Living a Normal Life with HIV

Understanding Cardiovascular Disease

Cardiovascular Disease includes all diseases of the heart and blood vessels. Most commonly it refers to heart attack, angina and stroke. To maintain cardiovascular health, our bodies need the proteins, hormones and various cells necessary for blood vessel repair and upkeep as well as normal cholesterol and blood pressure levels. People are more likely to develop cardiovascular disease for a number of reasons, including high cholesterol levels and high blood pressure, as well as lifestyle factors such as smoking, increased weight or obesity, and being physically inactive.

Atherosclerosis is a term describing hard, fatty plaques made of cholesterol stuck the inner lining of blood vessels. All adults will have some level of atherosclerosis in their blood vessels, it occurs normally with aging. However in some individuals large, thick atherosclerotic plaques can rupture and cause heart attack or stroke by blocking the blood supply to the heart or brain. Cholesterol levels in the blood are a good marker (in combination with other factors such as age and smoking status) in estimating cardiovascular health. A blood test for cholesterol will measure "good" HDL cholesterol, and "bad" LDL cholesterol, as well as triglyceride levels. Increased LDL or decreased HDL levels may indicate an increased risk of cardiovascular disease

What makes a person more at risk of Cardiovascular Disease?

There are many factors that contribute to an increased risk for cardiovascular disease. Some of these, such as age, sex and family history are outside of our control. However, there are other factors, such as smoking, diet and exercise, which are things that we can manage as individuals.

Factors that contribute to Cardiovascular Disease

- Family history of heart disease
- Age & Sex (Men are generally at greater risk. Risk increases with age)
- High Blood pressure
- High Cholesterol levels
- Diabetes
- Smoking / Alcohol / High body weight
- Diet (High salt, fat and alcohol intake)
- Lack of regular, weight-bearing exercise
- Unrelieved stress

How is Cardiovascular Health affected by HIV?

Cardiovascular disease is common in patients with HIV. While many risk factors, such as smoking, obesity, poor diet and physical inactivity can lead to cardiovascular disease, HIV infection itself is thought to cause chronic inflammation, which can affect blood vessels and promote atherosclerosis.

Studies have shown that people with HIV tend to have decreased HDL ("good") cholesterol levels in the blood. As more people with HIV live longer with effective therapy, it is important to understand why people with HIV are at higher risk of cardiovascular disease so that we can prevent serious cardiovascular events, such as heart attacks and strokes, among these individuals.

Also, research shows that starting HIV medications can be associated with altered cholesterol levels. Right now, we do not fully understand the mechanisms of these changes.

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What can you do to lower your risk of Cardiovascular Disease?

Healthy Eating: A well-balanced diet, consisting of breads, cereals, fruits and vegetables as well as low-fat dairy products and lean proteins. Plenty of fluids (2 litres) each day, preferably water! Try to limit alcohol and salt intake.

Exercise: Regular exercise reduces your risk of heart attack, high blood pressure and stroke. Aim to exercise for 30 minutes, 5 days a week. Walking is a start, but it should vary in intensity and not be the same every day. If you are unsure, consult your doctor for advice on what exercise would suit you.

Quit Smoking: Stopping smoking greatly reduces your risk of heart disease. One in every two smokers will die of a tobacco-related disease.

For expert help: Freephone the National Smokers Quitline on 1800 201 203 or visit www.quit.ie.

Regularly Check Blood Pressure and Cholesterol:

High cholesterol levels and high blood pressure increase your risk of heart disease. The only way to know if you have high blood pressure or cholesterol is to get checked regularly by your doctor. Healthy diet, exercise and medications prescribed by your doctor can be used to bring blood pressure and cholesterol levels under control and reduce your risk of heart attack or stroke.

HIV Molecular Research Group

Established by Dr Paddy Mallon in 2008, the HMRG, is internationally recognized for its collaborative, translational research aimed at maintaining long term health in people living with HIV receiving antiretroviral therapy.

Based at the Mater Misericordiae University Hospital campus, the group comprises researchers with laboratory, statistical and clinical research expertise.

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HMRG Research | HIV and Cardiovascular Disease

The HRMG conducts a number of studies examining the pathogenesis of cardiovascular disease in people living with HIV and has come up with several important findings.

1. People living with HIV have immune activation that contributes to the pathogenesis of cardiovascular disease.

Work completed by HMRG has shown that people with HIV have an activated immune system that is not corrected with antiretroviral therapy and that this immune activation is characterised by abnormalities linked to increased risk of cardiovascular disease.

*O'Halloran JA, Dunne E, Gurwith M, Lambert JS, Sheehan GJ, Feeney ER, et al. The effect of initiation of antiretroviral therapy on monocyte, endothelial and platelet function in HIV-1 infection. HIV Med 2015,**16**:608-619.*

2. Cells of people living with HIV have signals which suggest abnormal cholesterol metabolism.

Cells called monocyte / macrophages, important in the pathogenesis of cardiovascular disease, contribute to atherosclerosis by retaining cholesterol which then becomes embedded in the walls of blood vessels. Work led by HMRG involving research sites in Dublin, London and Amsterdam has shown that in people with HIV, monocytes have an abnormal gene signature that suggests their cells have too much cholesterol and these abnormalities are not corrected with antiretroviral treatment. These findings have identified specific targets that may be used in the treatment of these abnormalities in people with HIV.

*O'Halloran JA, Maughan RT, Feeney ER, Lambert J, Sheehan G, Moyle G, et al. Dysregulated Monocyte Cholesterol Metabolism Gene Expression With ART Initiation. CROI 2016, Boston, MA 2016,**Abstract 665**.*

*Feeney ER, McAuley N, O'Halloran JA, Rock C, Low J, Satchell CS, et al. The expression of cholesterol metabolism genes in monocytes from HIV-infected subjects suggests intracellular cholesterol accumulation. J Infect Dis2013,**207**:628-637.*

3. Some antiretroviral treatments may also alter the risk of cardiovascular disease.

Groundbreaking research conducted by HMRG scientists in collaboration with scientists from the Royal College of Surgeons in Ireland have identified an association between a commonly used antiretroviral drug and activity of platelets, which are important in how the blood clots. Abnormalities in platelet function may increase an individual's risk of heart disease and these findings may explain observations from large international studies linking use of this drug with increased cardiovascular disease.

*Satchell CS, O'Halloran JA, Cotter AG, Peace AJ, O'Connor EF, Tedesco AF, et al. Increased platelet reactivity in HIV-1-infected patients receiving abacavir-containing antiretroviral therapy. J Infect Dis 2011,**204**:1202-1210.*

O'Halloran JA, Dunne E, Tinago W, Denieffe S, Kenny D, Mallon PWG. Effect of Switch from Abacavir to Tenofovir DF on Platelet Function Markers: a SWIFT Trial Sub-study. CROI, Boston, MA 2014:Abstract 749LB.

See also the Irish Heart Foundation www.irishheart.ie