

Extensive anterolateral STEMI in a young HIV-positive patient without conventional risk factors: Diagnostic value of electrocardiography

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Abstract

A 40-year-old HIV-positive man without conventional cardiovascular risk factors presented with persistent chest pain and extensive anterolateral ST-elevation on ECG. Despite fibrinolysis, symptoms persisted, and rescue PCI revealed total ostial LAD occlusion. A drug-eluting stent restored TIMI 3 flow, leading to rapid recovery and 12-month event-free follow-up. This case underscores the diagnostic value of ECG in identifying high-risk proximal LAD occlusion, highlights HIV-associated vascular risk beyond traditional factors, and reinforces the importance of timely revascularization and individualized secondary prevention.

Keywords: Electrocardiography, ST-elevation myocardial infarction, Human immunodeficiency virus

Introduction

ST-Elevation Myocardial Infarction (STEMI) remains a leading cause of global cardiovascular morbidity and mortality, making early recognition and timely reperfusion essential to improve clinical outcomes. Electrocardiography (ECG) continues to serve as a cornerstone of early diagnosis, offering rapid and non-invasive information regarding the location, extent, and severity of coronary occlusion. Characteristic patterns, such as extensive ST-segment elevation in anterior leads with reciprocal depression in inferior leads, are strongly associated with proximal Left Anterior Descending (LAD) artery occlusion and carry significant prognostic implications [1].

In addition to traditional risk factors such as hypertension, diabetes, dyslipidemia, and smoking, recent evidence highlights the role of chronic infectious and inflammatory conditions as non-traditional contributors to atherothrombosis [5,9]. Human immunodeficiency virus (HIV) infection, even in patients receiving effective antiretroviral therapy, has been linked to persistent immune activation, endothelial dysfunction, and accelerated atherosclerosis [2]. Here, we report a rare case of

extensive anterolateral STEMI in a young HIV-positive patient without conventional cardiovascular risk factors, underscoring the diagnostic value of ECG in identifying high-risk coronary occlusion and emphasizing the importance of guideline-based, individualized management strategies.

Case presentations

A 40-year-old Indonesian man was referred to our hospital with persistent chest pain and dyspnea, despite having received initial therapy with dual antiplatelet agents and a statin at a previous facility. On arrival, he appeared distressed, clutching his chest, and reported severe pain (numeric rating scale 9/10). His medical history was notable only for HIV infection diagnosed seven years earlier, with consistent adherence to antiretroviral therapy (Zidovudine, Lamivudine, and Efavirenz). He denied conventional cardiovascular risk factors such as hypertension, diabetes, dyslipidemia, renal disease, or hepatic disease.

Initial laboratory evaluation revealed mild anemia, leukopenia, and elevated liver enzymes, while cardiac biomarkers were markedly increased (CK-MB 1769 U/L; Troponin I 137,149 ng/mL). Serial

electrocardiograms demonstrated extensive ST-segment elevation in anterior leads with reciprocal depression in inferior leads, consistent with anterolateral STEMI (Figure 1A–C).

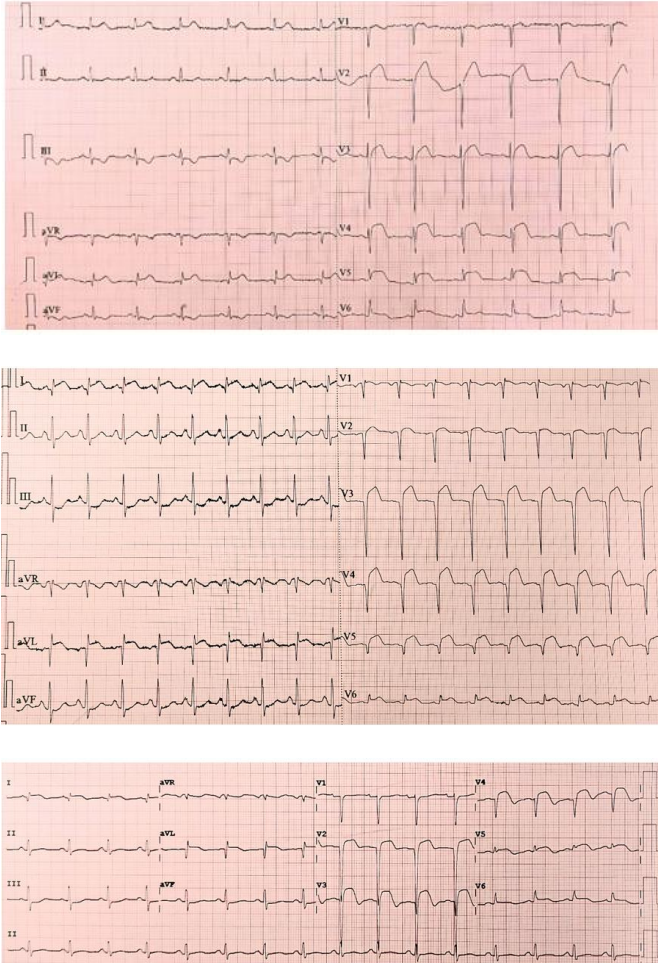


Figure 1A–C. Electrocardiogram showing ST-segment elevation in leads V2–V6, I, and aVL, with reciprocal ST depression in leads III and aVF

With a clinical status of Killip Class IV, the patient was admitted to the intensive care unit and received supportive therapy including intravenous fluids, norepinephrine infusion, subcutaneous enoxaparin, and continuation of dual antiplatelet therapy. On the second day, due to failed thrombolysis, rescue percutaneous coronary intervention (PCI) was performed. Coronary angiography revealed total occlusion at the ostium of the LAD artery (Figure 2A). A drug-eluting stent was successfully deployed, restoring thrombolysis in myocardial infarction (TIMI) 3 flow (Figure 2B).

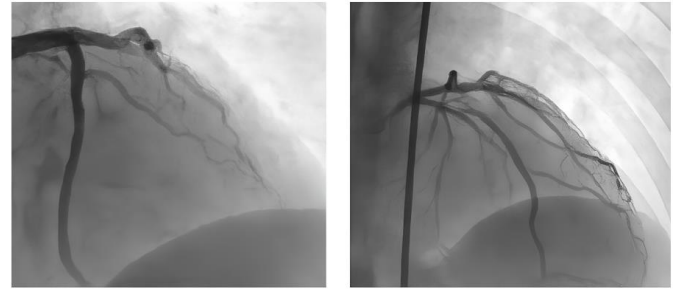


Figure 2A–B. Coronary angiography demonstrating (A) total ostial occlusion of the Left Anterior Descending (LAD) artery, and (B) restoration of TIMI 3 flow following successful deployment of a drug-eluting stent

Post-procedural management focused on hemodynamic stabilization and optimization of secondary prevention therapy (Aspirin, Ticagrelor, Atorvastatin, Bisoprolol, and Ramipril), alongside continuation of antiretroviral therapy. The patient's symptoms resolved by day five, and he was discharged on day nine in stable condition.

At one-month follow-up, he remained asymptomatic with sinus rhythm and occasional premature ventricular contractions on ECG. At two months, his CD4 count was 292 cells/ μ L, indicating moderate immunocompetence. At six and twelve months, he continued outpatient follow-up without recurrence of symptoms and had returned to normal daily activities.

Discussion

This case highlights an unusual presentation of extensive anterolateral STEMI in a young HIV-positive patient without conventional cardiovascular risk factors. Electrocardiographic findings were central to both diagnosis and clinical decision-making. Serial ECG recordings demonstrated marked ST-segment elevation in the anterior precordial leads with reciprocal depression in the inferior leads, a pattern strongly suggestive of proximal LAD artery occlusion. Such an ECG pattern carries significant clinical implications, as proximal LAD lesions are typically associated with larger infarct size, higher rates of cardiogenic shock, and poor prognosis [3, 4].

The correlation between the patient's ECG pattern and the angiographic finding of total ostial LAD occlusion underscores the diagnostic power of ECG in acute coronary syndromes. In resource-limited

settings, where immediate angiography may not be feasible, recognition of such high-risk ECG patterns can provide the basis for urgent referral and early invasive strategies. This reinforces the role of ECG in highlighting its clinical value beyond that of a simple diagnostic tool [5].

From a pathophysiological perspective, the occurrence of STEMI in an HIV-positive patient without metabolic comorbidities suggests that chronic immune activation, endothelial dysfunction, and systemic inflammation may accelerate atherogenesis and increase plaque vulnerability. Previous studies have reported that HIV infection independently elevates the risk of myocardial infarction, even in patients with good viral suppression on antiretroviral therapy. This case reinforces the importance of considering HIV as a non-traditional cardiovascular risk factor, particularly when interpreting acute ECG changes in younger patients [1, 6].

The failure of fibrinolytic therapy in this patient further illustrates the limitations of pharmacologic reperfusion in lesions with a high thrombus burden, such as proximal LAD occlusion. Rescue PCI successfully restored TIMI 3 flow, consistent with current ESC and ACC guidelines recommending early invasive management in cases of failed thrombolysis. The transition from clopidogrel to ticagrelor after PCI reflected an individualized antiplatelet strategy, taking into account variability in drug response and the need for more potent platelet inhibition in high-risk lesions [7].

The patient's rapid clinical recovery and sustained event-free survival over 12 months underscore the therapeutic value of timely revascularization and adherence to secondary prevention therapy. From an electrocardiographic perspective, follow-up ECGs demonstrated sinus rhythm with occasional premature ventricular contractions, suggesting relatively favorable electrical remodeling after extensive myocardial injury. This emphasizes the role of serial ECG monitoring not only in acute diagnosis as well as in long-term prognostic assessment [8, 10].

Conclusion

This case illustrates the crucial role of ECG in identifying high-risk coronary occlusion, particularly

in patients with atypical risk profiles such as HIV infection. The concordance between ECG findings and angiographic anatomy reinforces the relevance of ECG as a frontline diagnostic and prognostic tool in the management of acute coronary syndromes. Clinicians should maintain a high index of suspicion for acute coronary syndromes in HIV-positive individuals and integrate careful ECG interpretation with guideline-based decision-making to optimize clinical outcomes.

References

1. Elendu C, Amaechi DC, Elendu TC, Omeludike EK, Alakwe-Ojimba CE, Obidigbo B, et al. Comprehensive review of ST-segment elevation myocardial infarction: Understanding pathophysiology, diagnostic strategies, and current treatment approaches. *Medicine*. 2023;102(43): e35687. doi: 10.1097/md.00000000000035687.
2. Obare LM, Temu T, Mallal SA, Wanjalla CN. Inflammation in HIV and Its Impact on Atherosclerotic Cardiovascular Disease. *Circulation research*. 2024;134(11):1515-45. doi: 10.1161/circresaha.124.323891.
3. Fernando A, Guragai N, Vasudev R, Pullatt R, Randhawa P. a Rare Case of Myocarditis Mimicking ST-Elevation Myocardial Infarction. *Cureus*. 2020;12(11): e11671. doi: 10.7759/cureus.11671.
4. Putera AM, Irwanto, Maramis MM. Quality-of-Life (QoL) of Indonesian Children Living with HIV: The Role of Caregiver Stigma, Burden of Care, and Coping. *HIV/AIDS (Auckland, NZ)*. 2020; 12:573-81. doi: 10.2147/hiv. S269629.
5. Zhan ZQ, Li YH, Li Y, Li JP, Nikus KC. Electrocardiographic findings of acute total occlusion associated with a sub-occlusion involving the left anterior descending and the right coronary artery. *Journal of electrocardiology*. 2019; 55:107-10. doi: 10.1016/j.jelectrocard.2019.05.012.
6. Elendu C, Otobrise DE, Blewusi GS, Iheanetu NA, Olaofe PA, Bob-Ume NC, et al. The heart and HIV therapy: exploring the dual cardiovascular impact of antiretroviral treatment - a narrative review. *Annals of medicine and surgery (2012)*. 2025;87(8):5012-28. doi: 10.1097/ms9.0000000000003465.

7. Ozaki Y, Tobe A, Onuma Y, Kobayashi Y, Amano T, Muramatsu T, et al. CVIT expert consensus document on primary percutaneous coronary intervention (PCI) for acute coronary syndromes (ACS) in 2024. *Cardiovascular intervention and therapeutics*. 2024;39(4):335-75. doi: 10.1007/s12928-024-01036-y.
8. Velleca A, Shullo MA, Dhital K, Azeka E, Colvin M, DePasquale E, et al. The International Society for Heart and Lung Transplantation (ISHLT) guidelines for the care of heart transplant recipients. *The Journal of heart and lung transplantation: the official publication of the International Society for Heart Transplantation*. 2023;42(5):e1-e141. doi: 10.1016/j.healun.2022.10.015.
9. Masih, S., Punchanathan, U. E., Naqshbandi, M. M., & Ahmed, F. (2025). How inclusive leadership drives change-oriented extra-role behaviors via leader-member exchange and trust in leadership. *Global Knowledge, Memory and Communication*.
10. Jordan, K. J., & Espiritu, A. J. (2025). Knowledge and barriers to accessing comprehensive care for hemophilia patients in Rwanda: A cross-sectional study. *Perinatal Journal*, 33(1), 844-853.