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Case Report

CASE REPORT

Multiple coronary aneurysms in a young adult with acquired immunodeficiency syndrome

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Abstract

HIV infection can cause multiple deleterious effects on the cardiovascular system. Emerging evidence has supported a direct association between HIV infection and accelerated atherosclerosis. The mechanism for atherosclerosis in HIV-positive patients is multifactorial, an interplay between conventional risk factors, HIV itself and highly active antiretroviral therapy. The case described is a 29-year-old man with HIV, non-adherent to antiretroviral therapy and with few cardiovascular risk factors, who presented with chest pain and non-ST elevation myocardial infarction. Cardiac catheterization revealed multiple coronary artery aneurysms in the left main coronary artery and the right coronary artery. Aneurysmal formation may develop from vasculitis, HIV itself, accelerated atherosclerosis, congenital formation or medications (e.g. protease inhibitors). The researchers provide a review of coronary artery disease, aneurysmal formation and vasculitic processes in the context of HIV. As this clinical entity becomes more apparent, alternative therapeutic options may need to be explored.

INTRODUCTION

Patients with HIV can experience a wide range of unique pathology and disease, affecting every human organ system. Evidence is growing that HIV-infected individuals are predisposed to myriad cardiovascular complications, including accelerated atherosclerosis and early myocardial infarction (MI) [1]. In the era of highly active antiretroviral therapy (HAART), the patterns and severity of coronary disease in HIV-infected patients have evolved such that AIDS is becoming a chronic disease. Proposed factors contributing to coronary artery disease (CAD) in this population include HIV itself, HIV-associated vasculitis, a higher prevalence of risk factors for atherosclerosis and the widespread use of antiretrovirals [1]. Presented here is a case where a young man manifests a rare complication of HIV/AIDS in the form of coronary artery aneurysms (CAAs).

CASE REPORT

A 29-year-old African-American male with a 7-year history of HIV, non-adherent to HAART, presented with acute onset of chest pain. The pain was a severe, substernal tightness occurring at rest with associated shortness of breath. He had no other medical problems. His CD4 counts had been <250 cells/mm^3 since his diagnosis. He denied alcohol or illicit drug use but smoked one to two cigars daily over a few years. There was no family history of cardiac risk factors. Vital signs were normal, and BMI was 20. Cardiac, respiratory and peripheral arterial examinations were normal. He had no rashes, lymphadenopathy or conjunctival injection.

An electrocardiogram was normal with no ST segment abnormalities. Unexpectedly, cardiac enzymes were elevated, including a troponin T that increased from 0.06 to 1.16 ng/ml (reference

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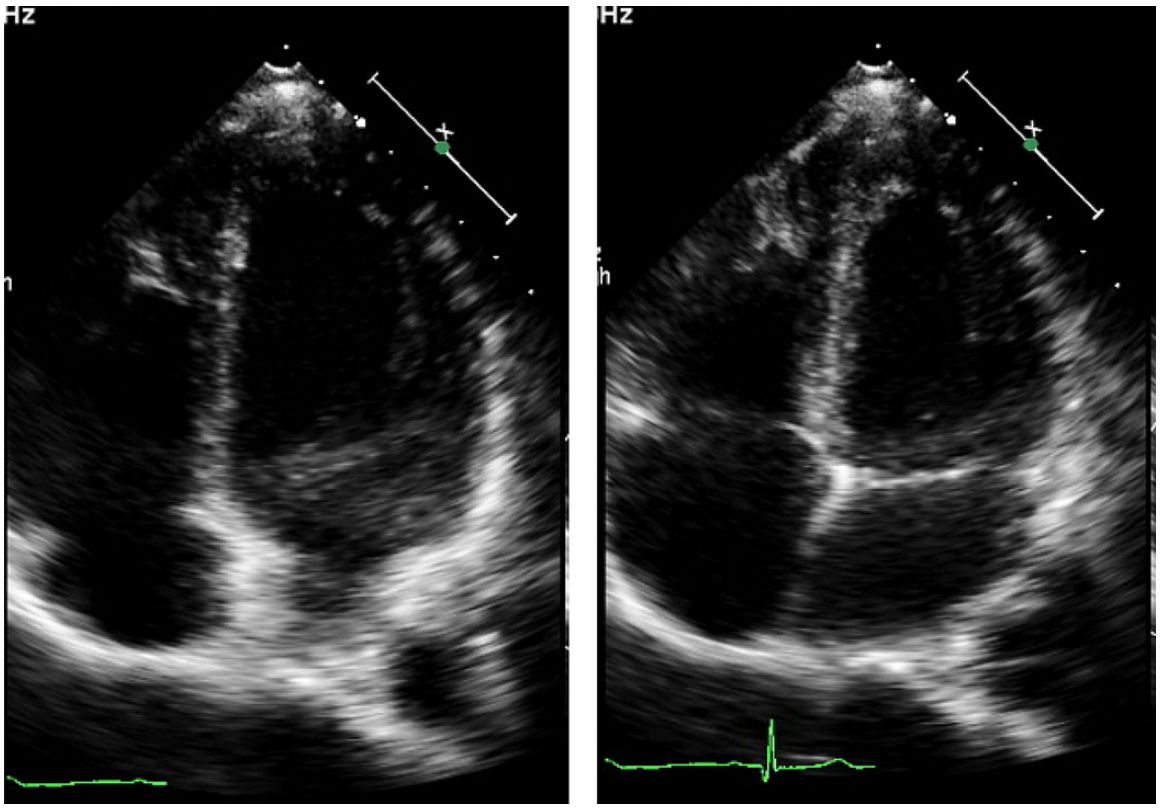

Figure 1: Transthoracic echocardiogram. (Left) Four-chamber view in end-diastole. (Right) Four-chamber view in end-systole showing apical cap hypokinesis.

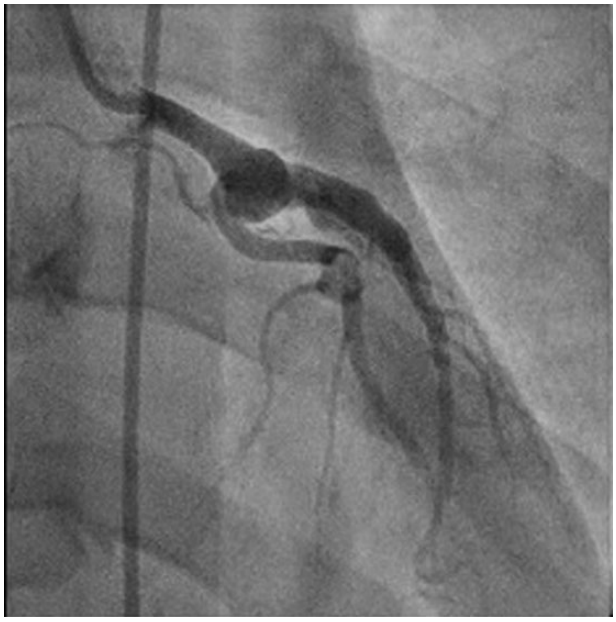

Figure 2: Left main CAA. Located distally near the bifurcation into the left anterior descending artery and the left circumflex artery.

<0.10 ng/ml) over three sets. An echocardiogram revealed a hypokinetic apical cap with a preserved ejection fraction of 55% (Fig. 1).

The patient underwent cardiac catheterization. Aneurysms were noted in the distal left main coronary artery (Fig. 2) and the middle and distal portions of the right coronary artery (Fig. 3). No endovascular interventions were performed.

Further laboratory work-up ensued in an effort to identify an etiology for the aneurysms. Absolute CD4 count was 18 cells/mm^3, along with a HIV viral load of 260,000 copies. Markers for cardiac risk factors including hemoglobin A1c, lipids and urine drug screen were normal. Extensive work-up for inflammatory or infectious causes was unrevealing (Table 1).

The patient was started on aspirin, clopidogrel, heparin, a statin and a beta blocker. Long-term anticoagulation was considered but was not initiated given the small to moderate size of the aneurysms. Plans were to resume HAART when he is willing to commit entirely to treatment. Over 1 year after the event, the patient continues to struggle with adherence and CD4 counts remain below 250 cells/mm^3.

DISCUSSION

Several mechanisms might explain the development of aneurysms in individuals infected with HIV. These include vasculitis (e.g. Kawasaki-like disease), infectious and mycotic causes, atherosclerosis, congenital formation or drug effects (e.g. protease inhibitors). HIV-associated aneurysms have been well described, although their causes are largely unknown [2]. Researchers have identified certain patterns in aneurysm location and morphology. There is often a predilection for large vessels, including arteries in the cerebral vasculature, the aorta, the carotid arteries or large arteries of the lower extremities [2]. Most patients with aneurysms are young and have evidence of multiple aneurysms [2]. CAAs have not been well documented in patients with HIV [3]. There is one recent report of a 22-year-old male with HIV who presented with ST-segment elevation MI related to CAAs [4].

HIV-associated vasculitides often lead to aneurysms [5]. In contrast to the patterns above, HIV vasculitis affects small- and

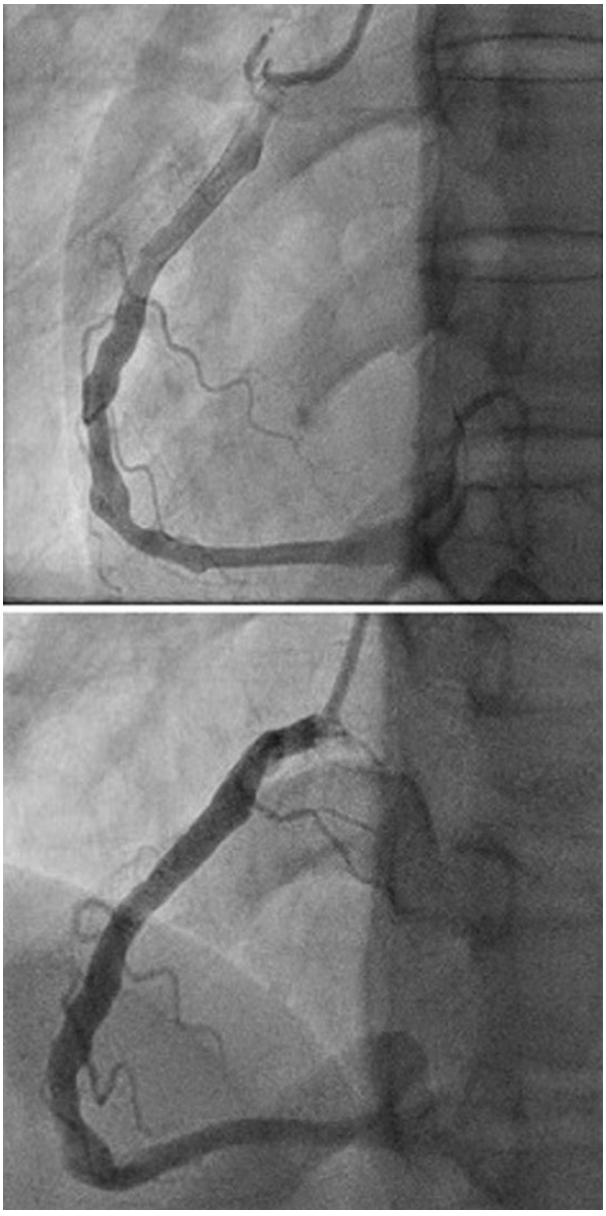

Figure 3: Right CAAs. Views of middle and distal RCA aneurysms.

Table 1: Laboratory findings.

Test	Results	Reference
Lyme IgG/IgM	0.19	<0.9
MHA-TP	Negative	Negative
Treponema pallidum IgG	Non-reactive	Non-reactive
cANCA	<1:20	<1:20
pANCA	<1:20	<1:20
GBM antibodies	5 units	<20 units
Histoplasma antigen	None detected	None detected
CMV IgM	<0.9	0–0.8 index
Rheumatoid factor	<20	0–20 IU/ml
MPO antibody	<9.0	9–9.0 U/ml
Proteinase-3 antibody	<3.5	0–3.5 U/ml
Cryptococcal antigen	Negative	Negative
Blood culture	Negative	Negative
Fungal blood culture	Negative	Negative
Rapid influenza screen	Negative	Negative

MHA-TP, microhemagglutination assay for *Treponema pallidum*; cANCA, anti-neutrophil cytoplasmic antibody (central); pANCA, anti-neutrophil cytoplasmic antibody (peripheral); GBM, glomerular basement membrane; CMV, cytomegalovirus; MPO, myeloperoxidase.

medium-sized arteries [5]. A Kawasaki-like syndrome can occur in adults with HIV, although it less often involves the heart than the pediatric syndrome. A review of 20 cases of Kawasaki-like syndrome in HIV-positive adults had no patients with CAAs, compared with 20% in the pediatric disease [3]. The cause of the Kawasaki disease is thought to be infectious, although evidence is scarce. In contrast, several factors likely contribute to the pathogenesis of HIV-associated vasculitides, including HIV itself, CD8T cells, immune complexes, immune reconstitution or infectious causes (i.e. CMV, EBV, mycobacterium tuberculosis or toxoplasmosis) [5].

There is compelling evidence for the independent association of HIV positivity with CAD. One large retrospective cohort study showed a significantly higher incidence of CAD in young patients (aged 18–34 years) compared with age-matched uninfected individuals [6]. A recent case–control study showed that HIV-1 replication, a low CD4T cell nadir and elevated CD8T cell count were independently associated with occurrence of MI [7]. In fact, HIV infection is a prothrombotic state, driven by derangement in coagulation factors and upregulation of the coagulation cascade; particularly, there are lower levels of protein S and higher level of anti-cardiolipin antibodies than in non-infected individuals [8]. Other research has established an association between the long-term use of protease inhibitors and rates of MI [9].

Coronary aneurysms in the general population are rare, with estimated incidence from 1 to 5% [10]. While there are no guidelines for the management of CAAs, experts have recommended conservative medical therapy (i.e. dual antiplatelet therapy, heparin and statin) in patients with CAAs and acute coronary syndrome (ACS) [10]. Invasive strategies (e.g. thrombectomy) may be appropriate in patients who have high-risk features, such as TIMI 0 or 1 flow, recurrent angina, hemodynamic instability or sustained ventricular tachycardia. Giant CAAs (vessel diameter >4 times the reference value) may be an indication for anticoagulation [10].

To conclude, there is much that remains unknown about HIV-associated aneurysms, especially coronary aneurysms due to their scarcity. The researchers speculate that the multiple coronary aneurysms in this patient were most likely caused by HIV itself, leading to inflammation that appears to be an atherosclerotic or prothrombotic process. The patient's modest risk factors for early CAD—aside from having low CD4 count and high HIV viral load—would make the argument for atherosclerosis less convincing.

Further investigation into the pathogenesis of aneurysm formation and atherosclerosis in HIV-infected individuals would be particularly valuable in understanding this chronic disease. Fundamentally, if researchers can elucidate the factors guiding aneurysm formation in AIDS, then different treatment modalities may be more prudent than others. For example, this patient received medical therapy for ACS, but perhaps other treatments, such as HAART, anti-inflammatory agents or long-term anticoagulation, might have been beneficial as well.

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CONFLICT OF INTEREST STATEMENT

None declared.

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ETHICAL APPROVAL

Aside from informed patient consent, ethical approval was not required for this case report.

CONSENT

Written informed consent was obtained directly from the patient for publication of this case report and any accompanying images.

GUARANTOR

M.C.K is the guarantor of this article.

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