VIII. PRE-DIABETES, METABOLIC SYNDROME, AND PREVENTION OF TYPE 2 DIABETES

A. Pre-diabetes

Type 2 diabetes is increasing in epidemic proportions in the U.S. and throughout the world. The complications resulting from diabetes can result in significant morbidity and mortality. Individuals with type 2 diabetes are at a significantly higher risk for coronary heart disease, peripheral vascular disease, stroke, as well as preventable blindness, end stage renal disease and non-traumatic amputation. They often have other comorbidities such as hypertension, dyslipidemia, and obesity. The term pre-diabetes refers to the intermediate metabolic states between normal and diabetic glucose homeostasis. It consists of two distinct states: 1) impaired fasting glucose or IFG (fasting BG between 100 and 125 mg/dL) and 2) impaired glucose tolerance or IGT (BG between 140-199 mg/dL 2 hours after 75 mg glucose load). Pre-diabetes can be thought of as an early stage of diabetes because a high proportion of these individuals develop the disease.

TABLE 25
Risk Factors for Development of Type 2 Diabetes

1. Age >45 years

2. Overweight defined as BMI >25 kg/m^2 (may not be correct for all ethnic groups)

3. Family history of diabetes (i.e., parents or siblings with diabetes)

4. Habitual physical inactivity

5. Race/ethnicity (e.g., African-Americans, Hispanic-Americans, American Indians, Asian-Americans, and Pacific Islanders)

6. Previously identified IFG or IGT

7. History of gestational diabetes mellitus or delivery of a baby weighing >9 lbs

8. Hypertension (>140/90 mmHg in adults)

9. HDL cholesterol ≤ 35 mg/dL (0.90 mmol/l) and/or a triglyceride level >250 mg/dL (2.82 mmol/l)

10. Polycystic ovary syndrome

11. History of vascular disease

12. Signs of insulin resistance, metabolic syndrome or conditions associated with insulin resistance (acanthosis nigricans, hypertension, dyslipidemia)

It is recommended that individuals with two or more of above risk factors be screened for diabetes.

B. Metabolic Syndrome

This is a condition that is usually associated with obesity, particularly visceral obesity, insulin resistance and type 2 diabetes. Individuals with metabolic syndrome are also at higher risk for developing atherosclerotic cardiovascular disease. Metabolic syndrome has also been variously called syndrome X, insulin resistance syndrome and cardiac dysmetabolic syndrome.

Various organizations, including the Adult Treatment Panel III (ATP III), the American Association of Clinical Endocrinologists (AACE), and the World Health Organization (WHO), have proposed different sets of criteria for diagnosis of metabolic syndrome. Perhaps the most commonly used criteria are the ones proposed by the Adult Treatment Panel III (ATP III), which require an individual to have three of the following five conditions to be diagnosed with metabolic syndrome:

- Abdominal obesity, defined as a waist circumference in men >102 cm (40 in) and in women >88 cm (35 inches)
- Serum triglycerides ≥150 mg/dL (1.7 mmol/l) or drug treatment for elevated triglycerides
- Serum HDL cholesterol >40 mg/dL (1 mmol/l) in men and <50 mg/dL (1.3 mmol/l) in women or drug treatment for low HDL cholesterol
- Blood pressure >130/85 mmHG or drug treatment for elevated blood pressure
- Fasting plasma glucose (FPG) ≥110 mg/dL (6.1 mmol/l) or drug treatment for elevated blood glucose.

C. Recommendations to Prevent or Delay Type 2 Diabetes

Individuals at high risk for developing diabetes need to become aware of the benefits of weight loss and following a carbohydrate-controlled diet and participating in regular physical activity.

At the present time, no pharmacologic intervention is proven to be effective in prevention of type 2 diabetes; however, individuals with both impaired fasting glucose and impaired glucose intolerance may benefit from metformin therapy.

REFERENCE SECTION VIII

AACE Medical Guidelines for Clinical Practice for the Management of Diabetes Mellitus. *Endocrine Practice.* 13(Suppl 1):3-66. May/June 2007