PERSPECTIVE

Signs and Symptoms of Metabolic Syndrome

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Description

Abdominal obesity, high blood pressure, high blood sugar, high serum triglycerides, and low serum high-density lipoprotein are the five medical disorders that make up the metabolic syndrome. The risk of acquiring type 2 diabetes and cardiovascular disease is correlated with metabolic syndrome. The percentage of adults in the U.S. who have metabolic syndrome rises with age, especially among racial and ethnic minorities. Prediabetes, metabolic syndrome, and insulin resistance are interconnected and share several characteristics. A problem of energy storage and use is assumed to be the fundamental cause of the syndrome. Medical study on the syndrome's origins is still ongoing.

Signs and symptoms

Central obesity, sometimes referred to as visceral, male-pattern, or apple-shaped adiposity, is the primary indicator of metabolic syndrome. It is characterised by an accumulation of adipose tissue, primarily around the waist and trunk. High blood pressure, lowered fasting HDL cholesterol, increased fasting serum triglyceride level, impaired fasting glucose, insulin resistance, or prediabetes are further indicators of metabolic syndrome. Hyperuricemia, fatty liver that develops into nonalcoholic fatty liver disease, polycystic ovarian syndrome in women and erectile dysfunction in males, as well as acanthosis nigricans, are all associated conditions.

Causes

Investigations are being done into the mechanisms underlying the metabolic syndrome's intricate pathways. The pathophysiology is incredibly complicated and has only been partially understood. The majority of those who suffer from the ailment are older, obese, couch potatoes, and to some extent, insulin resistant. Another contributing factor can be stress. Diet (especially the intake of sugar-sweetened beverages), heredity, ageing, sedentary lifestyles or low levels of physical activity, disturbed chronobiology/sleep, mood disorders/psychotropic medication usage, and excessive alcohol use are the main risk factors. Vidal-Puig evaluated the pathogenic role played in the illness by the excessive adipose tissue growth that occurs during continuous overeating and its ensuing lipotoxicity.

Obesity and insulin resistance are two factors that have been linked to the metabolic syndrome, however it is unclear if they are the actual cause of the condition or just its symptoms. Increases in fibrinogen, interleukin 6, Tumour Necrosis Factor-alpha (TNF-), and other markers of systemic inflammation are common. These markers include C-reactive protein. A number of causes have been suggested, including dietary fructose's effect on elevated uric acid levels. According to research, the increased consumption of foods that are unsuitable for humans biochemically in the Western diet is a contributing element in the development of the metabolic syndrome. The metabolic syndrome is correlated with weight gain. The main clinical feature of the condition is visceral and/or ectopic fat rather than overall adiposity, and insulin resistance is the main metabolic problem. Unmatched by physical activity or energy demand, the constant supply of energy from dietary carbohydrate, lipid, and protein fuels results in a backlog of the byproducts of mitochondrial oxidation, a process linked to developing mitochondrial dysfunction and insulin resistance.

Pathophysiology

When visceral fat develops, the adipocytes (fat cells) of the visceral fat typically raise plasma levels of TNF- and change the levels of other chemicals. Inflammatory cytokines can be produced as a result of TNF-, and it has also been demonstrated that TNF- may activate cell signalling by interacting with a TNF-receptor, which may result in insulin resistance. A study using rats fed a diet

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containing 33% sucrose has been suggested as a model for how the metabolic syndrome develops. The sugar initially increased triglyceride levels in the blood, which led to visceral fat and ultimately insulin resistance. There are some similarities between the development of metabolic syndrome in humans and the path from visceral obesity to elevated TNF- to insulin resistance. Adipose tissue growth is accompanied by an increase in immune cells, which contribute to inflammation. The risk of diabetes, atherosclerosis, and hypertension is raised by chronic inflammation.