

## Thromboembolism in a Patient with a Left Ventricular Aneurysm

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### Abstract

Idiopathic aneurysms involving the left ventricle are considered very rare, and in a majority of instances, they are asymptomatic. In a minority of patients, they may present with cardiac rupture, cardiac tamponade, ventricular arrhythmias, and sudden death. We describe the case of a 21-year-old male patient who was hospitalized for altered mentation and critical left lower limb ischemia because of acute embolic events. Transthoracic echocardiography demonstrated a left ventricular aneurysm and a reduced ejection fraction. Similarly, cardiac computed tomography showed a large left ventricular aneurysm with mobile vegetations representing thrombi. He was managed with therapeutic anticoagulation and recovered uneventfully.

**Keywords:** Thromboembolism, aneurysm, left ventricle, transthoracic echocardiography

### Introduction

A left ventricular aneurysm (LVA) refers to a dyskinetic area of the ventricular wall with a broad neck; this distinguishes it from a pseudoaneurysm (1). Pathologically, the wall of a true LVA is thinned out in comparison to the rest of the wall of the left ventricle and is usually composed of fibrous tissue, necrotic muscle, and sometimes, viable myocardium. LVAs can be congenital or acquired. The congenital variety is potentially lethal and develops as a result of a defective ventricular wall (2). The acquired types can be differentiated into cardiac and non-cardiac types where they are most commonly attributed as a result of coronary artery disease. Other various causes include cardiomyopathy, myocarditis, trauma, cardiac sarcoidosis, or Chagas disease (3). LVAs without an established cause are referred to as idiopathic (4). Favored sites of involvement include the anterior or anterolateral wall territory. Well-documented complications include thrombus formation, cardiac output impairment, aneurysmal rupture, and ventricular arrhythmias (5). Mortality in patients with LVA is up to six-times higher than that in patients without aneurysms (6). Death is often sudden and is most commonly related to the high incidence of ventricular tachyarrhythmias as a result of LVAs (7).

### Case Presentation

A 21-years-old male presented to a hospital with a 1-day history of left lower extremity pain, which was followed by an altered mental status occurring in the last 4 h associated with a single episode of non-bilious, non-projectile vomiting. The prior medical, surgical, and family history was unremarkable. Upon presentation, he had a Glasgow Coma Scale (GCS) of 12/15 (E3V3M6), and a physical examination revealed a pale, pulseless, and poikilothermic left lower extremity. His baseline 12-lead electrocardiogram (ECG) demonstrated left ventricular hypertrophy with inverted T waves in leads II, III, aVF, and V5-6 (Figure 1). Laboratory investigations of blood samples were sent, which included a complete blood count; blood glucose, BUN, creatinine, and serum Electrolytes levels; and coagulation profile, and the results were within normal ranges. The chest X-ray was unremarkable. He underwent CT angiography of lower extremities (Figure 2), which revealed occlusion of the left common femoral artery. Immediate anti-coagulation with IV heparin and activated partial thromboplastin time monitoring were started. Because of his altered mentation, MRI of the brain was performed, which demonstrated multiple bilateral infarcts involving the frontal and parietal regions and thalami, suggesting an embolic phenomenon. A transthoracic

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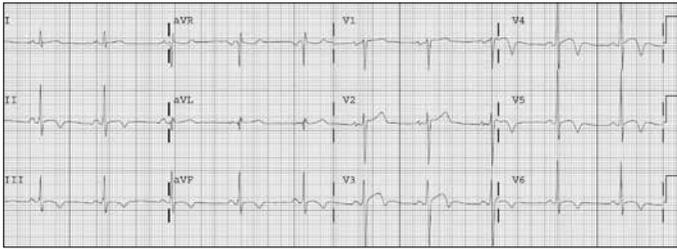
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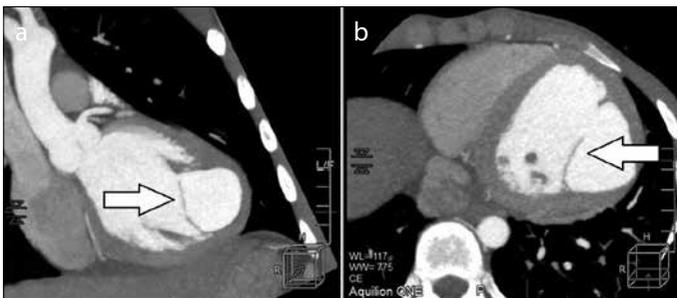




**Figure 1.** Twelve-lead electrocardiogram demonstrating left ventricular hypertrophy with inverted T waves in leads II, III, aVF, and V5-6



**Figure 2.** Abrupt cutoff/complete occlusion of the left common femoral artery noted. The left internal iliac artery also appears occluded just distal to its origin



**Figure 3. a, b.** CT coronary angiogram demonstrating a large left ventricular aneurysm involving the mid-to-distal inferolateral segments and large mobile filamentous structures arising from the junction of normal and aneurysmal wall representing thrombi

echocardiogram was performed, which showed severe global hypokinesia with an ejection fraction of 20% and a mid-to-distal posterolateral wall aneurysm, with suggestion of further advance imaging. Cardiac CT showed a large LVA involving the mid-to-distal inferolateral segments and large mobile filamentous structures arising from the junction of normal and aneurysmal wall, representing thrombi. The coronaries were normal (Figure 3). During the hospital stay, the patient underwent above-knee amputation of the left side. His anti-coagulant was progressively modified to enoxaparin and he was started on beta blockers. He recovered uneventfully and was discharged in a stable condition; he was advised to visit the hospital for regular follow-ups.

## Discussion

Left ventricular aneurysms are rare lesions that most commonly occur in the African population (8). They seem to occur as a result of a junctional defect between the cardiac muscle and the fibrous structure of the heart. The anatomy of the lesion can be complicated and has varying sizes, ranging from a few millimeters to several centimeters (9). Generally, a routine physical examination can fail to diagnose LVAs, unless there is calcification involving the aneurysmal wall (10). Progressive aneurysmal growth can cause eventual loss of support to the mitral apparatus, resulting in mitral regurgitation and cardiac failure. Currently, echocardiography serves as the most accurate tool for identification (11). The typical location of the aneurysm and the absence of coronary artery disease on angiography confirm a diagnosis of LVA.

Patients with LVAs can present with a variety of symptoms such as recurrent arterial emboli (12, 13), angina (14), congestive heart failure (15), ventricular tachyarrhythmias, and sudden cardiac death. The treatment and prognosis of LVAs are largely dependent on their size and location and on the degree of valvular involvement, functional class of congestive heart failure, and presence of ventricular tachyarrhythmias. Therefore, treatment can range from antiarrhythmic drugs (16) to VT ablation (17), implantation of an ICD (18), or aneurysmectomy (19). However, there are no long-term follow-up studies comparing the different management strategies.

## Conclusion

Left ventricular aneurysms are rare lesions that should be suspected in patients presenting with a clinical history of embolism, ventricular arrhythmias, and no cardiovascular disease. For emergency physicians, this should be considered in the differential diagnosis in patients presenting with multiple thromboembolisms involving different sides. Such patients should undergo echocardiography early in the ED to identify the condition.

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**Peer-review:** Externally peer-reviewed.

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