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Regions of the Brain Damaged by High Blood Pressure

High blood pressure is a prevalent condition, affecting about 30% of the global population, with another 30% showing early stages of the disease. Previous research has indicated that high blood pressure can impact cognitive function and cause long-term changes in the brain. However, the exact mechanisms through which high blood pressure damages the brain and the specific regions remain unclear.

A new study utilised MRI of the brain, genetic analyses, and observational data from thousands of patients to investigate the impact of high blood pressure on cognitive function.

The study, led by Professor Tomasz Guzik, used a combination of imaging, genetic, and observational approaches to identify specific regions of the brain that are impacted by high blood pressure, including the putamen and certain white matter areas. These regions are believed to play a role in cognitive functions such as memory, thinking skills, and dementia. The findings were further validated in a group of patients with high blood pressure in Italy, confirming the impact of high blood pressure on these identified brain regions.

The researchers identified nine specific brain regions that showed changes related to higher blood pressure and poorer cognitive function. These regions included the putamen, responsible for regulating movement and influencing learning, and white matter regions such as the anterior thalamic radiation, anterior corona radiata, and anterior limb of the internal capsule, which play a role in executive function, decision-making, and emotional management. The changes observed in these brain regions included reductions in brain volume and surface area, alterations in connections between different brain areas, and changes in measures of brain activity.

The researchers hope their findings will lead to novel treatment approaches for cognitive impairment in individuals with high blood pressure. Further investigation of the genes and proteins in the affected brain regions could enhance understanding of how high blood pressure impacts the brain and causes cognitive issues. Moreover, identifying these specific brain regions may allow for the prediction of faster memory loss and dementia development in the context of high blood pressure, enabling targeted and more intensive therapies for patients at higher risk. This could potentially lead to precision medicine interventions to prevent cognitive decline in those most vulnerable.

Source: ESC

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