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Brain Drainage Blockages Could Be Early Warning Sign of Alzheimer's

By Kanwal Munir

Scientists have warned that blockages in the brain's natural waste-clearing system could act as an early indicator of Alzheimer's disease, raising hopes for earlier and more accessible diagnosis.

Researchers from Singapore's Nanyang Technological University (NTU) have found that tiny fluid-filled channels surrounding blood vessels in the brain, known as perivascular spaces, play a vital role in draining neural waste via cerebrospinal fluid. When this drainage system is disrupted, waste can accumulate and contribute to brain damage linked with dementia.

The study explains that conditions such as high blood pressure and arterial stiffness can interfere with this clearance process. As a result, perivascular spaces may become enlarged, a change increasingly observed in people showing early signs of Alzheimer's disease.

Associate Professor Nagaendran Kandiah from NTU's Lee Kong Chian School of Medicine, who led the research, said these changes can be detected using routine MRI scans already used in cognitive assessments. He noted that identifying enlarged perivascular spaces could strengthen current diagnostic approaches without requiring costly or invasive new tests.

Co-author Justin Ong stressed that early detection is crucial, as it allows doctors to intervene sooner and potentially slow the progression of symptoms such as memory loss, reduced thinking ability, and mood changes.

To establish the link, the research team analysed MRI scans and clinical data from 979 participants in Singapore, comparing individuals with mild cognitive impairment to those without cognitive issues. The findings showed that enlarged perivascular spaces were more common in those with early cognitive decline.

The study also examined seven established Alzheimer's biomarkers. Four of these, including amyloid plaques and tau tangles, were significantly more prevalent in participants with enlarged perivascular spaces.

Notably, the association between these brain changes and Alzheimer's markers was stronger than that seen with white matter damage, a commonly used indicator in dementia diagnosis.

Researchers highlighted the importance of including diverse ethnic groups, noting that genetic risk factors differ across populations. The team plans to continue tracking participants to confirm whether these brain changes can reliably predict future Alzheimer's risk.

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