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Classical electrocardiographic clues for left main coronary artery disease



Fatih Sen, Ozcan Ozeke, Ozgur Kirbas*, Cengiz Burak, Habibe Kafes, Bahar Tekin Tak, Umran Ozdamar, Kadir Ocak, Serkan Topaloglu, Dursun Aras

Turkiye Yuksek Ihtisas Training and Research Hospital, Department of Cardiology, Ankara, Turkey

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ABSTRACT

Prediction of left main coronary artery (LMCA) or equivalent disease is important with regard to selecting the appropriate treatment strategy. The classical electrocardiographic pattern of LMCA disease includes ST elevation (STE) in lead aVR in the presence of extensive ST depression (most prominent in leads I, II, and V4–6) with the STE in aVR \geq V1. Patients with these findings may potentially require early coronary angiography and coronary bypass surgery; therefore selected patients with these findings on exercise testing might benefit from more urgent or expedited angiography.

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Prediction of left main coronary artery (LMCA) disease (occlusion or stenosis/obstruction) is important with regard to selecting the appropriate treatment strategy, because acute LMCA occlusion usually causes severe hemodynamic deterioration, resulting in a less favorable prognosis.^{1,2} Indeed, some authors argue that using the term “LMCA occlusion” is inaccurate, as most of these patients have at least some flow in their LMCA stenosis/obstruction (i.e. subtotal occlusion of LMCA). Over the past 2 decades, multiple studies have examined the utility of ST elevation (STE) in aVR for predicting severe LMCA or LMCA equivalent disease and mortality in patients with acute coronary syndromes^{1–3} and those undergoing exercise stress testing.^{3–6} The classical electrocardiographic (ECG) pattern of LMCA disease includes STE in lead aVR in the presence of extensive ST depression (most prominent in leads I, II, and V4–6) with the STE in aVR \geq V1

(Fig. 1).⁷ Patients with these findings may potentially require early coronary angiography and coronary bypass surgery.¹ Since lead aVR is electrically opposite to the left-sided leads I, II, aVL, and V4–6; ST depression in these leads will produce reciprocal ST elevation in aVR. Indeed, STE in aVR is postulated to result from two possible mechanisms: (a) diffuse subendocardial ischaemia, with ST depression in the lateral leads producing reciprocal change in aVR or (b) infarction of the basal septum, i.e. a STE myocardial infarction involving aVR.⁸ Whereas STE in aVR \geq 1 mm indicates severe LMCA or LMCA equivalent disease, the STE in aVR \geq V1 differentiates LMCA from proximal left anterior descending artery occlusion.⁷ The absence of STE in aVR almost entirely excludes a significant LMCA lesion.⁹ In addition to an acute coronary syndrome, STE in aVR during exercise stress testing also predicts LMCA or ostial LAD stenosis.^{10,11} Selected patients with these findings

* Corresponding author.

E-mail address: ozcanozeke@gmail.com (O. Kirbas).

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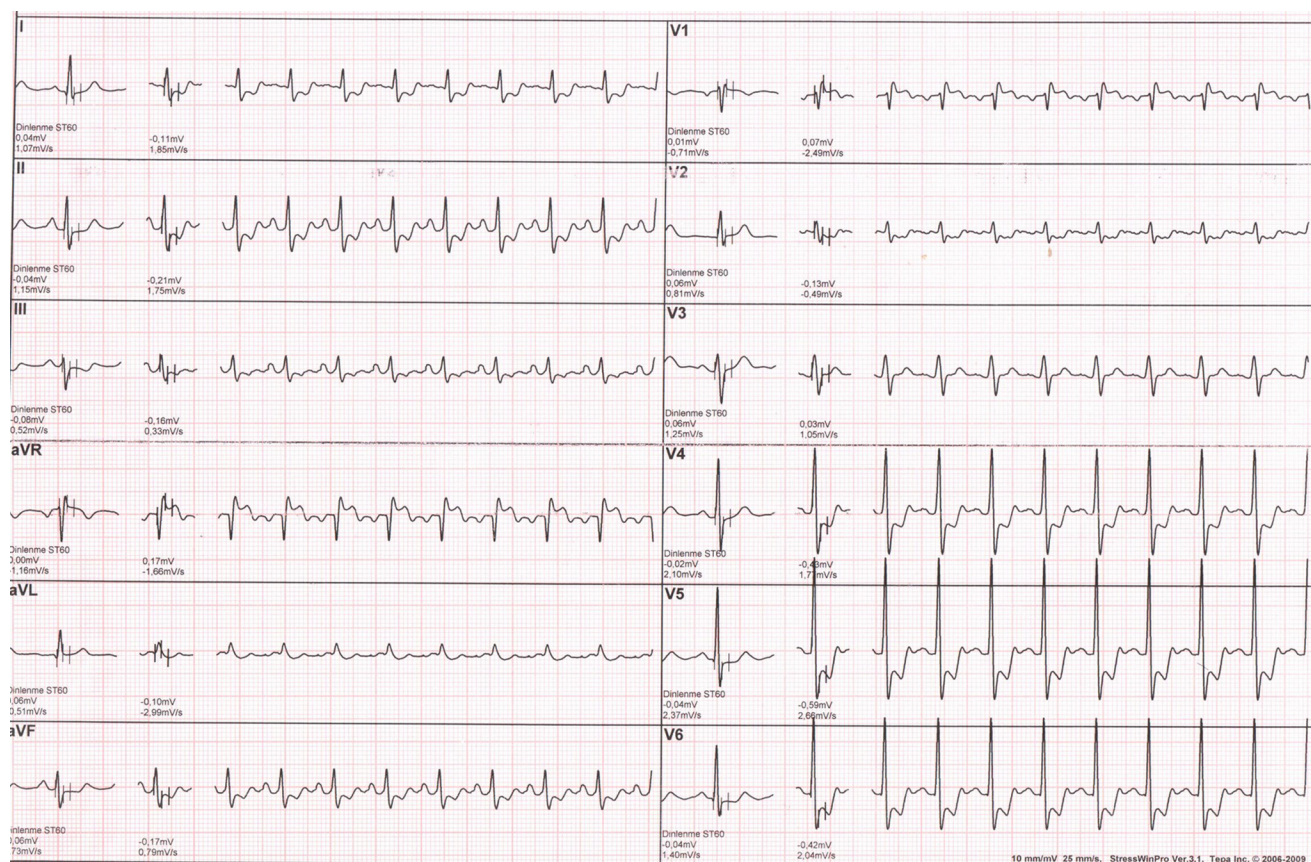


Fig. 1 – 12 lead electrocardiogram during exercise testing showing ST elevation in lead aVR in the presence of extensive ST depression (most prominent in leads I, II and V4–6) with the ST elevation in aVR \geq V1 taken from patient with angiographically confirmed left main coronary artery disease.

on exercise testing (Fig. 1) might benefit from more urgent or expedited angiography.¹

Conflicts of interest

The authors have none to declare.

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