

Midlife Hypertension Tied to Cortical Thinning

BY MICHELE G. SULLIVAN

FROM THE INTERNATIONAL CONFERENCE ON ALZHEIMER'S AND PARKINSON'S DISEASES

BARCELONA – Uncontrolled hypertension at midlife may be related to continuous cortical thinning, a condition which has been shown to be associated with dementia in old age.

"We suggest that midlife hypertension is associated with cortical thinning in areas related to blood pressure regulation, and dementia," Miika Vuorinen and his colleagues wrote in a poster at the conference.

"To our knowledge, this is the first study focusing on the effects of midlife hypertension on these multiple brain regions in later life," wrote Mr. Vuorinen, a doctoral student at the University of Finland, Kuopio.

The study yielded some interesting observations that await further clarification in other populations before additional interpretations can be made, said Dr. Richard J. Caselli, who was not involved in the study.

"The general relationship of cerebrovascular risk factors with Alzheimer's disease [AD] is an area of great interest, but also some controversy, as not all studies agree with each other. In the current case, for example, some factors like hypercholesterolemia and obesity, that others have found to correlate with AD risk, did not correlate with cortical thinning," said Dr. Caselli, professor of neurology at the Mayo Clinic in Scottsdale, Ariz.

The Cardiovascular Risk Factors, Aging, and Incidence of Dementia study (CAIDE) comprises 1,449 residents of

VITALS

Major Finding: Midlife hypertension was associated with a greater than threefold higher risk of late-life cortical thinning.

Data Source: A subgroup of 63 older adults in the Cardiovascular Risk Factors, Aging, and Incidence of Dementia study (CAIDE), which comprises 1,449 residents of eastern Finland with up to 30 years of follow-up data.

Disclosures: The study group noted no potential conflicts of interest in either study. The CAIDE study is sponsored by grants from the university, and various Swedish and Finnish government grants.

eastern Finland who were first evaluated at midlife, in 1972, 1977, 1982, or 1987.

Now, with up to 30 years of follow-up, researchers are evaluating how midlife blood pressure, body mass index, cholesterol levels, smoking, and physical activity might relate to late-life brain health.

This substudy included all participants who were suspected of having mild cognitive impairment at their 2005-2008 visit. All of these participants (mean age 78 years) underwent magnetic resonance imaging. Of these, 63 had images sufficient to measure cortical thickness in 10 brain areas related to cognition and blood pressure regulation: the bilateral hemispheric anterior insulae cortices, bilateral orbitofrontal cortices, and bilateral posterior superior or medial temporal gyri and the left intraparietal sulcus. Measurements of the right hemisphere involved only the temporal pole, entorhinal cortex, and inferior frontal gyrus.

The researchers compared participants

who had midlife hypertension (blood pressure of more than 160/95 mm Hg) against normotensive subjects. Elevated midlife blood pressure was associated with cortical thinning in all of the brain regions measured.

The right hemisphere of the brain showed more thinning overall than did the left hemisphere, and the insular cortices and orbitofrontal areas were bilaterally affected, the investigators noted.

None of the associations changed in a multivariate analysis that controlled for age, gender, late-life antihypertensive medications, follow-up time, or the type of scanner used in the imaging.

"In a further analysis, systolic blood pressure and pulse pressure showed linear relationships with decreasing cortical thickness in the right insular cortex," the investigators added.

Decreasing blood pressure in late life was also related to decreased cortical thickness, supporting previous findings that patients who develop dementia may also experience decreasing blood pressure, the investigators noted.

Dr. Caselli cautioned that subgroup analyses "get tricky and risk bias," and he wondered "why should the insular cortex specifically show such a strong effect?" Even though it is interesting, is it "coincidence or is it meaningful?" he asked.

"Cortical thinning can certainly relate to Alzheimer's disease, but it may also relate to cerebrovascular disease, so the correlation, while of interest, need not

be exclusively related to Alzheimer's disease," Dr. Caselli said.

He added that the investigators did not mention apolipoprotein E (APOE) genotype, but "some studies have shown that CV risk factors have a greater impact on [APOE e4 allele] carriers than [do] non-carriers, at least as regards AD-related outcomes."

The same group of investigators recently published another CAIDE substudy, which found significant associations between increased white matter lesions in late life with mid- and late-life vascular risk factors (*Dement. Geriatr. Cogn. Disord.* 2011;31:119-25).

This substudy comprised 112 CAIDE participants with an average follow-up of 21 years. The subjects underwent MRI scanning and were assessed for white matter lesions. White matter lesions were found to be significantly associated with other CAIDE risk factors, including being overweight at midlife (relative risk 2.5), obesity (RR 2.9), and hypertension (RR 2.7); the associations remained significant after adjustment for several factors.

This study found a similar late-life blood pressure association: subjects with midlife, but not late-life, hypertension (RR 3.25). This association remained significant even after an analysis that controlled for antihypertensive medication at midlife. The use of lipid-lowering drugs reduced the risk of late-life white matter lesions by 87%, the investigators noted.

"These results indicate that early and sustained vascular risk factor control is associated with a lower likelihood of having more severe white matter lesions in late life," they wrote. ■

Each Sugary Drink Raised Blood Pressure by 1.6/0.8 mm Hg

BY FRANCES CORREA

FROM HYPERTENSION

High consumption of sugar-sweetened beverages appeared to adversely affect blood pressure levels in a population-based study involving more than 2,600 people living in the United Kingdom and the United States.

The findings should help shore up the message to patients that consumption of soda and fruit juice needs to be limited for a healthy diet.

"If individuals want to drink sugar-sweetened beverages, we suggest they do so only in moderation [fewer than three 12-ounce cans per week]," the lead investigator of the study, Ian Brown, Ph.D., said in an interview.

The International Study of Macro/Micronutrients and Blood Pressure (INTERMAP) involved 2,696 people aged 40-59 years recruited from 10 population samples in the United Kingdom and United States. In addition to answering questions about the intake of beverages sweetened by fructose, glucose, and sucrose, participants were asked about their consumption of diet beverages and alcohol. Each subject also provided two 24-hour urine collection samples, according to Dr. Brown of the department of epidemiology and biostatistics at the Imperial College of London, and his colleagues.

Multiple regression analyses showed that for each serving of a sugar-sweetened beverage consumed per day, systolic blood pressure increased by 1.6 mm Hg. Diastolic blood pressure rose by 0.8 mm Hg, the investigators wrote.

A direct association also was observed between the intake of fructose-sweetened beverages and blood pressure. Fructose intake that was higher by 2 standard deviations was associated with a 3.4-mm Hg increase in systolic blood pressure and a 2.5-mm Hg increase in diastolic blood pressure, according to the findings (*J. Hypertens.* 2011 Feb. 28 [doi: 10.1161/HYPERTENSION.AHA.110.165456]).

These associations between sugared beverage intake and blood pressure were strongest among individuals with higher urinary sodium excretion, the researchers added. The results remained statistically significant after the investigators accounted for differences in body mass.

The researchers concluded that higher blood pressure is associated with high consumption of glucose and fructose, as well as with higher levels of dietary sugar and sodium.

There was no significant correlation between diet soda intake and blood pressure levels.

The study was the first in people to suggest that there is an association between high sodium intake and high sugar-sweetened beverage intake and the overall

effect on blood pressure, Dr. Brown said in an interview.

"It has been suggested by other scientists that consumption of high levels of sugars and salt may lead to sodium retention in the kidneys and/or volume expansion (i.e., an increased level of fluid in the body), which could lead to higher blood pressure," Dr. Brown said.

The findings also suggest that people who consume more than one sugar-sweetened beverage daily tend to consume less of other types of nutrients including starch, fiber, protein (animal and vegetable), and polyunsaturated and monounsaturated fatty acids.

But critics of the study emphasized that the "level of blood pressure changes noted by the authors are inconsequential and well within standard measurement error," according to a statement by the American Beverage Association.

In addition, "The results of [the analysis] obfuscate other important variables that are linked to high blood pressure," the statement said.

The investigators reported having no conflicts of interest. Dr. Brown's analysis was supported by a U.K. Medical Research Council studentship. The INTERMAP Study as a whole was supported by a grant from the National Heart, Lung, and Blood Institute; the Chicago Health Resource Foundation; and national agencies in China, Japan, and the United Kingdom. ■