

Adiposity Is a Risk Factor for Ischemic Stroke

BY BRUCE JANCIN
Denver Bureau

VIENNA — Adiposity as reflected in body mass index proved a strong risk factor for ischemic stroke in both men and women in a study of 50,000 Finnish adults followed for an average of 20 years, Dr. Jaakko Tuomilehto said at the annual congress of the European Society of Cardiology.

BMI remained an independent risk factor for total and ischemic stroke even after adjustment in a multivariate model for mediating factors including systolic blood pressure, total cholesterol, diabetes, physical activity, age, and smoking, added Dr. Tuomilehto of the University of Helsinki.

Adiposity is a well-established risk factor for cardiovascular disease. However, its relation to cerebrovascular disease has been debated. Some studies have linked BMI to ischemic stroke risk, but the association has melted away after adjustment for known

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stroke risk factors affected by adiposity, including hypertension, diabetes, and hypercholesterolemia. That wasn't the case in this unusually large and long-term prospective Finnish epidemiologic study, in which

2,554 people developed ischemic stroke and 674 experienced hemorrhagic stroke.

Using as the reference standard normal-weight men as defined by a BMI of 18.5-24.9 kg/m², the adjusted risk of ischemic stroke was 51% lower in underweight men (BMI less than 18.5), 27% higher in overweight men (BMI 25.0-29.9), and 70% higher in obese men (BMI 30 or higher).

In contrast, underweight women had an 81% greater risk of ischemic stroke than did normal-weight women. Overweight women had an 11% increase in ischemic stroke, compared with normal-weight women, while obese women had a 41% increased risk, Dr. Tuomilehto continued.

The relationship between adiposity and hemorrhagic stroke risk was more complex than for ischemic stroke. Using the standard four BMI categories, BMI was not associated with hemorrhagic stroke risk in men or women. However, upon dividing BMI into seven categories, a statistically significant U-shaped relationship was found between BMI and hemorrhagic stroke risk in women, but not men. In a multivariate analysis, the lowest risk of hemorrhagic stroke was observed in women with a BMI of 23.0-24.9. The risk was increased 91% in women with a BMI of 35 or more, by 60% in those with a BMI of 27.0-29.9, by 91% in women with a BMI of 20.0-22.9, and by 190% in those with a BMI below 18.5.

Abdominal obesity was associated with a significantly increased risk of ischemic stroke only in men. Men in the highest quartile of waist circumference had a mul-

tivariate-adjusted risk for ischemic stroke 2.1-fold greater than for men in the lowest quartile. Similarly, men in the top quartile of waist-hip ratio—another measure of abdominal obesity—had a 2.3-fold greater risk of ischemic stroke than did those in the lowest quartile. There was no association between abdominal obesity and hemorrhagic stroke.

Asked to speculate about the likely mechanism by which adiposity affects ischemic stroke risk, Dr. Tuomilehto replied

that his hypothesis involves inflammatory cytokines, which are known to be increased in obesity. C-reactive protein levels were measured in the Finnish study, but those data haven't yet been analyzed.

Audience discussion focused on the trend for increased risks of both ischemic and hemorrhagic stroke in lean Finnish women having a BMI below 18.5. Dr. Tuomilehto suggested several possible explanations. Some lean women were probably heavy smokers or alcohol drinkers,

and even though investigators attempted to adjust for those factors, they may have not been entirely successful.

"Especially for alcohol drinking, it is very difficult to get accurate information on a questionnaire basis," he observed.

Also, some epidemiologic studies have shown lean individuals tend to have a relatively high dietary sodium intake for their body mass—and at least in animals, a high sodium intake is a direct cause of stroke, Dr. Tuomilehto added. ■

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