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Metabolic obesity: the paradox between visceral and subcutaneous fat.

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Abstract

In contrast to the accumulation of fat in the gluteo-femoral region, the accumulation of fat around abdominal viscera and inside intraabdominal solid organs is strongly associated with obesity-related complications like Type 2 diabetes and coronary artery disease. The association between visceral adiposity and accelerated atherosclerosis was shown to be independent of age, overall obesity or the amount of subcutaneous fat. Recent evidence revealed several biological and genetic differences between intraabdominal visceral-fat and peripheral subcutaneous-fat. Such differences are also reflected in their contrasting roles in the pathogenesis of obesity-related cardiometabolic problems, in either lean or obese individuals. The functional differences between visceral and the subcutaneous adipocytes may be related to their anatomical location. Visceral adipose tissue and its adipose-tissue resident macrophages produce more proinflammatory cytokines like tumor necrosis factor-alpha (TNF-alpha) and interleukin-6 (IL-6) and less adiponectin. These cytokines changes induce insulin resistance and play a major role in the pathogenesis of endothelial dysfunction and subsequent atherosclerosis. The rate of visceral fat accumulation is also different according to the individual's gender and ethnic background; being more prominent in white men, African American women and Asian Indian and Japanese men and women. Such differences may explain the variation in the cardiometabolic risk at different waist measurements between different populations. However, it is unclear how much visceral fat reduction is needed to induce favorable metabolic changes. On the other hand, peripheral fat mass is negatively correlated with atherogenic metabolic risk factors and its selective reduction by liposuction does improve cardiovascular risk profile. The increasing knowledge about body fat distribution and its modifiers may lead to the development of more effective treatment strategies for people with/or at high risk for Type 2 diabetes and coronary artery disease. These accumulating observations also urge our need for a new definition of obesity based on the anatomical location of fat rather than on its volume, especially when cardiometabolic risk is considered. The term "Metabolic Obesity", in reference to visceral fat accumulation in either lean or obese individuals may identify those at risk for cardiovascular disease better than the currently used definitions of obesity.

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