Increased body fat – along with central adiposity – significantly predicted the development of diabetes in a large, ethnically-diverse clinical trial of patients with impaired glucose tolerance (IGT). At the North American Association for the Study of Obesity (NAASO) 2004 Annual Meeting in Las Vegas, Dr. George Bray, MD, presented data from the body composition substudy of the Diabetes Prevention Program (DPP).

**LARGE POPULATION**

“While it is known that increased body fat and central adiposity predicts the onset of diabetes, their effects in a large population of patients with IGT has not been previously reported,” he said. The NAASO meeting was co-sponsored by the American Diabetes Association. Dr. Bray is Boyd Professor at the Pennington Center, Louisiana State University.

To test the relationship between increased body fat with central adiposity and IGT, researchers used data from the DPP, which recruited patients with IGT who had elevated fasting and/or impaired postload plasma glucose concentrations.

The DPP, published in *The New England Journal of Medicine* in 2002, randomized patients to treatment with metformin, lifestyle modification or placebo. Investigators evaluated the treatment arms with regard to their ability to prevent or delay the onset of diabetes in nondiabetic patients with elevated glucose who were at high risk for diabetes. The lifestyle intervention program reduced diabetes better than metformin.

**SUBSTUDY MEASUREMENTS**

In the body composition substudy, Dr. Bray and colleagues measured height, weight, waist circumference, hip circumference, triceps, subscapular, suprailiac, abdominal and calf skin folds at baseline in 3,234 patients. Patients were randomized to metformin, a lifestyle modification program or placebo. “The ethnic mix of the patients consisted of 54.7% whites, 19.9% African-Americans, 15.7% Hispanics, 4.4% Asian-Americans and Pacific Islanders and 5.3% American-Indians,” he said.

No differences between anthropometric measurements by treatment group within ethnic group were
The females weighed less and had smaller waist circumferences and ratio of waist-to-hip circumference; but had higher body mass index (BMI), larger hip circumference and larger skin folds at all measured sites,” Dr. Bray noted.

The investigators used sex-specific Cox proportional hazard regression models to predict diabetes over an average of 3.2 years. They found that baseline waist circumference had the highest hazard ratio (HR) of the obesity measures per 1 SD difference in both men and women (1.34 [95% CI, 1.18-1.52] and 1.28 [1.17-1.41], respectively). This HR remained after accounting for treatment groups as well as adjusting for age and ethnicity.

In separate models, higher baseline values for waist-height ratio, BMI, waist-hip ratio, weight, hip circumference and subscapular skin fold measures also significantly predicted the development of diabetes in both genders,” Dr. Bray said. When the researchers analyzed additional skin fold measurements including the suprailiac, triceps plus subscapular and the sum of the skin-fold measurements, they found that these significantly predicted diabetes in females but not in males.

For each measure of body fat, the HR per each 1 SD difference at baseline was lower for females than for males using sex-specific comparisons. “Increased body fat and central adiposity significantly predicted diabetes development in an ethnically diverse, large population, in this clinical trial of patients with IGT,” Dr. Bray concluded.

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