Impact of Metabolic Syndrome as a Risk Factor for Atherothrombotic Stroke

Key words: cerebral infarction, visceral obesity, ultrasonography

In recent years, cerebral infarction, myocardial infarction, and peripheral artery disease are categorized into a comprehensive concept termed atherothrombosis since they have a common pathophysiological process, that is, obstruction by blood clot triggered by rupture of unstable plaque formed during atherosclerosis of the arteries. According to the 2002 report from the World Health Organization (WHO), atherothrombosis is the leading cause of death in the world, which occupies 28% of total death (The World Health Report. WHO Geneva, 2002). We conducted a nationwide survey for the current status of thrombotic diseases and antithrombotic therapy by sending a questionnaire to 3,357 physicians, who were extracted by random sampling among 11,697 physicians to treat patients with vascular diseases (1). A total of 1,784 (53%) physicians responded to the questionnaire. The estimated number of patients with cerebral infarction and myocardial infarction calculated from the formula of total sample number divided by collection rate and extraction rate, was 1.4 to 1.8 million and 0.7 to 0.8 million, respectively. This ratio of cerebral infarction to myocardial infarction (the prevalence of cerebral infarction is more than double that of myocardial infarction) is just opposite in the United States; the prevalence of myocardial infarction is more than two times higher than that of cerebral infarction. Therefore, our survey showed that the Japanese population is prone to cerebral infarction much more than myocardial infarction among atherothrombotic diseases in comparison with American population.

The national Metabolic Syndrome Criteria Study Group has very recently published new criteria of the metabolic syndrome (2). In these criteria, visceral obesity is emphasized as a key component in the upstream of metabolic cascade leading to diabetes mellitus, dyslipidemia, and hypertension. According to the Hisayama Study, prevalence of obesity as well as diabetes mellitus and hyperlipidemia as risk factors for stroke has been exponentially increased during recent decades (3). It is known that visceral obesity is more important than generalized obesity as a risk factor for cardiovascular disease (4, 5). Visceral fat deposit has been estimated by abdominal CT scan. In the last issue, Kawamoto et al have reported an association of metabolic syndrome with ischemic stroke (6).

They used ultrasonography instead of CT to evaluate the accumulation of visceral fat as one of the five components (visceral obesity, hypertension, hypertriglyceridemia, low high-density-lipoprotein cholesterol, and diabetes mellitus) (7). They had previously demonstrated that preperitoneal and subcutaneous fat thickness on ultrasonography could reflect body fat distribution more accurately (8). They showed that the metabolic syndrome is associated with atherothrombotic stroke and that an increased risk of atherothrombotic stroke is associated with increases in the numbers of the five components of the metabolic syndrome (6).

The metabolic syndrome had been studied as a risk factor for cardiovascular disease. However, Ninomiya et al (9) reported that metabolic syndrome is associated with not only myocardial infarction but also or even more with cerebral infarction. Current epidemiological studies have demonstrated that the ratio of atherothrombotic stroke is gradually increasing among subtypes of ischemic stroke among Japanese patients. According to a nationwide survey or a registry of acute ischemic stroke such as the Japanese Multicenter Stroke Investigators Collaboration (J-MUSIC) (10) or the Japan Standard Stroke Registration Study (JSSRS) (11), the prevalence of atherothrombotic stroke is going to exceed that of lacunar stroke, which has been the leading subtype of ischemic stroke in Japan. Analyses for comparisons between different areas in Japan by the J-MUSIC indicated that the prevalence of atherothrombotic stroke as well as diabetes mellitus and hyperlipidemia is higher in Kanto (Tokyo urban) and Kinki (Osaka urban) areas than in other rural areas (10). Therefore, it is suggested that the increase in atherothrombotic stroke is associated with increases in diabetes mellitus and hyperlipidemia, which are the downstream components of the metabolic syndrome. The impact of the metabolic syndrome as a risk factor for stroke is becoming greater, and thus strategy against the metabolic syndrome should be warranted for stroke prevention.

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