Case 27: Questions & Answers:

1. STEMI? Yes. Complicated with Cardiac arrest.
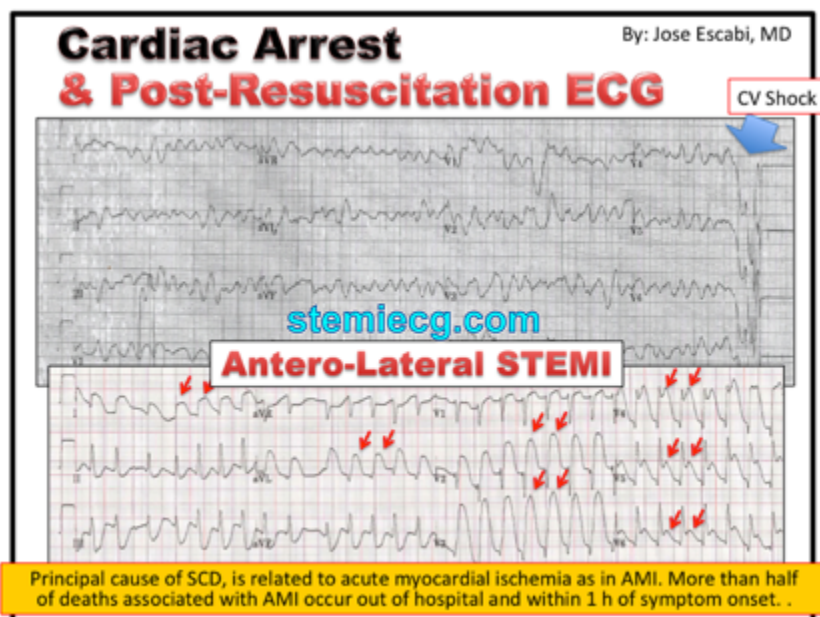
2. Territory? Anterior and lateral walls involved.

3. What is the Culprit Vessel? Proximal left anterior descending (LAD) artery.

ECG findings:

- Anterior and lateral precordial ST-segment elevations upon V1-V6, aVL and L-1, consistent with STEMI.

- Anterior wall STEMI in the presence of reciprocal ST segment depression upon leads II, III and aVF, besides evidence of high lateral STE (L-1 & aVL) and septal STE (V1-V2) all favor proximal LAD occlusion.

Clinical Progress:

- Upon performing the patients first diagnostic 12-lead ECG (see below), the patient went into ventricular fibrillation.

- He was initially managed with CPR and ACLS. He required defibrillation x4, IV amiodarone and endotracheal intubation with assisted ventilation.

- Upon electric stabilization and return of spontaneous circulation (ROSC) a diagnostic 12-lead was performed (10 minutes from arrival) with evidence of an extensive anterolateral STEMI.

Cardiac Arrest & Post-Resuscitation ECG — By: Jose Escabi, MD

CV Shock

stemiecg.com — Antero-Lateral STEMI

Principal cause of SCD, is related to acute myocardial ischemia as in AMI. More than half of deaths associated with AMI occur out of hospital and within 1 h of symptom onset. .

- Although under sedation the patient was responsive to simple commands (not comatose) and with a temporary stabilization of his ventricular rhythm storm for which he was rushed to the catheterization lab and underwent PPCI.

- Although the patient had some initial distal LAD non-reflow from distal macro and micro clot embolism to his distal apical LAD, the patient had a significant hemodynamic and rhythm stabilization. He was weaned from mechanical ventilation the next day and discharged after 7 days of medication and clinical optimization.

Teaching Points:

- "Time is LIFE"

- Sudden cardiac death (SCD) is the mechanism of death in over 60% of patients with known coronary heart disease (CHD).

- Sudden cardiac arrest (SCA) may be the **initial** clinical manifestation of CHD (in ~15 percent).

- Among patients with CHD, SCA can occur both during an acute coronary syndrome (ACS) and in the setting of chronic, otherwise stable CHD (often such patients have had prior myocardial damage and scar that serves as a substrate for SCA).

- Death from a ventricular tachyarrhythmia in the setting of an acute myocardial infarction (AMI) has historically been one of the most frequent causes of SCD.

- Out-of-hospital cardiac arrest with STEMI is most often due to lethal ventricular arrhythmias, including sustained VT and VF.

- In one series, 60% of deaths associated with acute MI occurred within the first hour and were attributable to ventricular fibrillation (VF).

- The mechanisms for these arrhythmias are multifactorial and include ongoing ischemia, hemodynamic and electrolyte abnormalities, reentry, and enhanced automaticity.

- Defibrillation (non-synchronized delivery of a shock) is the definitive therapy for VF.

- A 12-lead electrocardiogram (ECG) should be performed within 10 min of arrival (or cardioversion) to identify patients who benefit from emergent angiography.

- Performance of an immediate heart catheterization for PCI for the management of a comatose (or non-comatose) patient with STEMI after an out of hospital cardiac arrest (OHCA) has a Class-1 recommendation.

- Early introduction of mild therapeutic hypothermia is also a Class-1 established treatment goal for patients that remain comatose after OHCA resuscitation.

- Mortality in post-cardiac arrest patients with STEMI who are awake and undergo successful PCI is only 5%, but it increases to 50% if patients are comatose.

- Successfully resuscitated comatose patients represent a heterogeneous population with a baseline survival rate of only 25%. With hypothermia and PCI, survival improves to 60%, with favorable neurological outcomes achieved in 86% of survivors.

- The presence of *unfavorable resuscitation features* that adversely affect the procedural risk/survival benefit of PCI must be considered prior to reaching a decision to proceed with coronary angiography, especially when multiple unfavorable features are present.

- All of the following ***unfavorable features*** are relative, and are not absolute predictors of poor outcomes (Tanveer R, et al. JACC 2015;66:62-73):
  - Unwitnessed arrest
  - Initial rhythm non-VF
  - No bystander cardiopulmonary resuscitation
  - Longer than 30 min to return of spontaneous circulation (ROSC)
  - Ongoing CPR (>30 minutes)
  - Evidence of unresponsive hypoperfusion and microcirculatory failure (pH < 7.2 and lactate levels >7 mmol/l)
  - Age >85 years
  - End-stage renal disease on hemodialysis
  - Noncardiac causes (e.g. traumatic arrest)

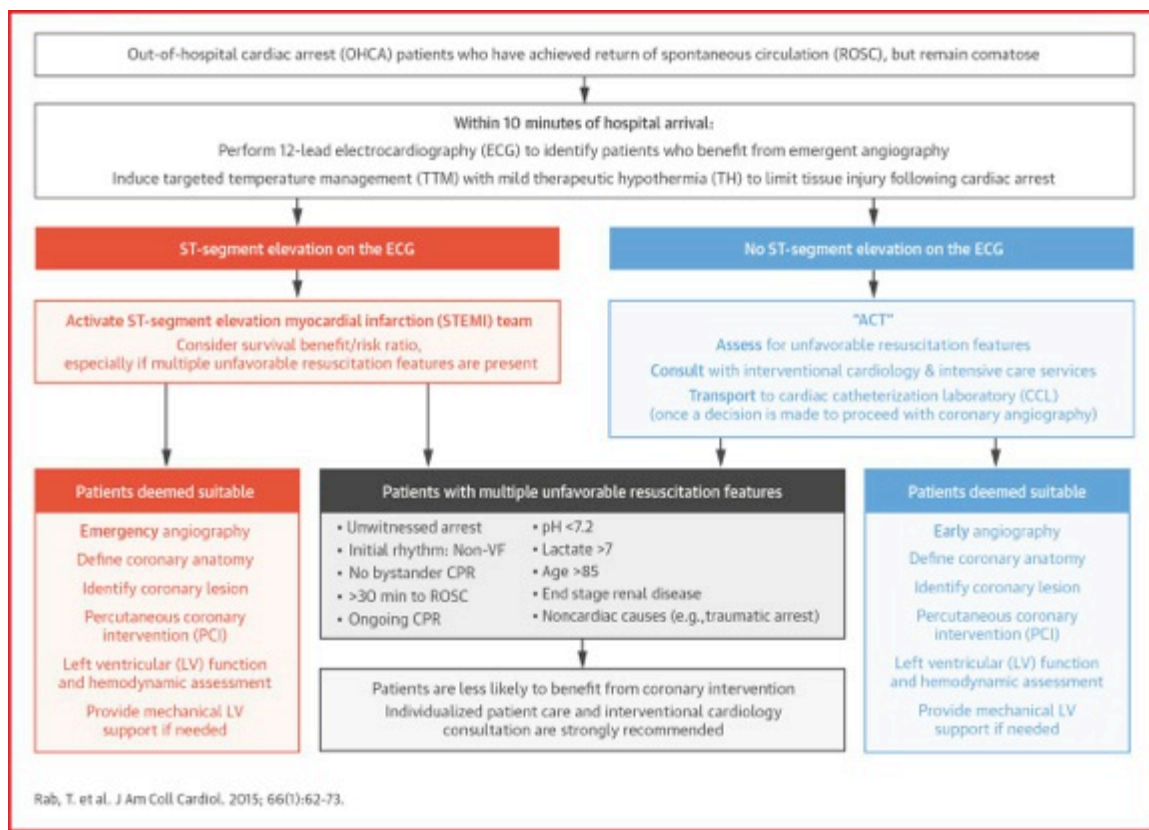**Diagnostic ECG (10 minutes after arrival & cardiopulmonary resuscitation):**
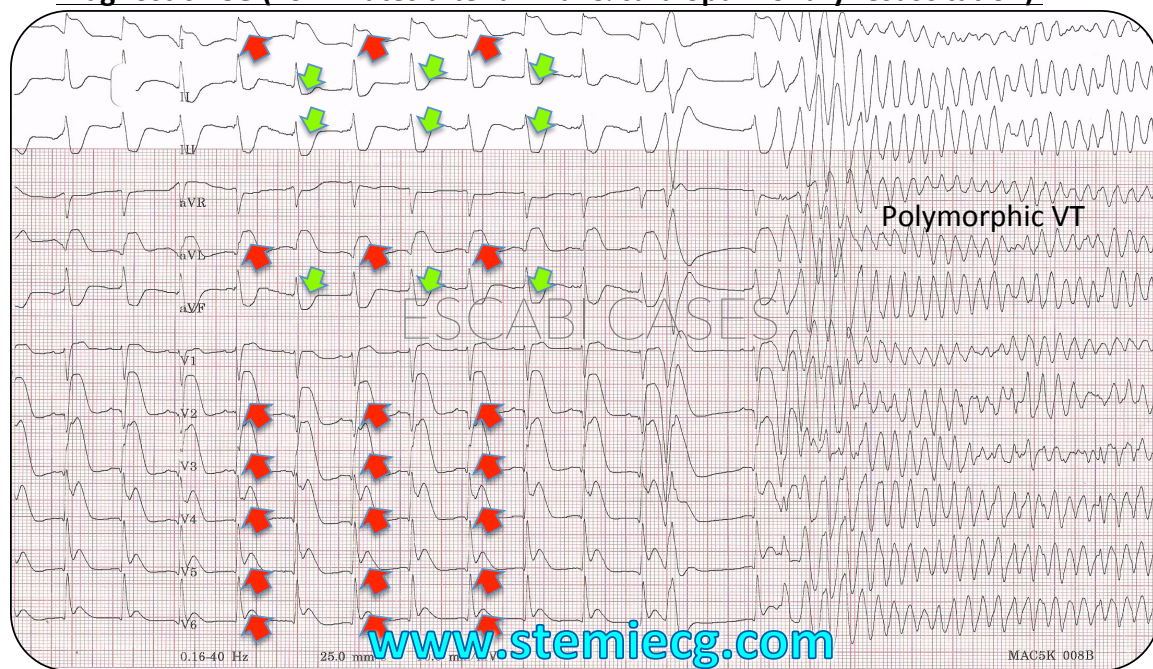
⬆ ST segment elevation ⬇ Reciprocal ST segment depressions

Coronary angiography:
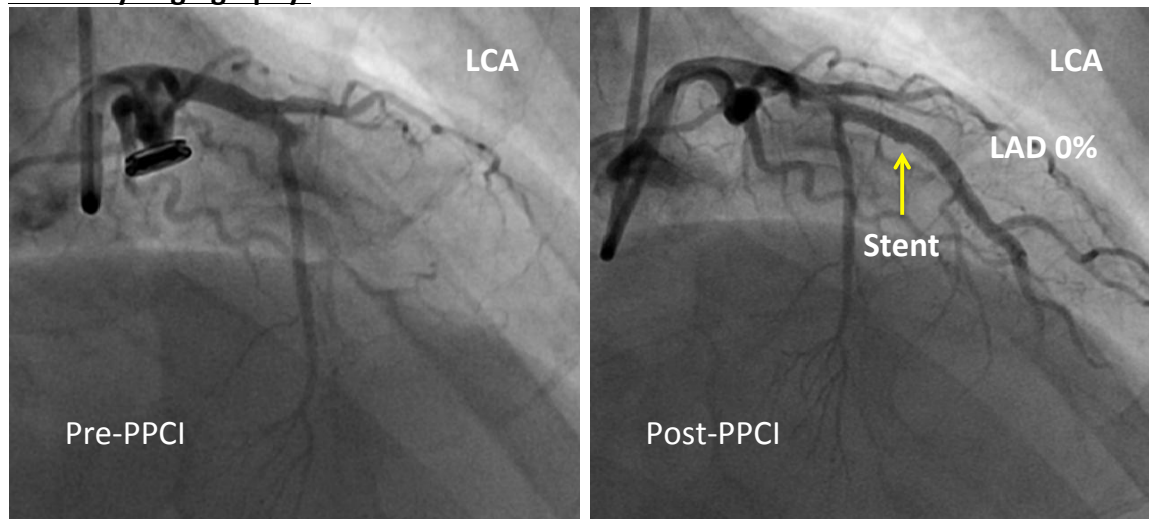
Cardiac Arrest Care Algorithm 2015

Tanveer Rab, et al. JACC 2015; 66: 62-73.

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