

Metabolic syndrome connection with cancer and cardiovascular diseases

[Health & Medicine](#), [Cancer](#)



Metabolic syndrome consists of bunch of symptoms like raised blood pressure, high blood sugar, abnormality of cholesterol level, lower high density lipoprotein (HDL) etc. The appearance of metabolic syndrome depends on ground of heredity, age, food habit, physical activity, sexual characteristics etc. This is more common in females than males. This was found that about 8 to 24. 2% males and 7 to 46. 5% females are victims. The impact and clinical challenges of the syndrome is an important matter worldwide. People who have metabolic syndrome have greater chances to be affected by cardiovascular disease and diabetics, which can turn as life threatening diseases. Gerald Reaven marked interrelation between metabolic syndromes and cardiovascular dangers like raised blood pressure, lower HDL, hyper-triglyceridemia and lower level of glucose. On the other hand metabolic syndrome also connected with non-cardiovascular diseases like cancer. Non-cardiovascular diseases have correlation with cardiovascular diseases.

Cardiovascular Disease

Cardiovascular disease causes blockage in blood vessels; that can direct to coronary artery diseases (CAD) like myocardial infraction (heart attack) and angina (stroke or chest pain). Atherosclerosis is caused by coronary artery disease, stroke and peripheral artery disease; which can be influenced by high blood pressure, smoking, diabetes, bad food habit, increased level of cholesterol etc. Many people are dying by cardiovascular disease worldwide. Statistics shows that 17. 9 million people have died in 2015 and 12. 3 million in 1990. It has been shown that 82% people died by coronary artery disease are aged 65 and above.

Way to Cardiovascular Disease

Over the last decades, the topicality of fat distribution for the progression of cardiovascular disease (CVD) and metabolic disorders was marked despite the finding of so-called metabolically well fatted people, which was first told by Sims about 15 years ago. Huge amount of adipose tissue storage leads to the development of cardiovascular and metabolic diseases. The waist-to-hip ratio seems to be more to the body mass index (BMI) while measuring the individual disease risk since it detects people with a comparatively low BMI but raised intra-abdominal fat accumulation. Furthermore, it has been found that the waist-to-hip ratio and waist and hip amplitude are superior to BMI in determining the risk of myocardial infarction. The better diagnostic parameter of visceral fat than waist circumference shows the combination of a raised waist circumference and grown fasting triglyceride concentrations. Higher triglycerides and raised waist circumference are linked with high cardio-metabolic risk factor, as statistically shown a ratio; that the risk in men 2.40 and in women 3.84 for oncoming coronary artery disease. On the other hand; high level of visceral fat is linked with hypertension. In comparison to other influencing factors, the waist circumference in men and women showed the strongest association to systolic and diastolic blood pressure.

Visceral fat and cardiovascular disease is associated patho-physiologically from multiple views. One mechanism might be the association of visceral and ectopic fat accumulation, e. g. fatty degeneration of cardiac cells. It has been found that visceral obeseness is ideal for epicardial and pericardial fat. In addition, loss of visceral fat from more fatty parts; that cause weight loss

decreases epithelial obesity. Pericardial fat associated with adiposity, vascular calcification, and further cardiovascular risk factors.

Cardiovascular risk

When people who don't take alcohol may have ' Non-alcoholic fatty liver disease' (NAFLD); which is a very common disorder and directs over storage of fat in liver. Fatty liver is the most common type of this disease and a type of abnormal disease. Fat is stored in the liver cells of the fatty liver. It does not harm the liver by itself. NAFLD may cause very serious conditions in some people called 'Non-alcoholic steatohepatitis' (NASH). Liver cell inflammation leads to the storage of fat in NASH. NAFLD leads to the risk of CVD, chronic kidney disease (CKD) and arrhythmic cardiac disease.

Chronic low-grade inflammation caused by activated macrophages in visceral adipose tissue may also contribute to cardiovascular risk in patients with MeS. It has been found that low C-reactive protein in healthy fatty people have the same risk for CVD as a healthy low weight person. Adipose tissue of obese patients expresses large amounts of proinflammatory cytokines such as tumor necrosis factor (TNF)-alpha or interleukin (IL)-6. Furthermore, adipose tissue macrophages are elevated in obesity and perpetuate inflammatory pathways, e. g. by being responsible for almost all adipose tissue TNF-alpha expression. Adipokine is leptin which signals the peripheral energy condition to the brain. Leptin is synthesized and secreted by white adipocytes. It has been found that hyperleptinemia is linked with CVD; such as atherosclerosis. The development of leptin resistance, appears to be of major relevance for the genesis and maintenance of obesity. This

resistance may occur at several sites, namely at the blood-brain barrier and at specific hypothalamic nuclei such as the arcuate nucleus and other nuclei associated with reward-related eating behavior. In conclusion, elevated leptin levels and leptin resistance are associated with obesity, IR, myocardial infarction, and congestive heart failure.

Cancer

With sex-specific differences cancer can develop at a higher risk; in metabolic syndrome. Insulin resistance, hyperinsulinemia, and chronic subclinical inflammation might directly and indirectly promote cellular dedifferentiation and thus tumorigenesis. Cancer progression can occur by stimulation of cell survival, cell proliferation, and angiogenesis. Insulin acts as a growth factor and hyperinsulinemia, as often prevalent in MeS; may cause a more rapid and aggressive growth of cancers such as colorectal carcinoma, pancreatic carcinoma, liver cancer, and others. Adipocytes represent a central mediator of the inflammatory response in obese patients. They also secrete growth factors like insulin-like growth factor 1 or vascular endothelial growth factor besides proinflammatory cytokines or adipokines. Through these growth factors, PI3K/Akt signaling is stimulated, which is involved in the regulation of cell survival, cell proliferation, and cell migration. Thus, hyperplasia, tumor growth, and metastasis formation is influenced by chronic inflammation in adipose tissue. Moreover, abdominal obesity induces significant changes in adipose stem cells, which may initiate breast cancer formation through estrogen-dependent pathways.

In metabolic syndrome impaired blood clotting can be seen; that can cause cardiovascular disease [29]. Beside atherothrombotic cardiovascular events, there is also a higher rate of thromboembolism. Both are caused by reduced activity of vasodilators and an increased expression of vasoconstrictors as a consequence of endothelial dysfunction. Chronic inflammation, dyslipidemia, and hypertension are the result of this dysfunction.

Prevention

1. Diet

Regarding the dietary habits of the population, changes have occurred in different areas. The potential to prevent CVD through dietary adaptations is still poorly implemented. Adherence to a balanced diet is generally limited; the control of elevated blood pressure, dyslipidaemias and dysglycaemia can largely be improved through changes in lifestyle. General practitioners have an opportunity to provide counseling about diet for the management of coronary risk factors, in clinical level. Consumption of more fruits, nuts, seeds and vegetables can prevent coronary artery disease. Also limit the consumption of refined grains and sugars. Processed foods can cause cancer; as they contain many chemicals. Alcohol is the most dangerous beverage for CVD.

2. Smoking

Tobacco smoking the most cost-effective strategy to prevent CVD. Smoking increases the risk of developing cardiovascular diseases that can interrupt the function of the heart and function of blood vessels. As a result coronary heart disease or stroke can occur. Smoking damages the lining of arteries,

leading to a buildup of fatty material; which narrows the artery. This can cause angina or stroke. Tobacco harms blood cells; so that blood cancer can occur. Smoking also reduces oxygen supply to the heart, increases blood pressure, raise heart rate etc. Avoiding smoking can prevent cardiovascular diseases as well as liver and kidney diseases.

3. Physical Activity

The promotion of physical exercise is a crucial and central issue in all strategies of CVD prevention. At the individual level, physical activity is advised at different time points; it has become a part of regular life from childhood onwards. Children and adolescents are encouraged to spend 30 to 45 minutes daily in exercise activities either at school or in their leisure time. From young adulthood physical activity can prevent cardiovascular disease and others from that period of life. Physical activities help in blood circulation of the heart; as well as full body.

Conclusion

It appears that from metabolic syndrome different diseases can appear especially cardiovascular disease and cancer.