Visceral and Ectopic Fat: Emerging Risk Factors in Cardio Metabolic Health

Cuevas Santos*

Department of Kinesiology, Laval University, Quebec, Canada

Corresponding Author: Cuevas Santos, Department of Kinesiology, Laval University, Quebec, Canada, Email: santoscu@gmail.com

Description

Findings from epidemiological studies over the last three decades indicate that visceral adipose tissue, when accurately assessed through imaging techniques like CT or MRI, serves as an independent risk marker for cardiovascular and metabolic diseases. There is growing evidence that ectopic fat deposition, such as that found in the liver and around the heart, may also heighten the risk for atherosclerosis and cardiometabolic issues. This joint position statement from the International Atherosclerosis Society and the International Chair on Cardiometabolic Risk Working Group on Visceral Obesity summarizes the evidence surrounding visceral and ectopic fat as emerging risk factors for type 2 diabetes, atherosclerosis and cardiovascular disease. The statement emphasizes practical recommendations for healthcare professionals and outlines future research and clinical practice directions.

The statement discusses how visceral and ectopic fat are measured, their pathophysiology and their contributions to adverse health outcomes. It also examines treatment responses and highlights lessons learned from public health programs aimed at addressing these fat types. The need for straightforward, clinically applicable tools to monitor changes in visceral and ectopic fat over time is emphasized, alongside the importance of public health messaging that focuses on these fat types in addition to general body weight. This approach is essential in combating the rising global obesity epidemic.

Since 1980, obesity rates have doubled in more than 70 countries, continuing to escalate worldwide. In the United States, the age-adjusted prevalence of obesity defined by a BMI of 30 kg/m² or higher was estimated at 38% in 2014, with around 8% categorized as having class III obesity, the most severe form. While BMI serves as a simple metric for tracking obesity trends, it fails to capture the heterogeneity within obesity. Individuals with similar BMI values can present significantly different health risks and comorbidities. A notable number of those classified as having metabolically healthy obesity may still develop metabolic syndrome and face increased cardiovascular disease risks.

Despite long-standing recognition of BMI's limitations, many obesity guidelines continue to endorse it as the primary tool for assessing obesity-related health risks. This endorsement persists even though BMI does not effectively represent total body fat, particularly central abdominal fat. The considerable variation in intra-abdominal (visceral) fat distribution among individuals further complicates the picture. Advanced imaging studies using CT and MRI have demonstrated that abdominal fat compartments differ significantly and are associated variably with atherosclerosis and cardiometabolic risks.

Visceral adiposity: A key cardiovascular risk factor

International atherosclerosis society and the international chair on cardiometabolic risk convened in prague to address the significance of visceral adiposity and ectopic fat as emerging risk factors for cardiovascular disease. The group agreed to create consensus documents that would reflect the views of both organizations. This position statement aims to summarize the evidence linking visceral and ectopic fat to type 2 diabetes, atherosclerosis and cardiovascular disease, with a focus on actionable recommendations for health professionals and future research directions.

The advancement of medical imaging has revolutionized the assessment of body composition, allowing precise measurement of visceral fat. Cross-sectional imaging *via* CT or MRI provides valuable insights into total and regional body fat composition. These imaging techniques enable the differentiation of visible subcutaneous fat from internal fat deposits, allowing for better understanding of the relationship between fat distribution and health outcomes. Early research highlighted that Visceral Adipose Tissue (VAT) is the strongest correlate of metabolic abnormalities previously linked solely to overall body fat.

Emerging evidence supports that VAT serves as a important link between obesity and health risk. Visceral adiposity can be seen as a pathological response to an energy surplus, where the subcutaneous fat fails to expand properly, leading to increased cardiovascular and metabolic disease risk. Excess visceral fat accumulation is characterized by various detrimental changes in fat distribution and function.

The role of ectopic fat-located in organs such as the liver, heart and muscle in the dysmetabolic state linked to excessive VAT is a matter of ongoing debate. Notably, high liver fat levels, often manifesting as Non-Alcoholic Fatty Liver Disease (NAFLD), have been robustly associated with various metabolic disorders.

Studies show that changes in energy intake and expenditure can significantly impact VAT and overall fat levels. Meta-analyses have demonstrated that aerobic exercise, combined with dietary

changes, can lead to reductions in VAT, particularly in individuals with type 2 diabetes.

While BMI serves as a general marker for assessing obesity-related health risks at the population level, it does not capture the individual variations in cardiometabolic risk among those with the same BMI. Insights from imaging studies reinforce the need to move beyond BMI to better identify individuals with excess visceral fat, who are at a higher risk for cardiometabolic conditions.