

ST-elevation in aVR with Diffuse ST-segment Depression: Need for Urgent Catheterization?

Bruce M. Lo, MD, MBA*
 Megyn K. Christensen, DO†
 Katherine E. Schaffer, MD†
 Theodore J. Tzavaras, MD*

*Sentara Norfolk General Hospital/Eastern Virginia Medical School at Old Dominion University, Norfolk, Virginia

†Eastern Virginia Medical School at Old Dominion University, Norfolk, Virginia

Section Editor: Shadi Lahham, MD

Submission history: Submitted September 5, 2024; Revision received October 11, 2024; Accepted October 18, 2024

Electronically published: December 17, 2024

Full text available through open access at http://escholarship.org/uc/uciem_cpccem

DOI: 10.5811/cpcem.35284

Case Presentation: A 33-year-old female with a history of antiphospholipid syndrome presented with exertional chest pain and ST-elevation in aVR with diffuse ST-segment depression. An emergent catheterization was performed, which showed an isolated 99% stenosis in the left main coronary artery. The remaining coronary arteries were without any stenosis. Successful stent placement was performed, and the patient was discharged without complications.

Discussion: Previous guidelines have suggested that ST-segment elevation with diffuse ST-segment depression should be treated as a ST-elevation myocardial infarction equivalent involving either the left-main or proximal left anterior descending coronary artery. However, recent data suggests that most of these cases may not involve that region. Regardless, this electrocardiogram finding should still be a concern for acute coronary syndrome, with the need for urgent catheterization. [Clin Pract Cases Emerg Med. 2025;19(1):109-110.]

Keywords: acute coronary syndrome; aVR; ST-segment elevation.

CASE PRESENTATION

A 33-year-old female with a history of antiphospholipid syndrome (APS), presented with exertional chest pain and shortness of breath. An electrocardiogram (ECG) was performed (Image 1), which showed ST-elevation in aVR with

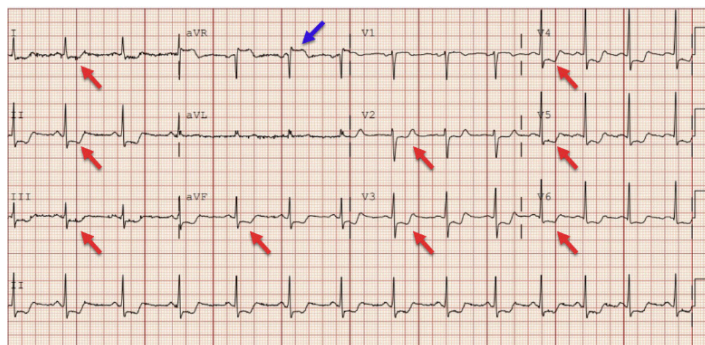


Image 1. Electrocardiogram with ST-segment elevation in aVR (blue arrow) and diffuse ST-segment depression (red arrow).

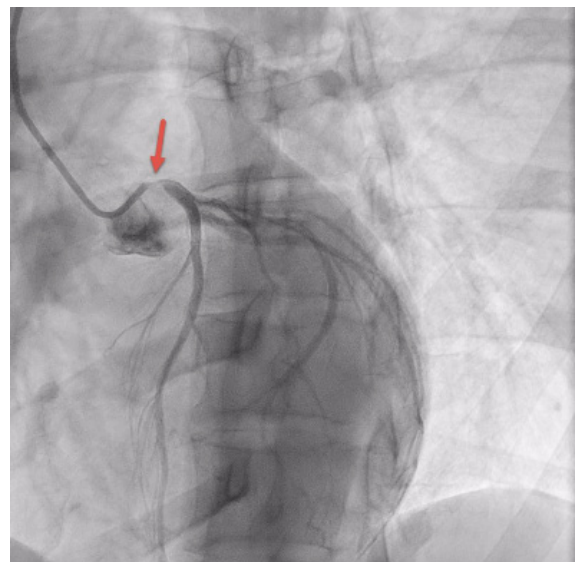


Image 2. Cardiac catheterization showing 99% stenosis in the left main coronary artery (arrow).

diffuse ST-depression. The patient was taken emergently for a heart catheterization, which showed a 99% stenosis at the ostial left main artery (Image 2). The remaining coronary arteries showed no disease. The patient had a drug-eluting stent placed with improvement to 0% stenosis, and she was discharged home several days later without event.

DISCUSSION

ST-segment elevation in aVR with diffuse ST-segment depression has been described to indicate left main or proximal left anterior descending coronary artery stenosis, with previous guidelines suggesting to treat as a ST-elevation myocardial infarction equivalent.¹ However, recent data suggests that only 10% will have a culprit lesion with these ECG findings, but approximately 60% will have severe coronary artery disease.² Although the ECG pattern may not always correspond with a culprit lesion, it should raise concerns for significant coronary artery disease, and an urgent cardiology consultation is needed. History such as APS, which is a multisystem autoimmune disease associated with coronary artery disease, should also increase suspicion for acute myocardial infarction especially in those who are less than 45 years of age.³

Address for Correspondence: Bruce M. Lo, MD, MBA, Sentara Norfolk General Hospital/Eastern Virginia Medical School at Old Dominion University, 600 Gresham Drive, Norfolk, VA 23507. Email: Brucelo1@yahoo.com.

Conflicts of Interest: By the *CPC-EM* article submission agreement, all authors are required to disclose all affiliations, funding sources and financial or management relationships that could be perceived as potential sources of bias. The authors disclosed none.

Copyright: © 2025 Lo et al. This is an open access article distributed in accordance with the terms of the Creative Commons Attribution ([CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)) License. See: <http://creativecommons.org/licenses/by/4.0/>

The authors attest that their institution requires neither Institutional Review Board approval, nor patient consent for publication of this case report. Documentation on file.

CPC-EM Capsule

What do we already know about this clinical entity?

Evidence is mixed on whether ST-segment elevation in aVR with diffuse ST-segment depression represents a ST-elevation myocardial infarction equivalent.

What is the major impact of the image(s)?

These findings can represent significant coronary artery disease, with this case showing an isolated 99% stenosis in the left main coronary artery.

How might this improve emergency medicine practice?

These electrocardiogram findings should raise concerns for acute coronary syndrome and urgent consultation with cardiology to improve outcomes.

REFERENCES

1. Wagner GS, Macfarlane P, Wellens H, et al. AHA/ACCF/HRS recommendations for the standardization and interpretation of the electrocardiogram: part VI: acute ischemia/infarction: a scientific statement from the American Heart Association Electrocardiography and Arrhythmias Committee, Council on Clinical Cardiology; the American College of Cardiology Foundation; and the Heart Rhythm Society. Endorsed by the International Society for Computerized Electrocardiology. *J Am Coll Cardiol*. 2009;53(11):1003-11.
2. Harhash AA, Huang JJ, Reddy S, et al. aVR ST segment elevation: acute STEMI or Not? Incidence of an acute coronary occlusion. *Am J Med*. 2019;132(5):622-30.
3. Sood A, Singh A, Gadkari C. Myocardial infarction in young individuals: a review article. *Cureus*. 2023;15(4):e37102.