



REVIEW ARTICLE

Cardiovascular disease associated with human immunodeficiency virus: A review[☆]



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Human immunodeficiency virus

Abstract The cardiovascular manifestations of human immunodeficiency virus (HIV) infection have changed significantly following the introduction of highly active antiretroviral therapy (HAART) regimens. On one hand, HAART has altered the course of HIV disease, with longer survival of HIV-infected patients, and cardiovascular complications of HIV infection such as myocarditis have been reduced. On the other hand, HAART is associated with an increase in the prevalence of both peripheral and coronary arterial disease. As longevity increases in HIV-infected individuals, long-term effects, such as cardiovascular disease, are emerging as leading health issues in this population. In the present review article, we discuss HIV-associated cardiovascular disease, focusing on epidemiology, etiopathogenesis, diagnosis, prognosis, management and therapy. Cardiovascular involvement in treatment-naïve patients is still important in situations such as non-adherence to treatment, late initiation of treatment, and/or limited access to HAART in developing countries. We therefore describe the cardiovascular consequences in treatment-naïve patients and the potential effect of antiretroviral treatment on their regression, as well as the metabolic and cardiovascular implications of HAART regimens in HIV-infected individuals.

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PALAVRAS-CHAVE

Doença cardiovascular;
Terapêutica antirretroviral;

Patologia cardiovascular associada ao vírus da imunodeficiência humana

Resumo As manifestações cardiovasculares da infeção pelo vírus da imunodeficiência humana (VIH) modificaram-se significativamente com a introdução dos regimes de terapêutica antirretroviral de elevada potência (HAART). Por um lado, a HAART modificou o curso da doença VIH, com o prolongamento da sobrevivência dos doentes VIH-infetados. Complicações

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cardiovasculares da infecção VIH, como a miocardite, foram reduzidas. Por outro lado, a HAART tem sido associada ao aumento da prevalência de doenças arteriais periféricas e coronárias. Com o aumento da longevidade dos indivíduos VIH-infetados, efeitos a longo prazo, como a doença cardiovascular, estão a emergir como questões de saúde proeminentes nesta população. No presente artigo de revisão, discutiremos a patologia cardiovascular associada ao VIH, focando-nos na epidemiologia, etiopatogénese, diagnóstico, prognóstico, abordagem e terapêutica. A importância do envolvimento cardiovascular em doentes não tratados pelas novas terapêuticas é ainda uma realidade em situações como o não cumprimento da terapêutica, o início tardio da terapêutica ou o acesso limitado à HAART nos países em desenvolvimento. Assim, descreveremos as consequências cardiovasculares nos doentes não tratados e o potencial efeito da terapêutica antirretroviral na sua regressão, e as consequências metabólicas e implicações cardiovasculares dos regimes HAART nas pessoas infetadas pelo VIH.

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AIDS	acquired immunodeficiency syndrome
ART	antiretroviral therapy
BP	blood pressure
CCB	calcium channel blocker
CVD	cardiovascular disease
EACS	European AIDS Clinical Society
HAART	highly active antiretroviral therapy
HIV	human immunodeficiency virus
HF	heart failure
HTN	nephropathy hypertensive nephropathy
IE	infectious endocarditis
IHD	ischemic heart disease
iNOS	inducible nitric oxide synthase
KS	Kaposi sarcoma
LV	left ventricular
LVDD	left ventricular diastolic dysfunction
MI	myocardial infarction
MRSA	methicillin-resistant <i>Staphylococcus aureus</i>
NHL	non-Hodgkin lymphoma
NNRTI	non-nucleoside reverse-transcriptase inhibitor
NRTI	nucleoside reverse-transcriptase inhibitor
PAH	pulmonary arterial hypertension
PE	pericardial effusion
PI	protease inhibitor
QTc	corrected QT
TTE	transthoracic echocardiography

Introduction

Human immunodeficiency virus (HIV) is a retrovirus with tropism for cells expressing CD4. In 2012 the number of HIV-positive individuals was estimated at 35.3 million.¹

The introduction of highly active antiretroviral therapy (HAART) has prolonged the survival of HIV-positive individuals, turning acquired immunodeficiency syndrome (AIDS) into a chronic disease.

A retrospective analysis of causes of death in 13 cohort studies of HIV type 1 (HIV-1)-infected patients who initiated antiretroviral therapy (ART) in Europe and North America from 1996 through 2006 showed lower mortality from AIDS-related causes and higher mortality from causes associated with aging, such as non-AIDS malignancies and cardiovascular disease (CVD). The latter accounted for 7.9% of deaths, of which 40% were from myocardial infarction (MI)/ischemic heart disease (IHD), which suggests that the process of aging will become a dominant factor in HIV-1 mortality in the next decade.²

The cardiovascular manifestations of HIV infection have changed following the introduction of HAART. Cardiovascular involvement in treatment-naïve patients is still important in individuals who do not adhere to treatment or start treatment late, and in countries with limited access to ART. We therefore describe the cardiovascular consequences in treatment-naïve HIV-positive individuals and the potential effect of treatment on their regression, as well as the implications of HAART.

Cardiovascular manifestations of human immunodeficiency virus infection

Cardiomyopathy

Four types of cardiomyopathy are associated with HIV infection: myocarditis, hypokinetic cardiomyopathy (particularly in advanced stages of infection), dilated cardiomyopathy, and reduced left ventricular systolic function.³

Pre-HAART studies reported high prevalences of myocarditis, in up to 52% of patients.⁴ Acute myocarditis can lead to congestive heart failure (HF) and arrhythmias. Myositis is common in this population, and myoglobin is thus less specific as a marker of myocardial damage.⁵ Clinical features, risk factors such as drugs or antivirals, and complementary exams have a role in diagnosis. The gold standard in the diagnosis of myocarditis is endomyocardial biopsy.⁶

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