Alzheimer Disease and High Blood Pressure. What is the connection?

By Alisa G. Woods, PhD [2]

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Many factors can increase the risk for Alzheimer disease (AD), including smoking, obesity, hypertension, diabetes, and even educational level, and modification of risk factors might help prevent the disease. It is not completely understood, however, how these different contributions might tip the scale in favor of or against developing the degenerative brain disorder.

Approximately 44 million people throughout the world have dementia, and over 135 million people will have dementia by 2050. AD is the most frequently occurring form of dementia, accounting for 60%-70% of cases. Forgetfulness is an initial sign of AD, followed by dependence on others for care, anxiety, aggression, and eventually the inability to recognize loved ones. In the late stages of AD, loss of bodily control is common. There is currently no cure for AD, and available treatments typically only delay the cognitive decline by about 6 months. Approved AD medications include acetylcholinesterase inhibitors and a glutamate antagonist.

An international research group based in Denmark, the United Kingdom, and the United States sought to uncover the link between AD and its numerous risk factors, and recently published their findings.

The researchers, led by Soren D. Ostergaard of the Department of Clinical Medicine, Aarhus University, studied SNPs that have been associated with each risk factor. SNPs, “single nucleotide polymorphisms,” are variations in the DNA sequence that are often associated with specific conditions or diseases. The scientists included several risk factors for AD in their analysis, and the SNPs that have been associated with those risk factors. The risks factors used in the study were: type 2 diabetes, fasting glucose, insulin resistance, body mass index, total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, systolic blood pressure (SBP), smoking initiation, smoking quantity, university completion, and years of education.

According to the study report, “We sought to assess the causal nature of these associations using Mendelian randomization (MR).” Mendelian randomization is a system for measuring gene variations to find out whether a causal relationship to a disease might exist. The method requires the use of genes with a known function. Ostergaard and colleagues utilized data from the International Genomics of Alzheimer’s Project, with a dataset consisting of 17,008 people with AD and 37,154 elderly control subjects without cognitive problems.

Interestingly, genetically-predicted high SBP was associated with a lowered risk of AD, as well as an increased probability of taking antihypertensive medication.

In their report, the scientists concluded that “Inherited lifetime exposure to higher SBP is associated with lower AD risk. These findings suggest that higher blood pressure—or some environmental exposure associated with higher blood pressure, such as use of antihypertensive medications—may reduce AD risk.”

Identifying modifiable risk factors is extremely important in order to prevent the rise in AD, which seems inevitable, based on the increasing population of elderly individuals worldwide. Further studies may focus on blood pressure medications for AD prevention, or on identifying other factors that may influence blood pressure and similarly modify the risk of developing AD.

Key Points
• Studies of modifiable risk factors can be useful for understanding AD.
• High SBP was associated with a reduced AD risk.
• High blood pressure and associated conditions and medications in AD need to be further understood.