



# HIV: a covert risk factor for coronary artery disease

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## Introduction

- In the era of Highly Active AntiRetroviral Therapy (HAART), cardiovascular disease has emerged as one of the leading causes of death in older patients with HIV.
- High HIV viral loads and low CD4 counts are associated with increased cardiovascular risk<sup>1,3</sup>

## Case Description

- A 58-year-old man with HIV presents to clinic with six months of intermittent substernal chest pain.
- Pain is worse when eating certain foods and while supine. He attributes the pain to heart burn. More recently, he had episodes of pain provoked by exercise.
- Vitals were notable for a blood pressure of 165/84 mmHg and BMI of 28 kg/m<sup>2</sup>. The patient had no previous diagnosis of hypertension.
- HIV was diagnosed in 1986 and had been suppressed with normal CD4 counts on antiretroviral therapy since 2003. Antiretroviral medications included abacavir, dolutegravir, lamivudine, and tenofovir.

## Notable Labs

CBC / BMP	Unremarkable
Lipid panel	Total Cholesterol 245 mg/dL LDL 163 mg/dL
HIV PCR	Undetectable
CD4 count	1009

## Traditional Cardiovascular Risk Factors

Tobacco use	No
Diabetes	No
Hyperlipidemia	Yes (did not tolerate statin)
Hypertension	Yes (newly diagnosed)
Obesity	No (BMI 28 kg/m <sup>2</sup> )
Family History	No

## Diagnostic Workup

### Exercise Treadmill Stress Test

T-wave flattening in leads II, III, aVF, V5 and V6 at low workload.

### Coronary Angiography

Severe 3-vessel CAD with total occlusion of the proximal left anterior descending artery.

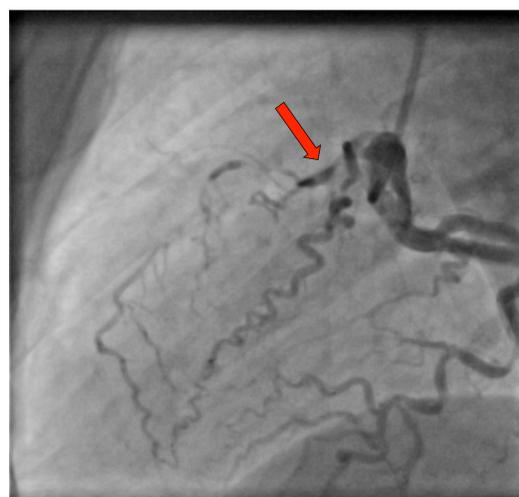


Figure 1. Lateral view. Proximally occluded LAD (red arrow) with late filling of distal branches from right-to-left collaterals.



Figure 2. LAO-caudal ("spider") view. Occluded LAD (red arrow).

The patient underwent a successful 3-vessel coronary artery bypass graft surgery. He was started on metoprolol, pravastatin, and aspirin. His antiretroviral regimen was changed to TAF/FTC/rilpivirine + dolutegravir.

## Abacavir and risk of MI

- The patient's antiretroviral regimen included abacavir, a commonly used nucleoside reverse transcriptase inhibitor (NRTI), for 15.5 years.
- Abacavir has been postulated to be a contributing factor to cardiovascular risk. Multiple observational and randomized controlled trials have produced mixed conclusions.

### Summary of Key Analyses Addressing Risk of MI with Abacavir<sup>2</sup>

Study	Study Design	Age, Yrs (Range)	Event (n)	Pts, N	ABC CV Effect	Time on ABC, Mos	Risk of MI (95% CI)
D:A:D <sup>[1]</sup>	Cohort	40 (35-47)	MI, validated (387)	22,625	Yes	≥ 6	2.04 (1.66-2.51)
D:A:D 2015 <sup>[2]</sup>	Cohort	39 (33-46)	MI (493)	32,663	Yes	Current	1.47 (1.26-1.71)
SMART <sup>[3]</sup>	RCT	45 (39-51)	MI, validated (19)	2752	Yes	Current	4.3 (1.4-13.0)
STEAL <sup>[4]</sup>	RCT	45.7 ± 8.8	MI (4)	357	Yes	96	2.79* (1.76-4.43)
QPHID <sup>[5]</sup>	CC	47 (22-67)	MI (125)	7053	Yes	Any	1.79 (1.16-2.76)
Danish <sup>[6]</sup>	Cohort	39 (33-47)	MI (67)	2952	Yes	> 6	2.00 (1.07-3.76)
VA (Choi) <sup>[7]</sup>	Cohort	46	CVD event (501)	10,931	Yes	Recent	1.64 (0.88-3.08)
Swiss <sup>[8]</sup>	Cohort	NR	CVD event (365)	11,856	Yes	Recent	4.06† (2.24-7.34)
MAGNIFICENT <sup>[9]</sup>	CC	50 (22-85.5)	CVD event (571)	1875	Yes	Current	1.56 (1.17-2.07)
NA-ACCORD <sup>[10]</sup>	Cohort	NR	MI, validated (301)	16,733	Yes	Recent	1.33
FHDH <sup>[11]</sup>	CC	47 (41-54)	MI (289)	74,958	No	< 12/recent	1.27* (0.64-2.49)
ALLRT/ACTG <sup>[12]</sup>	Cohort	37 (26-51)	MI (36)	5056	No	72	0.6 (0.3-1.4)
VA <sup>[13]</sup>	Cohort	46	MI (278)	19,424	No	Per 12	1.18 (0.92-1.50)
FDA <sup>[14]</sup>	MA of RCTs	36-42	MI (46)	9868	No	19	1.02 (0.56-1.84)
NA-ACCORD <sup>[10]</sup>	Cohort	NR	MI, validated (301)	16,733	No	Recent	1.33

## Discussion

This case highlights the importance of recognizing HIV infection as an independent risk factor for the development of CAD. Some traditional cardiovascular risk factors such as smoking, hypertension, and dyslipidemia are more prevalent in patients with HIV; however, even after adjusting for these risk factors, HIV infection alone is associated with an increased risk for myocardial infarction.

In this case, the patient's traditional cardiovascular risk factors include hyperlipidemia, male sex, and hypertension. However, the degree of obstructive CAD, including a totally occluded left anterior descending artery, is surprising given his younger age and generally healthy lifestyle.

Proposed mechanisms for the etiology of increased cardiovascular events include an immune-mediated or inflammatory process leading to accelerated atherosclerosis<sup>1</sup>. Further research is needed to determine the relationship between antiretroviral therapy, particularly abacavir, and risk of MI.

## Teaching Points

- Clinicians should have an increased index of suspicion for coronary artery disease in patients with HIV.
- In addition to HIV infection, certain antiretroviral therapy regimens (abacavir) have been associated with increased risk of MI.

## References

- Triant, V. A. (2012). HIV Infection and Coronary Heart Disease: An Intersection of Epidemics. *The Journal of Infectious Diseases*
- Clinical Care Options – HIV Slideset: *How common comorbidities affect ART management* (2017)
- Initiation of Antiretroviral Therapy in Early Asymptomatic HIV Infection. (2015). *The New England Journal of Medicine*.