

# **New imaging technique detects early brain damage from hypertension**

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Blood pressure reading. Credit: copyright American Heart Association

A new imaging technique found that some people with high blood pressure also have damage to nerve tracts connecting different parts of the brain, according to a study presented at the American Heart Association's 2015 High Blood Pressure Conference.

The area of brain damage detected is linked to difficulties in certain cognitive skills, decision-making, and the ability to regulate emotions.

"We already have clear ways to explore the damage [high blood pressure](#) can cause to the kidneys, eyes, and heart. We wanted to find a way to assess brain damage that could predict the development of dementia associated with vascular diseases," said Daniela Carnevale, Ph.D., the study's senior author and assistant professor at Sapienza University of Rome, based in Neuromed Institute.

While there has been a lot of research on hypertension-related brain changes in the grey matter, Carnevale proposed that a look into the brain's white matter could tell if high blood pressure was having an effect even earlier than what is known.

Researchers used [diffusion tensor imaging](#) (DTI), an enhancement of [magnetic resonance imaging](#) (MRI), to evaluate and compare the structural and functional properties of the main connections between different brain regions. Fifteen participants were on medication for moderate to severe high blood pressure and 15 participants had [normal blood pressure](#). Participants were also given a cognitive assessment.

The brain imaging found that, while none of the participants showed abnormalities on a standard MRI, the more advanced DTI revealed that participants with high blood pressure had damage to:

- brain fibers that affect non-verbal functions;
- nerve fibers that affect executive functioning and emotional regulation; and
- limbic system fibers, which are involved in attention tasks.

In addition, imaging and laboratory tests indicated damage to the heart and kidneys from high blood pressure.

Researchers also found those with high blood pressure performed significantly worse on two different assessments of cognitive function and memory. However, there were no differences in tests evaluating verbal function or ability to perform daily activities.

"DTI provides a way to evaluate pre-symptomatic brain damage in people with high blood pressure in order to identify possible therapies to help control brain damage and reduce the eventual development of dementia. It is generally accepted that not all available medications have the same impact on different kinds of organ damage," Carnevale said.

DTI, also called tractography, is not performed in routine medical practice, but the researchers suggest that physicians should start to consider potential [brain damage](#) as they treat patients with high [blood pressure](#).

Provided by American Heart Association

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