Medical Xpress

Change of heart? It may affect thinking and memory skills in middle age

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Subtle changes in the structure and the diastolic function of a person's heart between early adulthood and middle age may be associated with a decline in thinking and memory skills. The research is published in the

January 26, 2022, online issue of *Neurology*, the medical journal of the American Academy of Neurology. The diastolic function of the heart is when it rests between beats and the chambers fill with blood.

"Cardiovascular risk factors such as high blood pressure, high cholesterol and diabetes have been associated with an increased risk for cognitive impairment, but much less is known about heart structure and function and the risks for cognition," said study author Laure Rouch, PharmD, Ph.D., of the University of California, San Francisco. "We followed young adults for 25 years into middle age and found declines in thinking and memory skills independent of these other risk factors. Our findings are of critical importance in the context of identifying potential early markers in the heart of increased risk for later-life cognitive decline. Such abnormalities are common and often underdiagnosed as they do not produce any obvious symptoms."

The study looked at 2,653 people with an average age of 30. Participants had echocardiograms, ultrasound images of the heart, at the start of the study and again 20 and 25 years later. Echocardiograms are non-invasive and widely available.

Researchers used the images to measure the following: the weight of the left ventricle, one of four chambers of the heart; the volume of the blood that filled the left ventricle when pumping; and how well the left ventricle pumped blood to the body, specifically the percentage of blood pumped out of the heart.

Researchers found over 25 years, there was an average increase in the weight of the left ventricle of 0.27 grams per square meter per year (g/m^2), with average weight of 81 g/m^2 in the first year and 86 g/m^2 in the last year. There was also an average increase in left atrial volume of 0.42 milliliters of blood per square meter (mL/m^2) with average volume of 16 mL/m^2 in the first year and 26 mL/m^2 in the last year.

In the last year of the study, participants were given six cognitive tests to measure thinking and memory skills including global cognition, processing speed, executive function, delayed verbal memory and verbal fluency. Tests included tasks like recalling words from a list 10 minutes after looking at the list, as well as substituting symbols for numbers using a key at the top of the page.

After adjusting for factors like age, sex and education, researchers found that a greater than average increase from early to middle adulthood in the weight of a person's left ventricle was associated with lower midlife cognition on most tests.

Tests included a common dementia test that asks participants to do tasks like draw lines connecting alternating letters and numbers, and repeat five words, complete other tasks, and then repeat the same five words. Scores range from zero to 30 with 26 and higher representing normal cognition. Participants with a greater than average midlife increase in left ventricle weight had an average score of 22.7 while those without a greater than average increase in weight had an average score of 24.

Researchers also found a greater than average increase from early to middle adulthood in left atrial volume was associated with lower midlife global cognition.

However, a greater than average decrease in the percentage of blood pumped out of the left ventricle was not associated with cognition.

"What is interesting is that our results were similar after adjusting for cardiovascular risk factors such as high blood pressure, diabetes, smoking and obesity," Rouch said. "As early as young adulthood, even before the occurrence of cardiovascular disease, there may be heart abnormalities that could be risk markers for lower thinking and memory skills in middle age. In the future, a single echocardiogram may help

identify people at higher risk of cognitive impairment."

Rouch said that future research should determine whether interventions to improve the structure and function of the heart could benefit brain health. She said, "The question of whether altered cardiac structure and function could be a risk factor for cognitive impairment has major public health implications and could reveal another important heart-brain connection."

A limitation of the study is echocardiograms were performed up to 25 years apart using slightly different procedures and equipment, which may make the data hard to compare.

Provided by American Academy of Neurology

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