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Non-congenital aortic valve stenosis (AS) is a progressive disease most commonly found in the elderly that results in death if left untreated. Transcather aortic valve replacement (TAVR) has now become a treatment option among these older individuals not considered surgical candidates, and with the aging of the population, more patients will likely be undergoing treatment. With the reduction in mortality after TAVR, the question is how normalization of blood flow across the aortic valve might also benefit the brain. There is converging evidence from our lab and others that high-grade carotid artery stenosis and late-stage congestive heart failure can compromise cerebral auto regulation, resulting in cognitive impairment, and that improving cerebral hemodynamics can improve cognition. To date, however, there has been no direct measurement of the impact of AS on intracerebral hemodynamics. With the increasing recognition that vascular factors play a crucial role in the development of dementia, we propose to assess the potential cerebral hemodynamic and cognitive impact of AS, and we hypothesize that if there is restoration of normal cerebral blood flow after TAVR, then there will be a significant improvement in cognition. The reversibility of impaired cognition would expand consideration of TAVR beyond its systemic benefit. In this pilot project, we propose to recruit 78 TAVR patients from Columbia's Center for Interventional Vascular Therapy and 40 in whom TAVR will be delayed. All subjects will undergo baseline transcranial Doppler using measures of mean cerebral blood flow velocity (mCBFV) and vasomotor reactivity (VMR). There will also be cognitive assessment with a 50-min battery to evaluate processing speed, memory, attention, executive function and memory demonstrated to be most sensitive to the effects of diffuse hypoperfusion. After thirty days, both patients after TAVR and controls will return for follow-up TCD and cognitive testing to ascertain the potential gains of intervention, with an exploratory assessment of quality of life at baseline, 30-days and 90 days. Successful elucidation of the relationship between aortic valve disease and cerebral hemodynamics, in conjunction with the impact on cognition, will provide the impetus to progress to a larger study to determine if we can develop a risk stratification model for TAVR based on neurological and neurocognitive status. With the strong likelihood that TAVR will be extended to intermediate risk patients, they may have an even greater potential for cerebral hemodynamic recovery and cognitive improvement, and prevention of cognitive decline.