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A hidden brain problem may signal early Alzheimer's risk

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Scientists from Nanyang Technological University (NTU) in Singapore have discovered that a blocked waste removal system in the brain could be one of the earliest warning signs of Alzheimer's disease.

This blockage, which can be seen on regular MRI brain scans, may show up even before memory loss and other dementia symptoms begin.

The blockages occur in small channels around blood vessels, called perivascular spaces. These channels help clear harmful waste from the brain, including proteins like beta amyloid and tau.

These two substances are commonly found in high amounts in the brains of people with Alzheimer's. When the drainage system gets blocked, these toxic substances can build up and cause damage to brain cells.

The study was led by Associate Professor Nagaendran Kandiah from NTU's Lee Kong Chian School of Medicine. He explained that these clogged spaces, known as "enlarged perivascular spaces," could help doctors detect Alzheimer's disease earlier, just by looking at brain scans that are already done to check cognitive decline.

This research is especially important because it focused on Asian populations, which have been underrepresented in past Alzheimer's studies.

The team looked at nearly 1,000 people in Singapore, including those with normal memory and thinking and others with early signs of decline. These participants came from different ethnic backgrounds, reflecting the country's diverse population.

One reason this matters is that the risk factors for Alzheimer's can differ between populations. For example, a gene called APOE4 is known to raise Alzheimer's risk and is found in up to 60% of Caucasian patients with the disease. But among Singaporeans with dementia, the number is much lower—less than 20%. This means studies done on other populations may not apply directly to Asian patients.

To better understand the link between clogged brain drains and Alzheimer's, the NTU scientists compared brain scans with blood tests and other signs of brain damage. They looked at people who had mild cognitive impairment, which often comes before dementia, and compared them with those who had no memory or thinking problems.

They found that people with mild cognitive problems were more likely to have enlarged perivascular spaces than those with healthy brain function.

These clogged spaces were also linked to higher levels of beta amyloid and tau in the blood—key warning signs of Alzheimer's. In fact, this connection was stronger than the link between Alzheimer's markers and another common brain issue, white matter damage.

This means that blocked brain drains may actually be a better early signal of Alzheimer's than damage to white matter, which has traditionally been used by doctors to look for signs of dementia.

The study has important implications for how Alzheimer's is diagnosed and treated. If doctors can spot these changes earlier, they may be able to start treatment sooner and possibly slow the disease's progress.

Experts not involved in the study agreed with its importance. Dr. Rachel Cheong from Khoo Teck Puat Hospital said the research shows how small blood vessel changes may play a key role in Alzheimer's.

Dr. Chong Yao Feng from the National University Hospital added that Alzheimer's and blood vessel diseases should not always be seen as separate problems. The study shows they may work together to cause brain damage.

Doctors reading brain scans should be careful not to assume symptoms are caused by just one issue. If they see enlarged perivascular spaces, they may need to consider Alzheimer's as a possibility and run more tests to be sure.

The NTU team plans to keep studying the participants to see how many go on to develop full Alzheimer's dementia. If future research confirms these results, looking at clogged brain drains on MRI scans could become a regular way to detect Alzheimer's earlier than we can today.

If you care about Alzheimer's, please read studies about the likely cause of Alzheimer's disease, and new non-drug treatment that could help prevent Alzheimer's.

For more health information, please see recent studies about diet that may help prevent Alzheimer's, and results showing some dementia cases could be prevented by changing these 12 things.

The study is published in Neurology.

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