

New research may explain the link between hemodialysis and brain function decline

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A new study reveals that hemodialysis may reduce blood flow to the brain in older patients being treated for kidney failure. The findings, which appear in an upcoming issue of the *Journal of the American Society of Nephrology (JASN)*, may help explain why previous studies have found a link between hemodialysis and worsening cognitive function in elderly patients.

More than 2 million people with kidney failure worldwide currently receive treatment with dialysis or a kidney transplant to stay alive, with the majority of patients undergoing hemodialysis. Recent studies have provided increasing evidence that although conventional in-center hemodialysis can prolong lives, it may also have negative effects on the brain that lead to cognitive deficits. Investigators have hypothesized that the repetitive circulatory stress of hemodialysis—which filters a patient's [blood](#) outside the body before returning it—may reduce the blood supply to the brain; however, the mechanisms involved are unclear.

To investigate, Harmke Polinder-Bos, MD (University Medical Center Groningen, in The

Netherlands) and her colleagues studied the effects of conventional hemodialysis on cerebral [blood flow](#) (CBF), measured by special positron emission tomography-computed tomography imaging tests. During single hemodialysis sessions in 12 patients ?65 years of age, 3 scans were performed: before, early after the start of, and at the end of hemodialysis.

From before the start to the end of hemodialysis, CBF declined significantly by 10%, from an average of 34.5-30.5 ml/100 g per minute. CBF decline caused clinical symptoms in 1 patient. Regional CBF declined in all brain regions that were examined, including the frontal, parietal, temporal, and occipital lobes; cerebellum; and thalamus. Hemodialysis treatment-related factors that might relate to CBF decline were a higher body temperature in patients, a greater ultrafiltration volume and ultrafiltration rate during dialysis, and a higher blood pH.

"The findings of this study are an important step in understanding the negative effect of hemodialysis on the [brain](#)," said Dr. Polinder-Bos. "These findings might form a point of departure for further research to develop hemodialysis protocols that minimize or prevent cerebrovascular stress."

In an accompanying perspective article, Dawn F. Wolfgram, MD (Medical College of Wisconsin and Clement Zablocki VA Medical Center) noted that for many patients there may be other options available for treating [kidney failure](#). "Peritoneal dialysis, short frequent home dialysis, and nocturnal dialysis do not cause the significant hemodynamic stress that commonly accompanies conventional hemodialysis," she wrote. "The underutilization of these alternative dialytic techniques in the United States may have allowed the complications of hemodialysis to become more apparent, especially as older and sicker patients begin renal replacement therapy with in- center [hemodialysis](#)."

More information: Harmke A. Polinder-Bos et al, Hemodialysis Induces an Acute Decline in Cerebral Blood Flow in Elderly Patients, *Journal of the American Society of Nephrology* (2018). [DOI: 10.1681/ASN.2017101088](https://doi.org/10.1681/ASN.2017101088)

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