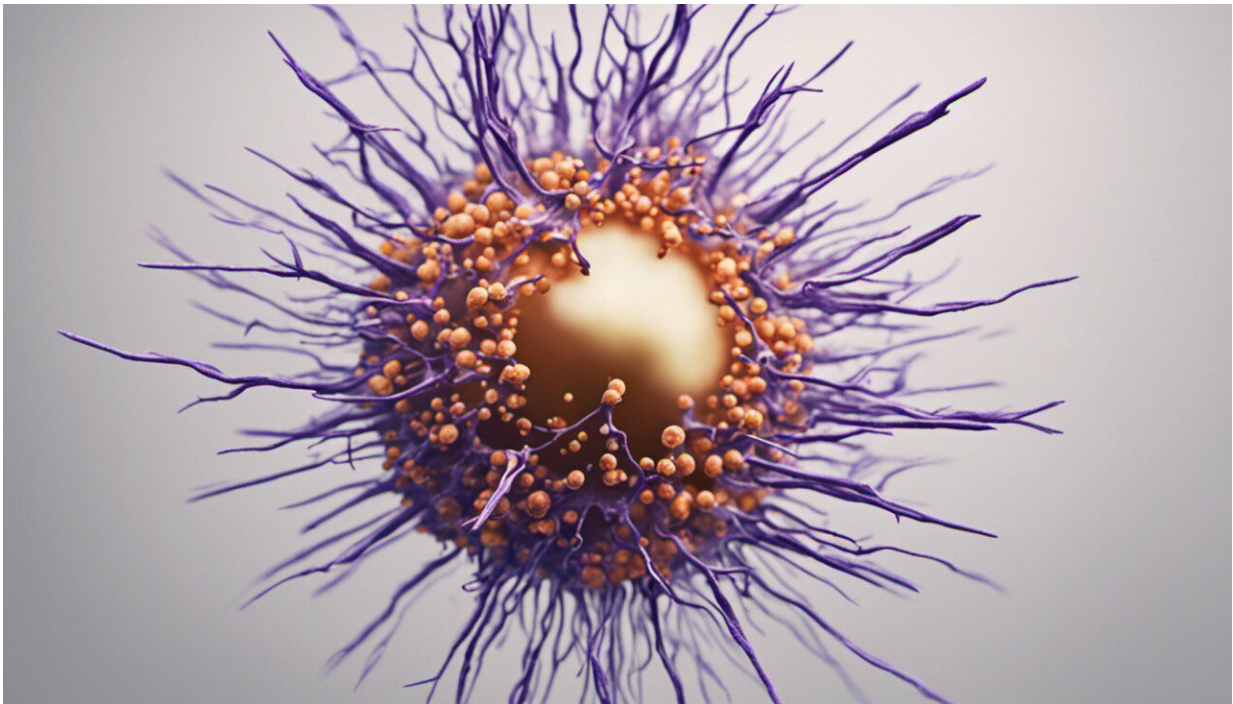


Heart failure is associated with loss of brain cells and a decline in mental processes

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Credit: AI-generated image ([disclaimer](#))

Australian researchers have found evidence that heart failure is associated with a decline in people's mental processes and a loss of grey matter in the brain. These changes can make it more difficult for heart failure (HF) patients to remember and carry out instructions such as taking the correct medication at the right times.

The authors of the study, which is published online today in the [European Heart Journal](#), say: "Our results are consistent with the observation that people with HF have trouble adhering to complex self-care advice, and suggest that simpler approaches to self-management may be required".

Professor Osvaldo Almeida, who is Professor and Winthrop Chair of [Geriatric Psychiatry](#) at the University of Western Australia and Director of Research at the Western Australia Institute for Health and Ageing in Perth, and his colleagues carried out [cognitive tests](#) on 35 patients with HF, 56 patients with ischaemic [heart disease](#) (IHD), which can often but not always accompany HF, and 64 healthy people without HF or IHD. They also used [magnetic resonance imaging](#) (MRI) to assess differences in the volume of grey matter in different [parts of the brain](#).

Results showed that patients with HF had worse immediate and long-term memory and reaction speeds (psychomotor speed) than the healthy controls. [Heart failure](#) was also associated with changes in [brain](#) regions that are important for mentally demanding cognitive and emotional processing.

"What we found in this study is that both IHD and HF are associated with a loss of cells in certain [brain regions](#) that are important for the modulation of emotions and mental activity – such a loss is more pronounced in people with HF, but can also be seen in people with IHD without HF," explained Prof Almeida. "Similarly, people with IHD and HF show subtle deficits in cognitive abilities compared with controls without either IHD or HF, and again those deficits are more pronounced in people with HF. Our study was not sufficiently large to show with certainty that the cognitive performance of participants with HF was worse than that of participants with IHD, although both showed deficits compared with controls."

The regions of the brain that showed loss of grey matter are believed to be important for memory, reasoning and planning. "There is evidence that they optimise performance in complex tasks that require 'mental effort'. Consequently, loss of [brain cells](#) in these regions may affect a person's performance in a number of different areas, such as memory, behaviour modification, inhibition, both emotional and cognitive, and organisation," said Prof Almeida.

"Our findings indicate that diseases that affect the heart affect the brain as well, and that the changes in organ function and blood circulation associated with HF seem to compound these effects in the brain. For these reasons, primary and secondary prevention are essential to minimise the impact of heart disease on brain structure and function. They are also consistent with the possibility that patients with HF may have trouble following complex management strategies, and, therefore, treatment messages should be simple and clear. Health professionals and patients need to be aware that problems caused by heart disease are not limited to the heart."

The authors write: "As far as we are aware, this is the first study that included an additional IHD control group that shares common risk factors with HF, which allowed us to show that the cognitive losses may be a non-specific consequence of increasing cardiovascular disease burden. Moreover, our analyses revealed that these subtle deficits . . . cannot be explained by impaired left ventricular ejection fraction, prevalent comorbid conditions, or biochemical markers.

"The acquisition of structural brain images allowed us to examine the impact of both HF and IHD on cerebral GM [grey matter] and to show that the people with HF display more widespread and extensive brain changes than adults with IHD."

Prof Almeida and his colleagues say that larger and longer studies are

need to clarify the physiological pathways by which HF could lead to loss of brain cells and worse [mental processes](#), and to see whether the changes are progressive; for instance, they are investigating whether [grey matter](#) loss increases and the cognitive problems become worse over time. They also want to examine whether HF patients could benefit from cognitive rehabilitation or stimulation.

More information: "Cognitive and brain changes associated with ischaemic heart disease and heart failure". European Heart Journal. [doi:10.1093/eurheartj/ehr467](https://doi.org/10.1093/eurheartj/ehr467)

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