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Trends and Perspective of Metabolic Syndrome

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Abstract

Overweight, sedentary lifestyles, and some degree of insulin resistance are only a few of the traits linked with individuals who have the metabolic syndrome. Additional risk factors include a sedentary or inactive lifestyle, the use of psychiatric drugs, and excessive alcohol use. Weight gain and insulin resistance are connected with the metabolic syndrome. The most effective methods of losing weight are low-calorie diets and increased physical activity. Preliminary research indicates that individuals who consume a paleolithic diet may reduce three of the five quantitative risk factors for cardiovascular disease.

Introduction

The metabolic syndrome is characterized by a group of risk factors that include abdominal obesity, impaired glucose tolerance, dyslipidemia, and high blood pressure. The fact that people with this condition have been shown to be at an increased risk of acquiring type 2 diabetes as well as cardiovascular disease is vital to keep in mind. It is a common condition that has been referred to as the dysmetabolic syndrome, syndrome X, insulin resistance syndrome, and obesity syndrome (Simmons et al., 2010), among other names (Saklayen, 2018).

Patients in metropolitan areas have been told about the need of testing serum cholesterol concentrations, watching for indicators of diabetes, having their blood pressure checked, and engaging in physical activity (Saklayen, 2018). Between the ages of 25 and 64, it has been found that the prevalence of metabolic syndrome is higher in males than in women. Women are more likely than men to develop the metabolic syndrome after the age of 65, despite the fact that the prevalence of the syndrome is higher in women than in men. As a result, both rising age and increasing waist circumference are associated with metabolic syndrome (Hernandez-Baixauli et al., 2020).

It has also been stated that several diagnostic criteria have been proposed by different organizations over the course of the previous few years (Giovannucci, 2007). The World Health Organization (WHO) was one of the first organizations to develop a definition of metabolic syndrome that was approved universally in 1998. Later, additional organizations adopted definitions that were somewhat different from the original. In order to improve consistency in both patient treatment and research, it is necessary to It was in 2009 that a conglomeration of organizations, including the International Diabetes Federation, the National Heart, Lung, and Blood Institute (NHLBI), the American Heart Association (AHA), the World Heart Federation, and the International Association for the Study of Diabetes, came up with a widely accepted and harmonized definition of metabolic syndrome.

According to these organization, the risk factors of metabolic syndrome include the following

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Elevated waist circumference

Raised triglycerides ≥1.7mmol/L (≥ 150 mg/dL)

Fasting triglycerides greater than or equal to 1.69 mmol/L (150 mg/dL)

Reduced HDL cholesterol <1.0mmol/L (<40mg/dL) in men, <1.3mmol/L (<50mg/dL) in women.

Elevated blood pressure ≥ 130 systolic or ≥85 diastolic.

Elevated fasting glucose ≥5.6 mmol/L (≥100mg/dL) or previously diagnosed type 2 diabetes (Cuspidi et al., 2008). Therefore having any 3 of 5 risk factors listed above constitutes a diagnosis of metabolic syndrome (Alessi & Juhan-Vague, 2008).

It has been indicated that metabolic syndrome may be link with blood clotting and proinflammatory tendencies. In as much as the combined criteria and risk factors do not commonly lead to symptoms that are obvious to the affected person, they are a warning of an elevated likelihood of clogged arteries, heart disease, stroke, diabetes, kidney dysfunction as well as premature death. It is important to note that complications from untreated metabolic syndrome can develop in as few as 15 years. According some reports, Smokers with metabolic syndrome tend to have an even poorer prognosis (Grundy, 2008).

Causes

Experts are undertaking researches to get a better understanding of the complex mechanisms that lead to the metabolic syndrome and the consequences of this condition. Despite our best efforts, we still don't know what causes this condition, in part because the pathophysiology is so complex and only partially understood. Overweight, sedentary, and having some degree of insulin resistance are just a few of the characteristics associated with persons who are affected by the syndrome. A third explanation is that stress has a role in the development of the illness itself, as previously stated. Sugar-sweetened beverages (particularly those with high quantities of sugar) are just one of numerous risk factors that may lead to obesity, and there are many more. (Cuspidi et al., 2008) Other risk factors include having a sedentary or inactive lifestyle, having mental problems or using psychiatric medications, and consuming excessive amounts of alcohol. Dr. Vidal-Puig spoke about the role that chronic overeating plays in the growth of adipose tissue, as well as the possibility of lipotoxicity as a result of this expansion of fat tissue.

The metabolic syndrome, while it may be caused primarily by obesity and insulin resistance, other scientists believe it is caused by a far more comprehensive metabolic breakdown. Patients with chronic renal illness often have high levels of C-reactive protein (CRP), fibrinogen, interleukin-6, and tumor necrosis factor-alpha in their blood (TNF-alpha). According to others, this is due to excessive amounts of uric acid in the bloodstream, which is induced by a high fructose consumption in the diet.

This conclusion was reached after extensive research. Due to a high consumption of foods that are not biochemically compatible with human metabolism, Western diets have been associated to an increased risk of developing metabolic syndrome in humans. Among other things, the metabolic syndrome is associated with weight gain and insulin resistance, among other things. It is more likely that visceral and/or ectopic fat (fat in organs that are not intended for fat storage) would contribute to the illness than total adiposity. Insulin resistance is the most often seen metabolic issue in patients. Carbohydrates, lipids, and proteins offer a constant source of energy, but the demand for energy is outpacing the quantity of available energy. Consequently, there is an increase in the amount of mitochondrial oxidation products in the body, which results in increased mitochondrial dysfunction and insulin resistance.

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Compositional Cause

According to other research, bad eating habits and an uninvigorating lifestyle are the most prevalent causes of metabolic syndrome in different forms. Others may occur in persons who have previously been diagnosed with hypertension or in those who have poorly managed type 2 diabetes. While a few are linked to hereditary variables (Shields & Hennekens, 2004), the majority are not.

These risk factors for metabolic syndrome are intertwined and interdependent. According to Turkoglu (Huang, 2005), both obesity and a lack of physical activity are associated with insulin resistance. Increased levels of very low-density lipoprotein, low-density lipoprotein, and triglyceride levels in the circulation are associated with insulin resistance, whereas decreased levels of high-density lipoprotein are associated with insulin resistance. Fatty plaque deposits in the arteries may arise as a consequence of this, which may eventually lead to cardiovascular disease, blood clots, and strokes. It is possible that insulin resistance will result in elevated insulin and glucose levels in the blood. It is vital to know that increased insulin levels cause the kidneys to retain more salt, resulting in raised blood pressure. Hypertension may result as a result of this. In turn, blood vessels and renal organs are harmed as a result of persistently elevated glucose levels (Türkoglu et al., 2003).

Whenever the possibility of metabolic syndrome is raised, laboratory testing are critical in confirming the diagnosis. The tests that are indicated are as follows: Glucose tolerance test: Typically, a fasting glucose test is conducted; however, in certain situations, a glucose tolerance test – which may include many glucose tests – may be performed instead. In order to detect whether or not a patient has diabetes or an impaired reaction to glucose, glucose testing is performed on them. Test for lipid profile: This test evaluates the levels of HDL, LDL, and triglycerides in the blood. If the triglycerides are sufficiently increased, it may be necessary to do a direct assessment of the LDL cholesterol. The hemoglobin A1c (HbA1c) test is performed. A marker of glucose control that may be used to make a diagnosis of diabetes (Welty et al., 2016) is the fasting glucose level. Non-laboratory testing for diagnosing metabolic syndrome, on the other hand, include blood pressure tests, which screen for hypertension and are used to rule out diabetes. Weight and waist circumference are two measures that indicate abdominal obesity (Ito, 2004).

Body mass index which is an alternate measure of obesity. It is calculated by taking: (weight in kilograms) / (height in meters squared). An adult with a BMI greater than 30 Kg/m^2 is considered obese (Huang, 2005; Meigs, J2004).

Diagnosis

According to the International Diabetes Federation Task Force on Epidemiology and Prevention, an interim statement has been published as part of the effort to develop a common definition of the metabolic syndrome, which includes obesity, high blood pressure, high cholesterol, and diabetes. The American Heart Association, World Heart Federation, and International Atherosclerosis Society collaborated on the project to develop a common definition of the metabolic syndrome. There are varied hazards associated with different waist measurements, as this definition admits, depending on the population being investigated. Based on the existing situation, local decision-making authorities will choose whether to define the level at which the risk starts to rise or the level at which the hazard has already become very serious. The process of making worldwide comparisons is made easier when cut points for different ethnic groups and genders have been established. Additionally, when agreed-upon cut points are employed, it is feasible to conduct more effective etiology research. Due to the high

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number of biracial people in the world, it will be important to carry out suitable examinations of these individuals in the near future. Considering that this syndrome occurs as a consequence of an excess of fat storage in adipose tissue, skeletal muscle, and the liver, it may be more useful to utilize a global overweight criterion to diagnose it rather than ethnically specific abdominal obesity criteria.

People who exhibit a specific set of symptoms are considered to be suffering from the metabolic syndrome, according to the National Center for Chronic Disease Prevention and Control (NCEP) and International Diabetes Federation (IDF) definitions of the condition, which are identical to the NCEP definition. The metabolic syndrome is defined as follows: According to the International Diabetes Federation guidelines, a person's central obesity is presumed if their body mass index (BMI) is more than 30 kg/m2, and a measurement of their waist circumference is not necessary. If the BMI is less than 30 and the waist circumference has not increased significantly, it is conceivable that no one will be disqualified from the research. In addition to the criteria given above, the NCEP definition specifies that other criteria may be used to characterize the metabolic syndrome in addition to those described before. Unlike the IDF, which applies waist circumference cut points that are particular to each geographic location, the NCEP adopts a single set of waist circumference cut values that are relevant to all areas of the United States.

Better way to Fight Metabolic Syndrome

According to the findings of the study, there are numerous approaches to avoid developing the metabolic syndrome. Losing weight is most effectively accomplished by a low-calorie diet combined with increased physical activity (such as 30 minutes of walking per day). Furthermore, a lot of studies have shown the significance of maintaining a healthy lifestyle. Certain potentially beneficial strategies only work in a tiny number of people, and this is mostly due to the fact that people don't stick with their diet and lifestyle changes once they begin. According to the International Obesity Taskforce, societal and political actions are critical in preventing the rise of obesity throughout the world.

According to the Caerphilly Heart Disease Study, which followed 2,375 male participants over the course of two decades, drinking one pint (568 milliliters) of milk or similar dairy products daily lowered metabolic syndrome risk by more than half. Following research has both verified and called into question the results reached by the authors. In preliminary studies, it has been demonstrated that people who follow a paleolithic diet may have three of the five quantifiable components of cardiovascular disease (cardiovascular disease) lower than those who already have one of these components, even if they already have one of these components.

Conclusion

To summarize, the most effective therapy for metabolic syndrome is weight loss by a healthy lifestyle adjustment. Those who are impacted should eliminate extra weight and engage in regular physical activity. It is also recommended that you quit smoking cigarettes. In addition, pharmacological therapy for hypertension and increased cholesterol levels may be required to alleviate the symptoms.

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