Extreme BMI Tied to Deep Intracerebral Hemorrhage

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LOS ANGELES – A body mass index of less than 18.5 or greater than 30 kg/m² was associated with increased risk for deep intracerebral hemorrhage in a case-control study of 772 adults.

The findings differed by sex, with an increased risk seen in males with a BMI of less than 18.5 or greater than 30 kg/m² but only in females with a BMI greater than 30 kg/m², Dr. Jonathan Rosand said at the meeting.

There appeared to be no association between BMI and risk for lobar intracerebral hemorrhage (ICH), said Dr. Rosand, director of the neuroscience intensive care unit and of the division of neurocritical care and emergency neurology at Harvard Medical School, Boston. Intracerebral hemorrhages routinely get categorized based on whether they occur in the cortical or subcortical regions (lobar ICH) or in the deep brain structures or brain stem (deep ICH). Extremes of BMI have been associated with an increased incidence of ICH in previous studies.

Dr. Rosand and his associates studied the effect of BMI on the risk of the subtypes of ICH by comparing consecutive patients with either lobar (188) or deep ICH (196) who were admitted to Massachusetts General Hospital, Boston, with a control group of 388 individuals matched for age and ethnicity.

All patients were older than 18 years. CT imaging at the time of admission determined the ICH location. Investigators calculated the BMI based on subjects’ height and weight at enrollment and divided subjects into four BMI quartiles: less than 18.5, 19-24, 25-30, and greater than 30.

Male sex, a BMI less than 18.5, and a BMI greater than 30 were significantly associated with an increased risk for deep ICH in both univariate and multivariate analyses. Some traditional risk factors for ICH – hypertension, diabetes, smoking, and obesity – were not significantly associated with increased risk in the two analyses. Diabetes mellitus was a risk factor in only univariate analysis.

The risk for deep ICH was 34% higher in males, nearly twice as high in patients with either a BMI of less than 18.5 or greater than 30, four times higher in patients with hypertension, and nearly three times higher in patients consuming more than 3 ounces of alcohol per day, compared with patients without those characteristics, in a multivariate analysis.

A subsequent sex-stratified analysis found a 75% higher risk for deep ICH in females with a BMI greater than 30, compared with females with a BMI of 19-24.

The risk for deep ICH was 81% higher in males with a BMI greater than 30 and nearly three times higher in males with a BMI less than 18.5, compared with males with a BMI of 19-24.

“Does there appear to be, at least in these data, a difference in the effect of BMI on risk of deep ICH in men compared with women,” Dr. Rosand said at the conference, which was sponsored by the American Heart Association. Risk for lobar ICH did not vary significantly based on BMI in either a univariate or multivariate analysis.

The association of deep intracerebral hemorrhage with hypertension, BMI, and possibly diabetes raises the hypothesis that deep ICH, a marker for hypercoagulability, is affected by obesity. However, the association warrants further study to determine the risk factors for the development of deep ICH.