

## Metabolic Syndrome

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Metabolic syndrome is a collection of physical attributes and laboratory tests that are associated with increased morbidity and mortality. Sometimes this has been called insulin resistance syndrome or pre-diabetes. Although there is currently considerable debate on the exact cause of metabolic syndrome, patients with metabolic syndrome appear to have an increased risk of cardiovascular disease and type 2 diabetes. There are actually now three definitions of metabolic syndrome: one by the World Health Organization (which requires an elevated fasting glucose), a second by the International Diabetes Federation (which requires an increased waist circumference), and a third by the National Cholesterol Education Program Adult Treatment Panel III (ATP III). The predictive value of each definition for developing type 2 diabetes or cardiovascular events can vary among different populations. The ATP III criteria is the most commonly used criteria in the United States. The ATP III panel defines metabolic syndrome as having any three of the following five characteristics (1):

- 1) Impaired fasting glucose (100 to 125 mg/dL)
- 2) Waist circumference of >102 cm (40 in) for men or >88 cm (35 in) for women
- 3) Hypertension (>130/85)
- 4) Fasting triglycerides >150 mg/dL
- 5) Low HDL (<40 mg/dL for men; <50 mg/dL for women)

Based upon these criteria, nearly 25% of the US adult population has metabolic syndrome and nearly 50% over the age of 60 (2). Worldwide, the prevalence is as high as 40% in some adult populations (3). In fact, the fastest growing segment of the population with metabolic syndrome is children. Although the ATP III definition of metabolic syndrome may or may not be the best criteria, this definition is easy to use clinically and has raised the awareness of the health risk both among health care providers as well as the public at large.

The first approach to management of metabolic syndrome is to institute lifestyle changes, i.e., to lose weight and exercise. In patients with pre-diabetes, recent studies have demonstrated that a modest degree of weight loss (5-7% of body weight) coupled with exercise (150 min/week) was associated with a nearly 70% reduction of risk for developing type 2 diabetes (4, 5). This was effective in all age and ethnic groups and twice as effective as metformin, a drug used to improve insulin sensitivity. Information on whether lifestyle modifications in people with metabolic syndrome reduce cardiovascular events is still pending. Studies to examine pharmacological intervention in patients with metabolic syndrome with insulin sensitizers and weight loss drugs are currently underway. Until the results of those studies are available, the best recommendation for all patients is to improve lifestyle. Individual components of the metabolic syndrome, i.e., hypertension, dyslipidemia, and impaired fasting

glucose, may be treated pharmacologically if lifestyle changes do not achieve the goals within three to six months. Numerous agents are currently FDA approved for treating these medical problems. It is important not to prolong the introduction of pharmacological therapy beyond this time frame or an endless cycle of three more months of lifestyle changes may be tried.

The diet component of metabolic syndrome does not have to be complicated. Although numerous diets have been proposed (low fat, low carbohydrate, etc.), the underlying feature of any diet is to consume a well-balanced, hypocaloric diet that results in a daily reduction of 500 to 1000 calories. The general advice of “eat less and do more” works for all patients and is easy to follow. Pharmacological agents are also available for weight loss which tends to improve the metabolic syndrome. A new class of weight loss agents (endocannabinoid antagonists) are currently being developed and may become available as early as 2006.

### Summary

- Metabolic syndrome is a cluster of risk factors for cardiovascular disease and type 2 diabetes
- Over 25% of the US population has metabolic syndrome
- Lifestyle intervention (diet and exercise) is an effective way to reduce the risk of type 2 diabetes in patients with metabolic syndrome
- Pharmacological therapies are available, (and many more are in development), for the treatment of individual components, or combinations of components, of Metabolic Syndrome.

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