# The Forgotten Lead

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## Vignette

A 45-year-old man with a history of double vessel coronary artery bypass grafting two years earlier, presents with prolonged, severe ischemic chest pain. His electrocardiogram (ECG) is shown in Figure 1.

## Questions

1. **What is your diagnosis?**
2. **What can you deduce about his coronary anatomy?**

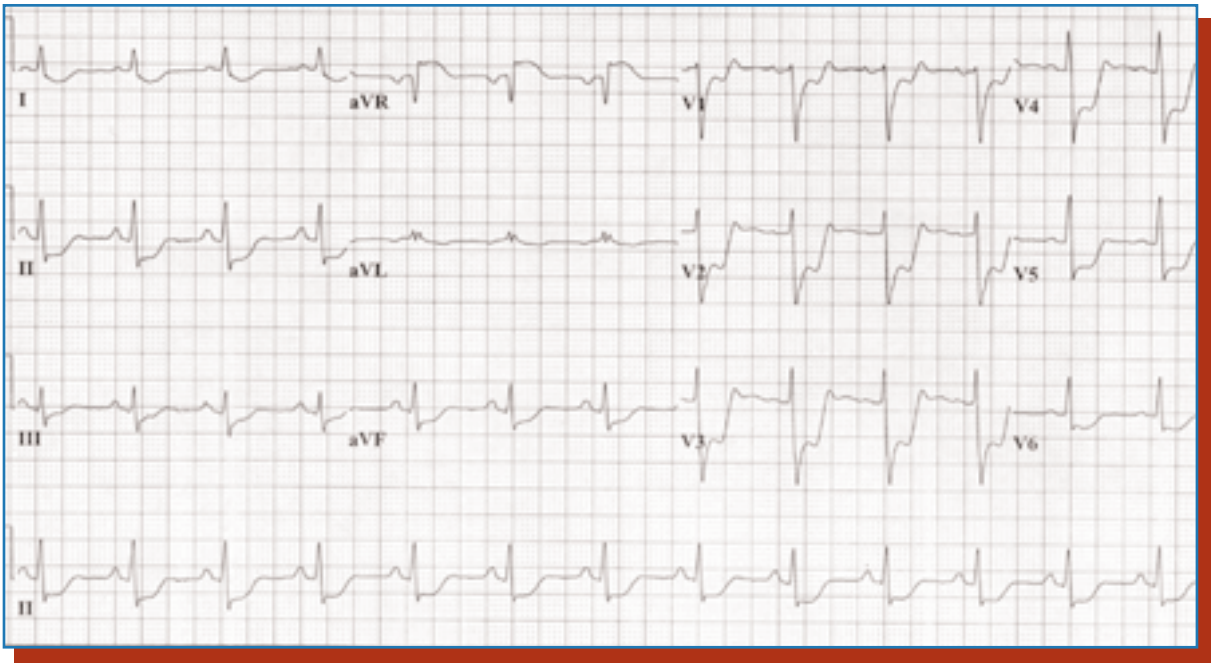


Figure 1. ECG recorded upon presentation.

## Answers

**1.** The diagnosis of an acute coronary syndrome is not in doubt. The patient is known to have coronary artery disease, the clinical presentation is classic, and the ECG is clearly severely ischemic. The initial management challenge is whether or not to administer thrombolytic therapy. The clinical suspicion notwithstanding, the initial ECG does not show a definite current of injury in two or more contiguous leads which would fulfill standard criteria for considering thrombolytic therapy. There is diffuse, marked ST segment depression in all leads with the exception of aVR and aVL, suggesting diffuse, severe, subendocardial ischemia or injury. Clinical trials to date have failed to demonstrate benefit from thrombolysis in such a setting.

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**2.** In this case, the presence of 3 mm to 4 mm of ST segment elevation in aVR is a cause for concern about the possibility of an acute left main coronary artery (LMCA) obstruction.

The patient was taken emergently to the cardiac catheterization laboratory where the LMCA was found to be totally occluded, the vein graft to the circumflex artery occluded, and the internal thoracic artery graft to the left anterior descending artery patent. The patient underwent a technically demanding, but ultimately satisfactory angioplasty and stent placement to the LMCA, with complete relief of his symptoms and resolution of the ECG changes over the next few hours.

ECG lead aVR is often neglected by electrocardiographers, generally because it is considered to provide only "reciprocal" information to what has already been obtained from other leads. However, it is becoming more widely appreciated that ST segment elevation in aVR, particularly if greater than in $V_1$, may be due to LMCA obstruction. Resultant injury to the basal segment of the interventricular septum may produce a ST segment vector pointing superiorly and to the right; absent or lesser ST segment elevation in $V_1$ can be explained by the net offsetting effect of simultaneous anterior and posterior injury vectors. In this case, the marked anterior ST segment depression is likely due, at least in part, to posterior wall injury in the circumflex artery territory in the face of relative preservation of anterior wall perfusion via the patent bypass graft. Dx