Metabolic Syndrome - Definition and Diagnostic Criteria in Japan

There is an increasing interest in multiple-risk-factor clustering syndrome as a highly atherogenic state independent of hypercholesterolemia. A variety of common disorders, such as hyperglycemia, hyperlipidemia and hypertension, are seen in individuals with this syndrome, and cardiovascular disease is very prevalent. In the recent 5 years, multiple-risk-factor syndrome has been called “metabolic syndrome”, although there have been some incompatibility of nomenclature among different committees.

These disorders are not clustered coincidently, and there is thought to be a key to the simultaneous development within certain individuals along with the associated development of cardiovascular disease.

Insulin resistance has been long considered to play a central role in the development of a range of metabolic disorders. These disorders that contribute to metabolic syndrome, except for hyperglycemia, cannot be interpreted by insulin resistance alone. In a consensus on the definition of metabolic syndrome from the International Diabetes Federation (IDF) the crucial, direct roles of intra-abdominal visceral fat accumulation in the development of multiple risks and cardiovascular disease have been recognized. As shown in the review article by Dr. Zimmet in this chapter, the IDF committee adopted waist circumference as the surrogate marker for abdominal adiposity as an essential component of this syndrome and recommended cutoff points that are applicable to specific ethnic groups.

In Japan, we organized a committee for the establishment of the definition and diagnostic criteria of metabolic syndrome in Japanese in April 2005 (1) and have discussed these matters for one year along with the IDF consensus group. Then, we established the definition of metabolic syndrome under the same principle as that used in the worldwide definition. Although there have been extensive data about visceral fat area determined by CT scan in Japan, the Japanese committee decided to adopt waist circumference as an essential component which is applicable to general physicians. The cutoff points were 85 cm for men and 90 cm for women, which were different from not only those of European but also other Asian countries. However, the Japanese cutoff points are based on the cutoff point of visceral fat area determined by CT scan. When the visceral fat area at the navel level exceeds 100 cm², the number of risk factors increases markedly. One hundred cm² of visceral fat area corresponding to an 85 cm and 90 cm waist circumference in Japanese men and women respectively. The reason why the cutoff point for women is larger than men is because amount of subcutaneous fat is greater in women with same visceral adiposity although there is substantial individual variation.

One of the reasons why this kind of complicated syndrome has been noted and accepted all over the world is because the mechanism of multiple risk factors and atherosclerosis have been substantially clarified by studies on adipocyte biology. We have investigated the functions of adipose-tissue, which have traditionally been regarded as a tissue passively storing excess energy in the form of triglycerides. Analysis of genes expressed in adipose tissue has shown that adipocytes produce and secrete a variety of bioactive substances, which we have named adipocytokines, including growth factors, cytokines and complement factors. Thus, adipose tissue seems to be an endocrine organ that can affect the function of other organs, including vascular walls throughout the whole body, through secretion of various adipocytokines. Dysregulation of adipocytokine secretion in subjects with visceral accumulation such as hypersecretion of PAI-1, TNF-α and hyposecretion of adiponectin may be an important molecular basis of metabolic syndrome.

So, in the future, plasma biomarkers such as adiponectin may be adopted as important components for the diagnosis or definition of metabolic syndrome.

References


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