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Press release
For immediate publication

**First extensive investigation of sex-specific differences in cerebral small vessel disease
Scientific focus on prevention and therapy**

Graz, 14 November 2024: Cerebral small vessel disease (CSVD for short) is a disease of the small blood vessels in the brain and one of the main causes of stroke. For the first time, sex-specific differences with regard to this disease have now been fully revealed in an international study conducted by scientists at the Medical University of Graz Department of Neurology. Recently published in JAMA Network Open, the results clearly indicate that men and women are affected differently by this disease, which could be of great importance in future approaches to prevention and treatment.

How blood vessels damage the brain: Findings on CSVD and sex-specific risks

Cerebral small vessel disease (CSVD) is responsible for around 20% of all ischemic strokes (strokes caused by blood clots) and is the most common cause of intracerebral hemorrhage (brain bleeds). In addition to these acute events, CSVD also significantly contributes to long-term cognitive impairment and the development of dementia in old age. In this disease, changes in the small blood vessels in the brain lead to circulatory disorders that damage brain tissue. "Despite the great clinical relevance of this disease, little was known about the differences in how it impacts men and women," explains author Simon Fandler-Höfler from the Med Uni Graz Department of Neurology.

Given the great clinical relevance of this sex-specific difference in cerebral small vessel disease, Med Uni Graz scientists and their international colleagues addressed this issue and conducted a comprehensive data analysis. They drew on data from the Microbleeds International Collaborative Network (MICON), which has information from over 20,000 patients in 38 global cohorts (including in Graz). "These patients all had an ischemic stroke, a stroke caused by the blockage of a cerebral blood vessel," says Thomas Gattringer, head of the Pathomechanisms of Stroke research unit. They received an MRI scan that was examined for typical sequelae and changes to the small blood vessels.

Brain damage: research focus on sex-specific differences

In their investigations, the scientists discovered interesting differences between men and women: It appeared that men are more frequently affected by cerebral microbleeds (CMBs)—around 28% of patients had at least one microbleeding event, whereby the prevalence in men was significantly higher than in women.

In contrast, women appeared to suffer damage to their white matter more frequently: so-called white matter hyperintensities that are visible as changes in MRI scans and suggest damage to the nerve connections as the result of chronic reduced circulation. Especially remarkable was that microbleeds in women are accompanied by a higher risk of death—a risk that was not observed in men with similar changes.

"These findings suggest that men and women are susceptible in different ways to certain processes that damage the blood vessels in the brain," summarizes Fandler-Höfler. While men are more frequently affected by microbleeds and small "lacunes" (small brain tissue injuries), women are more likely to exhibit changes in white matter. Both experts are in agreement: "A better understanding of these sex-specific differences could provide an important stimulus for future research and the development of targeted therapies."

In the long term, prevention as well as therapy and quality of life might be sustainably improved.

Publication

Sex Differences in Frequency, Severity, and Distribution of Cerebral Microbleeds

<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2824882>

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