

Obesity and Cardiovascular Disease- Focus on Inflammation

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Obesity is emerging as one of the most critical health care problems in the US and worldwide as $\geq 65\%$ of the US population is currently overweight or obese. Obesity is closely linked to the development of type 2 diabetes and cardiovascular disease that are important causes of morbidity and mortality associated with excess weight. Recently published work from our laboratory demonstrated that adipose tissue inflammation represents a key pathological process linked to metabolic stress and vascular endothelial dysfunction in obese subjects. Triggers of inflammation in fat are unknown but highly clinically relevant as individuals with reduced inflammation exhibit a much more favorable risk factor profile despite their severe obesity, supporting the growing notion that both quality and quantity of fat play a significant role in shaping cardiovascular phenotypes in human obesity. Our data also suggest that visceral fat is associated with a greater burden of cytokine production and we will present data to show direct human evidence that the visceral adipose microenvironment is more “toxic” to blood vessels, providing a potential mechanism linking visceral adiposity to cardiometabolic risk.

Cardiovascular disease (CVD) is a class of diseases that involve the heart or blood vessels. Cardiovascular disease includes coronary artery diseases (CAD) such as angina and myocardial infarction (commonly known as a heart attack). Other CVDs are stroke, hypertensive heart disease, rheumatic heart disease, cardiomyopathy, atrial fibrillation, congenital heart disease, endocarditis, aortic aneurysms, peripheral artery disease and venous thrombosis.

The underlying mechanisms vary depending on the disease in question. Coronary artery disease, stroke, and peripheral artery disease involve atherosclerosis. This may be caused by high blood pressure, smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, and excessive alcohol consumption, among others. High blood pressure results in 13% of CVD deaths, while tobacco results in 9%, diabetes 6%, lack of exercise 6% and obesity 5%. Rheumatic heart disease may follow untreated strep throat.

It is estimated that 90% of CVD is preventable. Prevention of atherosclerosis is by decreasing risk factors through: healthy eating, exercise, avoidance of tobacco smoke and limiting alcohol intake. Treating high blood pressure and diabetes is also beneficial. Treating people who have strep throat with antibiotics can decrease the risk of rheumatic heart disease. The effect of the use of aspirin in people who are otherwise healthy is of unclear benefit. The United States Preventive Services Task Force recommends against its use for prevention in women less than 55 and men less than 45 years old; however, in those who are older it is recommended in some individuals.^[7] Treatment of those who have CVD improves outcomes.

Cardiovascular diseases are the leading cause of death globally. This is true in all areas of the world except Africa. Together they resulted in 17.3 million deaths (31.5%) in 2013 up from 12.3 million (25.8%) in 1990. Deaths, at a given age, from CVD are more common and have been increasing in much of the developing world, while rates have declined in most of the developed world since the 1970s. Coronary artery disease and stroke account for 80% of CVD deaths in males and 75% of CVD deaths in females. Most cardiovascular disease affects older adults. In the United States 11% of people between 20 and 40 have CVD, while 37% between 40 and 60, 71% of people between 60 and 80, and 85% of people over 80 have CVD. The average age of death from coronary artery disease in the developed world is around 80 while it is around 68 in the developing world. Disease onset is typically seven to ten years earlier in men as compared to women.

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