

# HIV ASSOCIATED CARDIOVASCULAR DISEASE

## **Background**

1. Widespread use of antiretroviral therapies in the treatment of HIV has led to increased longevity, exposing HIV-positive patients to many common medical conditions seen in an aging population, such as cardiovascular disease (CVD)
2. People living with HIV have higher rates of myocardial infarction than those without, even when accounting for other comorbidities. Some antiviral medications appear to have a direct negative effect on myocardial function.

## **Pathophysiology**

1. Pathology of disease
  - Etiology of CVD in HIV is multifactorial, mediated through elevated cytokines, chronic vascular inflammation and endothelial dysfunction.<sup>1</sup>
  - HIV causes disease of the vascular tree, either directly on vascular or perivascular tissue, or indirectly via immune complex-mediated mechanisms, opportunistic infections and/or malignancies<sup>2</sup>
  - HIV also reduces total cholesterol, LDL and HDL but elevates triglycerides.
  - HAART exacerbates total cholesterol, LDL, triglycerides and insulin resistance. The prevalence of diabetes in HAART treated patients is increased although there are differences between the antiretroviral agents as to risk.
  - Most common cardiovascular manifestations: pericarditis, myocarditis, cardiomyopathy, pulmonary vascular disease and pulmonary hypertension, valvular disease and coronary artery disease.
2. Incidence, Prevalence<sup>3</sup>
  - Incidence of AIDS related cardiovascular disease varies worldwide
  - Risk increases with advancing age.
3. Additional Risk Factors<sup>4</sup>
  - HIV-infected persons have higher rates of other known CAD risk factors including:
    - Hypertension
    - Diabetes
    - FH of CVD
    - Lifestyle—cigarette smoking, exercise, diet, alcohol
4. Morbidity / Mortality
  - Relative risk of MI in HIV compared to non HIV subjects is 1.7-1.8.<sup>5</sup>

## **Diagnostics**

1. History
  - Family medical history was rarely important in the pre-HAART era because of premature death from HIV related causes. Family history is now important again.
  - A thorough assessment of cardiovascular risk factors for HIV patients includes:
    - Smoking history
    - Sex
    - Age

- Hypertension
  - Diabetes or metabolic syndrome
  - Obesity
  - Family History
- 2. Laboratory evaluation
  - Fasting lipid profiles—cardiac risk assessment is based on NCEP, Adult Treatment Panel III guidelines<sup>6</sup>
  - Fasting glucose and possibly glucose tolerance test
- 3. Other testing
  - EKG

## Therapeutics

1. Initial management
  - Most protease inhibitors significantly increase statin blood levels increasing the likelihood of side effects of those drugs. Most NNRTIs decrease levels of most statins.
  - Follow ATP-III guidelines with respect to when to initiate medications.
  - Common medications used:<sup>7</sup>
    - Pravastatin: 20–40 mg/d starting dose
    - Atorvastatin: 10 mg/d starting dose
    - Fluvastatin 20-40 mg is a reasonable alternative but has been less well studied.
  - Triglyceride level of >500 mg/dL or CHD and TG>200
    - Gemfibrozil 600 mg b.i.d.<sup>8</sup>
    - Fenofibrate 40-200 mg once a day
  - Carefully monitor virologic status and for hepatic and skeletal muscle toxicity.<sup>8</sup>
2. Further Management
  - In those patients who do not reach their target cholesterol goals on their initial therapy, combination therapy with a statin and fibrate derivative can be considered.
  - The potential benefit and safety of combination therapy in HIV-infected patients was noted in one study of atorvastatin and gemfibrozil<sup>9</sup>
  - Combination therapy should be approached with caution due to the risk of myopathy
  - Statin therapy may also be combined with niacin for persistently elevated LDL cholesterol with monitoring of liver enzymes and random glucose concentrations.

## Follow-Up

1. Return to Office
  - Routine monitoring of serum creatine kinase (CK) levels is not recommended for patients on statins.
  - Patients treated with statins should be alerted to report the new onset of myalgias or weakness. –the incidence of statin induced myopathy in HIV patients is increased.

## Prevention

1. Smoking cessation
2. Diet modification
3. Increased exercise
4. Diet therapy has been shown to decrease serum cholesterol levels in patients receiving antiretroviral therapy, although lipid levels may not reach desired goals and caution should be used regarding calorie restriction in the absence of obesity.

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