



Review Article

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Waistline As a "New" Clinical Marker for Cardiovascular Risk Evaluation

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Abstract

Metabolic syndrome represents a constellation of clinical-biological alterations at the level of different organs and systems and implies an increased cardiovascular risk in these patients. Waist circumference is a clinical marker used more and more frequently in specialized studies, increased values representing confirmation of the existence of excess abdominal adiposity (abdominal obesity), and implicitly increased cardiovascular risk for the respective patients.

Keywords: Metabolic syndrome, Waist circumference, Cardiovascular risk

Introduction

The metabolic syndrome is a constellation of risk factors of metabolic origin that associate an increased risk of cardiovascular disease and type 2 Diabetes Mellitus (DM). These risk factors are atherogenic dyslipidemia, high blood pressure, high blood sugar, prothrombotic status and proinflammatory status. The two major risk factors underlying the metabolic syndrome are obesity and insulin resistance, aggravating factors being sedentary lifestyle, advanced age, genetic and endocrine factors. The condition is progressive, starting with "borderline" risk factors that eventually become categorical risk factors. In many patients, the metabolic syndrome culminates in the appearance of type 2 diabetes, which further increases the risk of cardiovascular disease. As the condition progresses, drug therapies addressed to individual risk factors become necessary.

Metabolic Syndrome and Cardiovascular Risk

An advantage of identifying this particular association of risk factors is that it brings together the fields of cardiovascular and diabetology in a focused and unified effort to simultaneously reduce

the risk of both conditions. Moreover, cardiovascular disease is the leading "killer" of patients with diabetes, a fact that must be taken into account in both fields.

The risk associated with obesity is best quantified by measuring abdominal circumference (abdominal obesity). Insulin resistance can be secondary to obesity but may also have genetic components. The increasing prevalence of metabolic syndrome throughout the world seems to be mainly dictated by the high rate of obesity, exacerbated by a sedentary lifestyle and unhealthy diet. The name metabolic syndrome is suggestive of the multifactorial etiology, also relevant to a perspective on the pathogenesis of the disease. [1]. The metabolic syndrome is therefore a complex multifactorial characteristic, influenced by both genetic and environmental factors.

Metabolic Syndrome and Waist Circumference - A Bidimensional Relationship

One of the explanations for the presence of metabolic syndrome and perhaps also of Metabolic Associated Liver Steatotic Disease - MASLD (formerly known as Non-alcoholic fatty liver disease) is the regional distribution of adipose tissue. Thus, it has been proven



that predominantly central obesity (truncated or abdominal) is a more sensitive marker for the presence of insulin resistance than total adipose mass. [2,3].

Waist circumference and waist/hip ratio are correlated with visceral adiposity and a waist circumference over 80 cm allows suspicion of the presence of metabolic syndrome. Visceral fat releases numerous cytokines (adipokines) such as adiponectin, an anti-inflammatory adipokine, or resistin, a pro-inflammatory adipokine. Certain specific adipokines may create connections between metabolic syndrome, type 2 diabetes mellitus and MASLD, while imbalances in adipokine expression play an essential role in the development and progression of non-alcoholic steatohepatitis.

Patients with fatty liver have low levels of adiponectin and significantly increased levels of resistin compared to controls, while individuals with atherosclerosis have the highest levels of resistin. This cytokine increases the expression of key atherosclerosis molecules in endothelial cells. Consequently, both adipokines and MASLD are independent risk factors for cardiovascular events in patients with type 2 diabetes and metabolic syndrome [2].

In the evaluation of patients with type 2 diabetes, hypertension, obesity, or metabolic syndrome, waist-hip ratio and Body Mass Index (BMI) play an essential role.

Personal Considerations

In a personal study on 125 Romanian patients with fatty liver disease, we found an increased prevalence of subjects with waist/hip ratio values above normal limits (78 women with values >0.85 and 33 men with waist/hip ratio >0.9).

Most patients with high blood pressure or type 2 diabetes presented waist/hip index values higher than normal limits, regardless of age or sex.

Considering the IDF (International Diabetes Federation) definition of metabolic syndrome in which abdominal obesity is defined for European subjects as a waist circumference of >80 cm in women and over 94 cm in men, we found an even larger number of subjects with fatty liver presenting these characteristics, namely:

- a. 80 women with a waist circumference of >80 cm (90.9% of the total number of women)
- b. 32 men with a waist circumference of >94 cm (86.4% of the total number of men).

According to a study published in the New England Journal of Medicine more than 10 years ago, a BMI between 20 and 25 seems to carry the lowest risk for all-cause mortality [4].

Discussions

An advantage of identifying this particular association of risk factors (waist circumference above normal values, type 2 diabetes and metabolic syndrome) is that it brings together the fields of cardiovascular and diabetology in the perspective of a concentrated effort to simultaneously reduce the risk for both conditions.

Analysis of the results from the personal study allowed the finding of the existence of significant linear correlations between blood glucose-triglycerides ($r=0.25$) but also blood glucose-BMI ($r=0.23$), signifying the close link between blood glucose values and these paraclinical elements (triglycerides, BMI) participating in cardiovascular risk.

The correlation between age and waist/hip index ($r=0.22$) draws attention to the increased risk of abdominal obesity with advancing age, this type of obesity being an important and independent marker of cardiovascular risk.

The data underline the predominance of abdominal obesity in the group of patients with hepatic steatosis. It is also not surprising that over 94% of women and 84% of diabetic men had waist/hip ratio above normal limits. The 82 patients with steatosis (65.6%) who fit the definition of obesity ($BMI \geq 30 \text{ kg/m}^2$) support the data of previous epidemiological studies conducted in the USA or Western Europe in which the prevalence of obesity in patients with fatty liver/MASLD was between 60 and 80% [5].

The assessment of metabolic syndrome can also be performed using the Metabolic syndrome severity score, several studies confirming the reliability of the method and the association of MS with an increased cardiovascular risk [6].

Conclusions

The risk associated with obesity is best quantified by measuring abdominal circumference (abdominal obesity). People who have fatty liver are generally obese patients, with defining elements of metabolic syndrome, with important comorbidities and a high risk of cardiovascular disease or progression of hepatopathy to more advanced and serious stages (fibrosis - liver cirrhosis).

Acknowledgment

None.

Conflict of Interest

None.

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