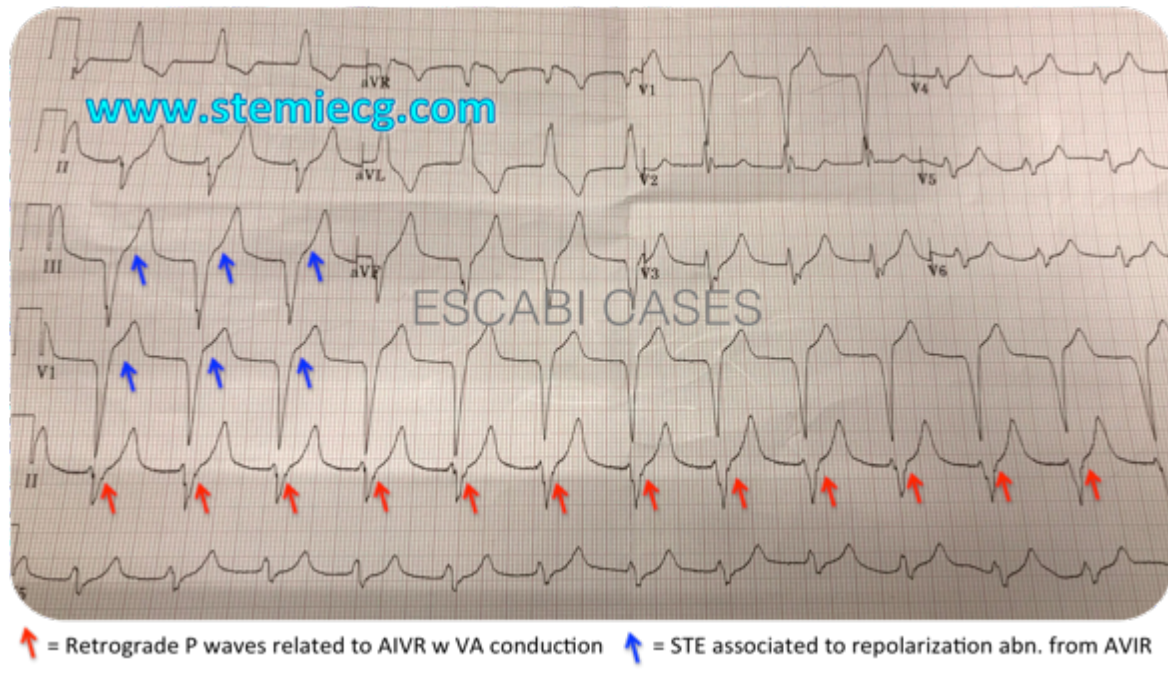
#### **F/U ECG**

- Wide QRS complex rhythm at 83/min, compatible with an accelerated Idioventricular rhythm (see definition below).
- ST segment changes related to repolarization abnormalities that result from the ectopic ventricular depolarization and rhythm (not to be confused with acute STEMI changes).

#### **Arrival ECG**



### **F/U ECG:**



### **Outcome Findings:**

- Improvement of chest pain symptoms and the presence of AIVR, favored an AMI spontaneous reperfusion.
- A diagnostic coronary angiography was performed with evidence of a proximal obstructive stenosis of a non-dominant small right coronary artery (RCA). The patient underwent a successful balloon angioplasty.

### **Accelerated Idioventricular Rhythm (AIVR):**

- AIVR is currently defined as an enhanced ectopic ventricular rhythm with at least 3 consecutive ventricular beats, which is faster than normal intrinsic ventricular escape rhythm ( $\leq 40$  bpm), but slower than ventricular tachycardia (at least 100-120 bpm).
- AIVR is generally a transient rhythm, rarely causing hemodynamic instability and rarely requiring treatment.
- Misdiagnosis of AIVR as slow ventricular tachycardia or complete heart block can lead to inappropriate therapies with potential complications.
- AIVR is often **a clue** to certain underlying conditions, **like myocardial ischemia-reperfusion**, digoxin toxicity, and cardiomyopathies.
- AIVR may indicate reperfusion with 97% specificity but only 45% sensitivity.

### **Teaching Points:**

- Isolated RV STEMI may be missed if not suspected.
- Extent of STE changes is related to vessel size, such as in this case that presented limited STE in view of occlusion of a non-dominant RCA.

- Additional right-sided ECG is important for diagnosis and confirmation of RV STEMI.
- Presence of AIVR is a useful sign of microvascular reperfusion.

### **Assessment of STEMI Reperfusion Pearls:**

1. Myocardial Reperfusion depends on **2 factors**:
  - Reperfusion of the infarct related artery (IRA).
  - Reperfusion of the microvascular circulation
2. 12-lead ECG evidence of reperfusion:
  - ST segment resolution >50% within 60-90 min\* (PPV for patency of 87%).
  - Terminal T wave inversion.
3. Angiographic: TIMI flow (from 0 to 3, 0 points being absence of flow & 3 points representing normal coronary flow) & TIMI myocardial perfusion (TMP) grading (from 0 to 3, 3 points representing the optimal perfusion). Both TIMI Flow & Grade correlate with prognosis.
4. Other:
  - **Resolution of chest pain (PPV for patency of ~90%).**
  - **Reperfusion arrhythmias (AIVR).**
  - Biochemical markers washout (peak <12hrs).

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