**HIV, Lipid Disorders and Cardiovascular Disease**

Created by Christopher Alonzo MD, MPH and Michael Green MD

**Learning Objectives**

1. Understand lipid disorders in newly infected HIV patients
2. Understand dyslipidemia in HIV infected patients on ART
3. Review and understand CVD in HIV infected patients

**Case:**

Mr. Aiden is a 52 year old man Caucasian, with a PMHx significant for newly diagnosed HIV 4 weeks ago, not currently on anti-retroviral therapy (ART), HTN on amlodipine, active smoker (1ppd for 20 yrs), poor medical follow up with last visit 7 years ago. Pt communicates that he is ready to start ART now and is seen in clinic to initiate staging and get medications. HIV VL 96,000 at diagnosis CD4 count 352. On exam he is overweight gentleman, BMI 32, HR 96, RR12, BP 147/88, with RRR, CTAB, large abdomen but soft and non tender, no LE edema, and pleasant on interview.

1. **What changes in Lipid do you expect in newly diagnosed HIV patients? What other risk factors regarding CVD should be evaluated with this patient?**

Labs and staging are completed with the following. Lipid panel Chol 160, HDL 34, LDL98, TG 111, UA + microalbuminuria, Gonorrhea/Chlamydia screening negative, Hemoglobin A1c 7.0, HLA B5701 negative, CD4 322, VL 112,000 genotype Wild Type, Hep A IgG +, Hep B immune, C serology negative, TB non-reactive, VDRL negative.

1. **Based on his laboratory testing and Hx what is his ASCVD risk score and overall CVD risk considering his HIV status?**
2. **What is the mechanism of increased MI and CVD due to HIV infection?**
3. **What ART therapy would you consider initiating? Is there any classes or specific medications you would preferentially use? Are there any you would avoid?**

Mr. Aiden starts on a regimen of Truvada and DTG with good viral response and control, now with an undetectable viral load, CD4 > 500, no complications or SE, and 100% adherence. Pt continues to have elevated BP 151/94 despite amlodipine 5mg daily, and lipid panel today noted to have Cholesterol 190, LDL 124, TG 144, and HDL of 39, he continues to smoke now ½ ppd for last year, and has very little physical activity. He worries that he will start to have “that look,” that people with AIDS had in the 1990’s.

6. **What changes in Lipid profile would you expect after initiating ART?**

**7. Describe the difference between Metabolic Syndrome and HIV Lipodystrophy.**

**8. What interventions would you recommend to reduce his ASCVD?**

**9.) What Medication would you select for this patient? Are there any special considerations for HIV patients regarding dyslipidemia treatment?**

**Recommended Reading**

# Jane A O'Halloran; Claudette S Satchell; Patrick WG Mallon. Dyslipidemia, Atherosclerosis and Cardiovascular Disease, An Increasingly Important Triad in an Aging Population Living With HIV. Future Virology. 2013;8(10):1021-1034. http://www.medscape.com/viewarticle/811580\_1

# Sabin CA, Worm SW, Weber R et al. Use of nucleoside reverse transcriptase inhibitors and risk of myocardial infarction in HIV-infected patients enrolled in the D:A:D study: a multi-cohort collaboration. Lancet371(9622),1417–1426 (2008).

# Worm SW, Sabin C, Weber R et al. Risk of myocardial infarction in patients with HIV infection exposed to specific individual antiretroviral drugs from the 3 major drug classes: the data collection on adverse events of anti-HIV drugs (D:A:D) study. J. Infect. Dis.201(3),318–330 (2010).

***Additional References/Reading***

1. Riddler SA, Smit E, Cole SR et al. Impact of HIV infection and HAART on serum lipids in men. JAMA289(22),2978–2982 (2003).
2. Triant VA, Lee H, Hadigan C, Grinspoon SK. Increased acute myocardial infarction rates and cardiovascular risk factors among patients with human immunodeficiency virus disease. *J. Clin. Endocrinol. Metab.*92(7),2506–2512 (2007).
3. Saves M, Chene G, Ducimetiere P *et al.* Risk factors for coronary heart disease in patients treated for human immunodeficiency virus infection compared with the general population. *Clin. Infect. Dis.*37(2),292–298 (2003).
4. Petoumenos K, Worm S, Reiss P *et al.* Rates of cardiovascular disease following smoking cessation in patients with HIV infection: results from the D:A:D study(\*). *HIV Med.*12(7),412–421 (2011).
5. Friis-Moller N, Sabin CA, Weber R *et al.* Combination antiretroviral therapy and the risk of myocardial infarction. *N. Engl. J. Med.*349(21),1993–2003 (2003).
▪ Initial publication highlighting the association between antiretroviral therapy and cardiovascular disease.
6. Armah K, Justice A, Oursler K *et al.* The impact of elevated and pre-hypertensive systolic blood pressure and the risk of acute myocardial infarction in HIV+ and HIV– veterans. Presented at: *19th Conference on Retroviruses and Opportunistic Infections*. Seattle, WA, USA, 5–8 March 2012 (Abstract 120).
7. Law MG, Friis-Moller N, El-Sadr WM *et al.* The use of the Framingham equation to predict myocardial infarctions in HIV-infected patients: comparison with observed events in the D:A:D Study. *HIV Med.*7(4),218–230 (2006).
8. Freiberg MS, Chang CC, Kuller LH *et al.* HIV infection and the risk of acute myocardial infarction. *JAMA*173(8),614–622 (2013).
9. Lang S, Mary-Krause M, Cotte L *et al.* Impact of individual antiretroviral drugs on the risk of myocardial infarction in human immunodeficiency virus-infected patients: a case–control study nested within the French Hospital Database on HIV ANRS cohort CO4. *Arch. Intern. Med.*170(14),1228–1238 (2010).
10. Cruciani M, Zanichelli V, Serpelloni G *et al.* Abacavir use and cardiovascular disease events: a meta-analysis of published and unpublished data. *AIDS*25(16),1993–2004 (2011).
11. Cutrell A, Brothers C, Yeo J, Hernandez J, Lapierre D. Abacavir and the potential risk of myocardial infarction. *Lancet*371(9622),1413 (2008).
12. Uptodate. **Epidemiology, clinical manifestations, and diagnosis of HIV-associated lipodystrophy**
13. **Epidemiology, clinical manifestations, and diagnosis of HIV-associated lipodystrophy**
14. <https://www.uptodate.com/contents/epidemiology-clinical-manifestations-and-diagnosis-of-hiv-associated-lipodystrophy?source=search_result&search=lipoatrophy%20HIV&selectedTitle=1~25>
15. **The metabolic syndrome (insulin resistance syndrome or syndrome X)**
16. **The metabolic syndrome (insulin resistance syndrome or syndrome X)**
17. Uptodate. https://www.uptodate.com/contents/the-metabolic-syndrome-insulin-resistance-syndrome-or-syndrome-x?source=search\_result&search=metabolic%20syndrome&selectedTitle=1~150