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Case Report

Acute Coronary Syndrome with ST Segment Elevation: New Electrocardiographic Pattern

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Abstract

A 58-year-old man with a history of hypertension and diabetes, presented to the emergency department (ED) after 2 hours of oppressive, severe chest pain radiating to the left arm and associated with dyspnea. Upon arrival he was stable, an ECG was performed that demonstrated an isolated elevation of the J point in DIII, with depression of the J point in DI, DII, AVL, V4 to V6, with isoelectric ST segment in AVF. Troponine was not expected because an ST equivalent pattern was suspected. Should the patient be treated for an acute coronary syndrome with elevation of the ST or non-ST elevation based on the ECG findings?

Diagnosis

Interpretation

Acute Coronary Syndrome with elevation of the inferior ST segment.

The ECG in Figure 1 shows an isolated elevation of the J point in DIII without concomitant elevation of the contiguous derivatives in the inferior face (subtle under-elevation of the J point in DII and isoelectric ST segment in AVF) and ST-segment depression in DI, AVL, V4 to V6 as reciprocal changes on the lateral side in the setting of an inferior ST myocardial infarction.

Clinical course

The patient received aspirin, clopidogrel and IV nitroglycerin, he was then transferred for urgent cardiac catheterization that showed an anterior descending coronary artery with 99% occlusion in its proximal and middle portion, the right coronary artery was codominant with 100% occlusion in the proximal third, the circumflex artery with multiple tandem lesions and 99% occlusion of chronic appearance.

The patient was transferred to the intermediate care unit and received treatment with IV Tirofiban. The echocardiogram revealed a preserved ventricular function with 45% ejection fraction and akinesia of the inferobasal segment. He was referred for surgical revascularization due to multivessel disease and impossibility of percutaneous intervention Figure 2.

Discussion

The electrocardiogram is a tool for the diagnosis of acute myocardial infarction (AMI) and for defining the possible culprit artery. However, some rare electrocardiographic patterns have been identified that are associated with a high probability of acute coronary

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artery occlusion requiring an emergent reperfusion therapy, these rare patterns could be misdiagnosed as " non-STEMI".

A new electrocardiographic pattern for inferior STEMI has been recently defined with three criteria: (1) Any ST elevation in DIII but not in other inferior leads, (2) ST depression in any of leads V4 to V6 but not in V2, (3)ST in lead V1 higher than ST in V2.

In this situation, a standard 12-lead electrocardiogram only shows ST elevation in DIII accompanied by ST depression in DI, DII, and isoelectric wave in AVF. The ST depression in the lateral derivatives complements these changes. This correlates with the findings in the cardiac catheterization of proximal occlusion of the circumflex artery associated with stable multivessel disease, in contrast to the usual pattern of inferior infarction that is generated by occlusion of the right coronary artery. These findings suggest an inferior acute myocardial infarction with concomitant critical lesions in other arteries (multivessel disease).

Figure 1: Electrocardiogram (ECG) showing isolated elevation of the J point in DIII, depression of the ST point in DI, DII, AVL and V4 to V6, with isoelectric ST segment in AVF.

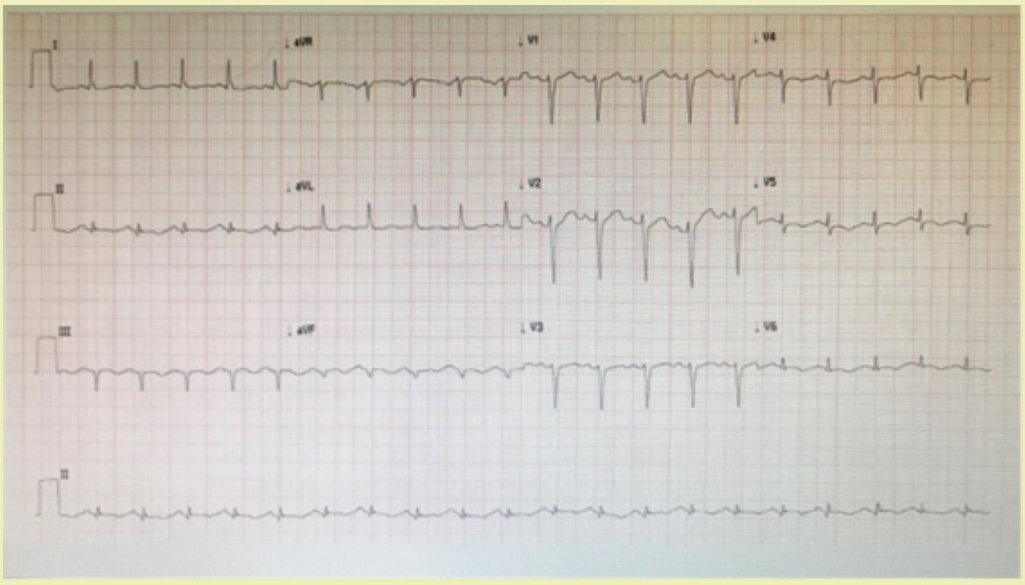

Figure 2: ECG after coronary angiography. Sinus rhythm, normalization of the J point in all derivatives, isolated Q wave in DIII.

The reason for this atypical pattern with non-contiguous ST elevation in inferior leads seems to be the average ST-vector not directed to the injury area located in the inferior wall. Theoretically, the average ST-vector that is more rightward than usual can be explained by the summation of the ST-vector of inferior MI and the ST-vector of subendocardial ischemia caused by the concurrent critical vessel disease.[1-4]

Not many descriptions of this new ST equivalent pattern are found in the literature. Evaluating these findings in the future would indicate the real incidence.

Pearls

a. Refers to an inferior STEMI

b. Recognition of this pattern is important because it indicates an atherothrombotic acute event event though the electrocardiogram does not show contiguous ST elevation.

c. Patients with this pattern have a higher risk of mortality in the short and long term.

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Conflicts of Interest

Author declares that there is no conflict of interest.

References

1. Thygesen K, Alpert JS, Jaffe AS, et al. Executive Group on behalf of the Joint European Society of Cardiology (ESC)/American College of Cardiology (ACC)/American Heart Association (AHA)/World Heart Federation (WHF) Task Force for the Universal Definition of Myocardial Infarction. Fourth Universal Definition of Myocardial Infarction. *J Am Coll Cardiol*. 2018;72:2231–2264.

2. Fiol M, Carrillo A, Cygankiewicz I, et al. A new electrocardiographic algorithm to locate the occlusion in left anterior descending coronary artery. *Clin Cardiol*. 2009;32:E1–E6.

3. Bozbeyoğlu E, Aslanger E, Yıldırımtürk Ö, et al. Theestablished electrocardiographic classification of anterior wall myocardial infarction-misguides clinicians in terms of infarct location, extent and prognosis. *Ann Noninvasive Electrocardiol*. 2019;24:e12628.

4. Aslanger E MD, Yıldırımtürk Ö, Şimşek B, et al. A new electrocardiographic pattern indicating inferior myocardial infarction. *Journal of Electrocardiology*. 2020;61:41–46.