The Metabolic Syndrome in Hong Kong Chinese

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The clustering of dysglycaemia, hypertension, and dyslipidaemia was first classified as Syndrome X. Since then, other risk factors such as obesity and albuminuria have been included and the syndrome was given other names such as the Metabolic Syndrome (MES) and Insulin Resistance Syndrome.

In 1998, Alberti and Zimmet proposed, for the first time, a definition for the MES for World Health Organization (WHO). In 1999, the European Group for the Study of Insulin Resistance (EGIR) also proposed a similar definition. Both criteria included the measurement of insulin resistance. In 2001, the National Cholesterol Education Program (NCEP) Expert Panel (Adult Treatment Panel III) proposed more simple diagnostic criteria for clinical identification of MES in their third report using waist circumference (>102 cm in men or >88 cm in women), blood pressure (≥130/85 mmHg), plasma glucose (known diabetes or fasting glucose ≥6.1 mmol/l), fasting plasma triglyceride (≥1.7 mmol/l) and high-density lipoprotein cholesterol concentrations (<1.0 mmol/l in men or <1.3 mmol/l in women) such that subjects having 3 or more of these conditions are regarded as MES.

Prevalence of MES in Hong Kong & Asia

Using the NCEP criteria, the Third National Health and Nutrition Examination Survey (NHANES III, 1988-1994) reported an age-adjusted prevalence of 23.7% of MES in US adult population, affecting 47 million subjects. Using the same criteria, the prevalence of MES was 6.8% in Korea, 12.2% in Singapore and 11.0-13.3% in Mainland China. While using WHO criteria, the prevalence of MES in Mainland China was reported to be 17.1%. There is growing evidence suggesting that for the same degree of body weight, Asian populations had considerably higher body fat compared to Caucasians. Hence, the definitions of obesity in Asians are usually modified as follows: BMI ≥25 kg/m², waist circumference ≥90 cm in men or ≥80 cm in women. If the cutoff for central obesity was modified using this Asia-Pacific definitions in the NCEP criteria, the prevalence of MES increased to 10.9% in Korea and 17.9% in Singapore.

In a cohort of Hong Kong Chinese subjects with a mean age of 37 years, the prevalence of MES was 6.1-11.6% depending on different diagnostic criteria. The prevalence increased further if the Asian definition for obesity was used (13.4% for the WHO, 8.9% for the EGIR and 9.6% for the NCEP definitions). On the other hand, Sung et al reported a high prevalence of insulin resistance in overweight preadolescent Hong Kong children. Up to 50% of these children had at least two of the three cardiovascular risk factors of dyslipidaemia, high blood pressure, and hyperinsulinaemia, and 8% had all three risk factors.

Morbidity and mortality of MES

MES is essentially a clustering of cardiovascular disease (CVD) risk factors. Not surprisingly, subjects with MES are suffering from an increased risk of CVD and even higher mortality. In the United States, coronary heart disease mortality was two-fold in those with MES compared to non-MES after a mean follow up of 13 years. A meta-analysis based on 11 prospective European cohort studies showed that the overall hazard ratios for CVD mortality were 2.26 in men and 2.78 in women, and for all-cause mortality, they were 1.44 in men and 1.38 in women. The San Antonio Heart Study also reported a significantly elevated all-cause mortality of 1.47 for MES by NCEP criteria and 1.27 for MES by WHO criteria, as compared to non-MES.

The presence of MES in diabetic patients is particularly important. The increased mortality risk in diabetic patients is not only due to hyperglycaemia but partly attributable to an increased prevalence of other metabolic derangements such as lipid disorders and albuminuria, which are associated with death by themselves. Among 5205 Hong Kong Chinese type-2 diabetic patients, the prevalence of MES was found to be 49.2-58.1% based on different definitions. They increased to 61.3-61.8% if modification according to the Asian Pacific guideline was adopted on the definition of obesity. An even higher prevalence of MES in type-2 diabetic patients of 78-84% has been reported in Finland.

Clinical Implications of MES

Amongst the various criteria for MES, the WHO and EGIR included insulin resistance as part of the diagnostic features. Furthermore, only the WHO criteria included albuminuria. There is preliminary evidence suggesting a better predictive power on long term outcomes by using WHO than other criteria, probably due to the inclusion
of albuminuria in the former definition. Despite its discriminative nature, measurement of insulin is labour intensive, expensive, not yet standardised and not widely available as routine clinical practice. Measurement of albuminuria is also not routinely performed in non-diabetic subjects. On the other hand, we found that subjects with MES had significantly worse CVD risk factors than non-MES, and these persisted no matter which criteria were used. So, the more simple NCEP criteria may be already good enough to identify high-risk MES patients, especially in the general population. More information is emerging on this issue. A modified, ‘better’ criterion for MES may be launched very soon.

In conclusion, metabolic syndrome is a clustering of cardiovascular risk factors, namely, obesity, hyperglycaemia, hypertension and dyslipidaemia. New biochemical index of chronic inflammation such as C-reactive protein may soon be added to the definition. It is associated with increased morbidity and mortality, and common in both East and West. In Hong Kong, the prevalence is estimated to be around 10% in general population and 60% among type 2 diabetic subjects. Population-based screening strategy is crucial for early identification. Aggressive intervention through life-style modification, weight reduction and pharmacological control of risk factors to target levels remains the key to minimise long-term morbidity and mortality.

References: