

# Acute Coronary Syndrome with Persistent ST Segment Elevation Isolated in aVR: A Case Study

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## Abstract

A 53 years old female patient with hypertension presented with constrictive retrosternal chest pain. Initial Electrocardiogram (ECG) showed ST elevation in aVR and high level cardiac Troponin-I. Thrombolysis with streptokinase was performed and she underwent coronary angiography who showed a long tight anterior inter ventricular lesion, occlusion of the proximal circumflex and an intermediate lesion of segment 2 of the right coronary.

## Keywords

Acute Coronary Syndrome, ST Elevation, aVR, Coronary Angiography

## 1. Introduction

Electrocardiogram (ECG) is the key first-line examination for the diagnosis of acute coronary syndromes. If persistent ST segment displacement is the early abnormality typical to myocardial infarction, its localization can sometimes misguide the diagnosis and management [1] [2]. We reported a rare and severe case of ST elevation myocardial infarction (STEMI) in aVR.

## 2. Case Presentation

A 53-year-old female patient was received in emergency room for acute constrictive retrosternal chest pain since 06 hours with neck, left shoulder and back radiation. She has a similar pain for one week appearing on exertion, brief and

self-limiting. The patient is on treatment with Amlodipine and Perindopril for hypertension since 3 years. She is a nonsmoker but acknowledges her sedentary life style. Vital signs measurements were as follows: Blood Pressure = 127/79 mmHg, Pulse rate = 100/min, Respiratory rate = 20/min, Weight = 102 Kg, Height = 1.59 m, BMI = 40, Temperature = 37°C, SpO<sub>2</sub> = 96%.

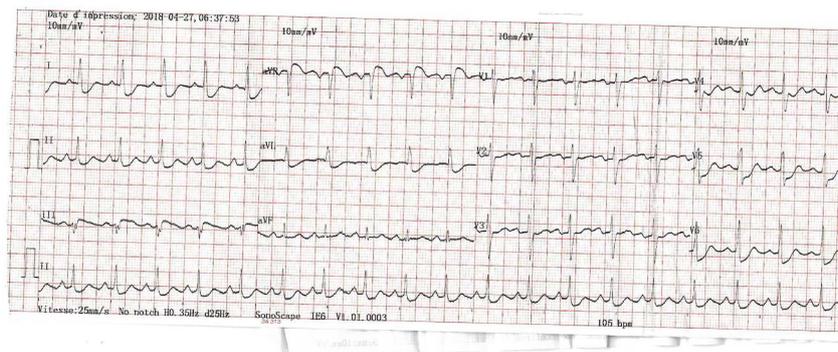
Physical examination was normal: Pulse was full volume and symmetric and no signs of congestive cardiac failure, cardio-pulmonary auscultation was normal with regular heart sounds, and no murmurs or any supra added sounds.

Acute coronary syndrome was suspected and a ECG taken within 10 minutes showed persistent 3 mm ST elevation in lead aVR and depression of the ST segment in the lateral leads V<sub>4</sub>, V<sub>5</sub>, D<sub>1</sub> and aVL (**Figure 1**).

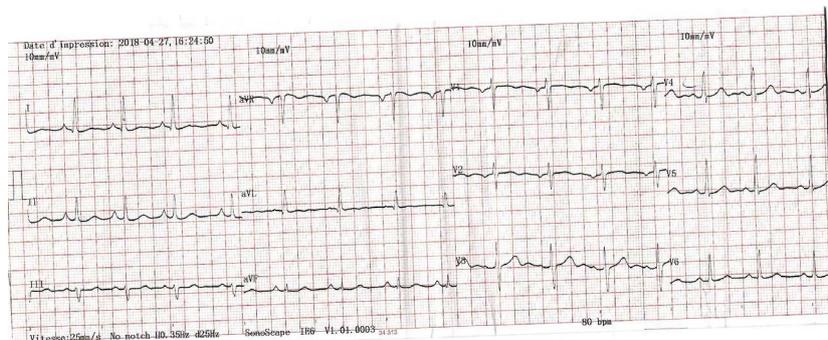
Blood cardiac Troponin—I level was high = 13.46 µg/l (normal < 0.1 µg/l). The results of the other investigations revealed a mild dyslipidemia with total blood cholesterol = 2.28 g/l, LDL = 1.67 g/l, HDL = 0.51 g/l. Random blood glucose = 1.24 g/l, serum creatinine = 06 mg/l and normal blood count.

The diagnosis of an acute coronary syndrome with ST elevation was retained. Primary angioplasty was impossible to perform immediately, the patient received within 30 minutes, fibrinolysis treatment using Streptokinase.

The evolution was favorable, characterized by pain amendment, a return to the isoelectric line of the ST segment in all the leads (**Figure 2**), the absence of rhythm and conduction disturbances as well as signs of heart failure. Cardiac Doppler ultrasound was normal.



**Figure 1.** ECG before Fibrinolysis showing ST elevation in aVR lead.



**Figure 2.** ECG after fibrinolysis showing a return to isoelectric line of ST segment.

Radial coronary angiography showed a tri truncal coronary stenosis with long tight anterior inter ventricular lesion, occlusion of the proximal circumflex and an intermediate lesion of segment 2 of the right coronary (**Figure 3**). The patient successfully underwent angioplasty in Italia.

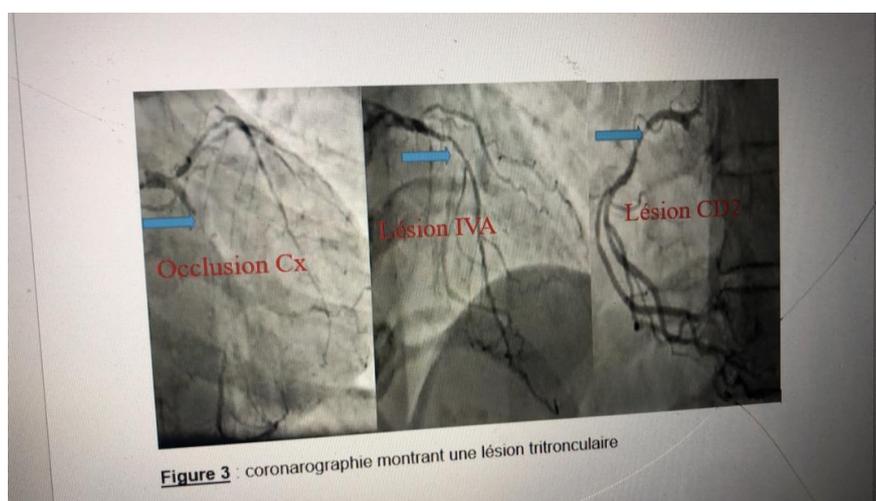
### 3. Discussion

In acute chest pain, the focus is on life-threatening etiologies: acute pericarditis, acute aortic syndrome, pulmonary embolism, and acute coronary syndrome [1]. The diagnostic strategy therefore considers the risk of acute coronary syndrome, clinical examination data, ECG results and cardiac enzyme assays [2] [3].

In our patient, the typical character of prolonged chest pain preceded by Novo's angina, the age of 53 years, sedentary lifestyle, obesity, hypertension and normal clinical examination led us to acute coronary artery syndrome.

A confirmatory ECG within 10 minutes according to the recommendations [4] was performed. In a similar context, although the diagnosis of ST + coronary syndrome is generally easy, the analysis of the aVR lead is often neglected [5]. ST segment elevation in aVR compared with a normal ST segment in V1 is strongly suggestive of myocardial infarction. In fact, occlusion of the common coronary trunk of the left coronary or of the first septal branches of the anterior inter ventricular which irrigates the basal wall of the septum below the aortic and pulmonary sigmoid valves results in an elevation of ST in aVR often related to severe coronary lesions [6] [7].

The absence of a careful analysis of the often overlooked aVR lead can be misleading, as in our patient, to the diagnosis of an acute coronary syndrome with ST segment depression in the left lateral leads V1, aVL, V4, V5, V6 corresponding to a mirror image of ST elevation in aVR. The resulting consequence is that therapeutically; our patient would not have benefited from fibrinolysis according to recommendations [4] which has been effective as evidenced by the evolution in our patient.



**Figure 3.** Radial coronary angiography showing tri truncal coronary stenosis.

Serum cardiac troponin I determination should not delay diagnosis and management, but may be contributory to diagnosis and follow-up [8]. Increasing serum troponin levels without consideration of ST segment elevation in aVR as in our patient would have led to a diagnosis of non-transmural myocardial infarction [4].

Coronary angiography, the reference exploration, confirmed in our patient the diagnosis of a Tri truncal coronary stenosis. In the GRACE register, 7% to 8% of non-ST ACS have an isolated elevation in aVR, and this elevation in aVR has also been found to be a marker of severe coronary injury [9]. Our patient despite the complex lesion successfully underwent angioplasty in Italia because of the young experiences of Dakar's team [10]. Coronary angioplasty with stent implantation is the treatment of choice for coronary atherosclerosis in its various presentations [11].

#### 4. Conclusion

Clinical presentation and ECG make it possible to accurately diagnose an acute coronary syndrome taking into consideration all the leads, in this case not neglecting lead—aVR.

#### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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