

# Rodney D. Raabe, MD

The radiologist who launched Legs For Life explains the benefit of CAS with embolic protection and its impact on treating cognitive decline.



**At the annual meeting of the Society of Interventional Radiology in Toronto, you presented some surprising data from the Carotid Artery Stenting with Protection (CASPR) trial. What can you tell us about your study?** I presented an abstract on carotid artery stenting (CAS) with embolic protection, the CASPR trial, which observed neurocognitive function before and after the procedure at 3 and 6 months, that showed unanticipated neurocognitive improvement.

We know that clamping the aorta in coronary artery bypass causes a shower of emboli in some patients. Particles will break off from the aorta and go up into the brain, and anywhere from 10% to 60% of people will have at least temporary neurocognitive decline. An average of 10% to 20% will have some neurocognitive long-term decline after clamping the aorta from coronary artery bypass, believed to be due to emboli. Our study used the Acculink and AccUNET neuroprotection device (Guidant Corporation, Indianapolis, IN), and we hypothesized that even though we know there are small microemboli by transcranial Doppler, there would not be enough emboli to cause any neurocognitive decline that occurs with coronary artery bypass, either acutely or with time.

Half of our patients were asymptomatic, meaning that they did not have stroke or transient ischemic attack-type symptoms, and the other half had a history of previous stroke or transient ischemic attack. All symptomatic patients had >70% stenosis, and asymptomatic patients had >80% stenosis. Approximately half of our patients had <90% stenosis, and the other half had >90% stenosis.

**What have your interim data revealed?** This is very preliminary data, but so far, 51 patients have entered into the

trial, and 30 have made it to 6 months. At our interim analysis, we were shocked to see 6-month data showing that not only did patients not decline or remain stable, but most improved. The subset of patients who had >90% stenosis all improved. The population of patients who had <90% stenosis were improved, but at this time have not shown statistical significance. Therefore, cognitive improvement may be related to the degree of stenosis.

Previously, physicians had thought that the circle of Willis and other collateral pathways would ensure that people would always have adequate blood flow to the brain, and if they were not symptomatic (no stroke or transient ischemic attack), their cognitive function would be fine. But we found in our study that most of these people improved, specifically in memory and executive functions, such as judgment and reason. Asymptomatic patients improved just as much if not more (although it was not statistically more) as the symptomatic patients. This means that when you have a tight stenosis, even if you are previously considered asymptomatic, you have probably turned off some of your neurocognitive function that returns when blood supply is returned to the brain by CAS. This may be important because right now CMS does not reimburse for “asymptomatic” patients.

**Who should receive screening?** Primary care physicians are not routinely evaluating carotids unless the patient has a bruit or a symptom. We should at least screen people with ultrasound who have a history of vascular disease and are experiencing some neurocognitive decline to see if they have carotid stenosis. In asymptomatic patients, the only symptom they may actually have is a decline in their cognitive function. Therefore, in the future, asymptomatic patients may not be considered asymptomatic.

**Does this happen elsewhere in the body?** Yes. This is just like in the heart when you have significant coronary artery disease, the heart often does not pump as well. Even though you may not have chest pain or a myocardial infarction, your heart may have a lower ejection fraction, so it is not functioning as well. The heart functions better when you restore blood flow. The same thing happens in the leg when you have narrowing of the arteries to the leg, you don't always have gangrene, but your legs may hurt or you do not walk as well. This improves when you

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restore blood flow. When you have carotid stenosis, however, the brain does not hurt, it just slows down or shuts off some of its neurocognitive function. We have shown that you can return this function by restoring blood flow with CAS.

**Will this change the way cognitive decline is diagnosed and treated?** It may. Some of our patients were in nursing homes and afterward were able to go home. Some were even able to return to work. Potentially, if this study is corroborated by other trials, CAS with embolic protection is potentially one way to treat early neurocognitive decline for those patients with carotid stenosis only. Although the results are very preliminary and need validation, this may change the way we look at neurovascular stenotic disease.

**Are other trials being planned that may validate your findings with CASPR?** Yes, the TACIT trial, which is an international European and American study will randomize CAS, carotid endarterectomy (CEA), and medical therapy. This trial will have a large substudy that will look at neurocognitive function in all three groups of patients. Some studies are showing that stenting and endarterectomy have the same stroke rate. They may just have different myocardial infarction rates or other complications such as in the high-risk population (as seen in SAPHIRE). But we may find that the neurocognitive benefit will be greater in one population or the other.

**CASPR investigated neurocognitive changes with CAS. Have these changes been evaluated with CEA before?** Yes, this was looked at 10 years ago. A meta-analysis was performed that showed that improvement could not be confirmed. It is possible that general anesthesia and clamping of the carotid artery in CEA may counterbalance improvements seen with improved bloodflow. Or it may be that with modern surgical techniques we find that patients with CEA actually have improved neurocognitive function. The TACIT study, I think, will really answer this question because they have a large enough population to adequately observe the CAS, CEA, and the medical treatment populations. The goal of treatment may not be just prevention of stroke, but also improvement in cognitive function.

**As originator of Legs For Life, a nationwide initiative to screen for Peripheral Vascular Disease (PVD), can you comment on its progress?** I started doing peripheral vascular screening in my hometown, Spokane,

Washington, at Sacred Heart Medical Center in 1994. I did that for about 3 to 4 years and found a quarter of the patients who came in for screening had significant previously undiagnosed vascular disease. We screened people if they experienced walking leg pain and had not had a previous diagnosis. Most of the people who were diagnosed were unaware that they had vascular disease and thought their pain was part of getting older. We now know that PVD is the most significant marker for coronary artery disease and cerebrovascular disease, and people should be aware that pain in the leg may put them at risk for this larger problem.

In 1998, I presented this program to SIR, which created a national screening program called Legs For Life. The program was designed to be a collaborative effort between interventional radiologists, surgeons, cardiologists, vascular medicine specialists, and primary care physicians. Today, the whole idea of patient education and screening at a national level has become something that is considered part of what we should do as a community of vascular specialists. The screening program also now includes evaluation for abdominal aortic aneurysms, carotid vascular disease, and peripheral venous disease.

**How has your practice at Spokane Sacred Heart Medical Center evolved?** Through the Legs For Life program, we developed a great relationship with the vascular surgeons in our community. As a result of collaboration, 6 years ago, our radiology group merged with the vascular surgery group in Spokane. Today, this group has more than 50 radiologists and five vascular surgeons. We are totally merged, and are the same economic entity, which we call Inland Vascular Institute. We wanted to offer patients the full spectrum of endovascular treatment and surgical treatment, without having economics as an issue.

I love my surgical colleagues. I have learned so much from them, and I think they will say the same thing. We have a very vibrant vascular practice doing endografts, carotid stenting, and many other vascular procedures. Our patients in the community benefit from the collaboration we have in our clinics, interventional labs, and surgical suites.

**Do you think other vascular practices in the US would benefit from your method of collaboration?** This model has worked very well in our community, and we are now involved in collaboration projects with cardiologists. Different specialties and groups in other communities will need to look for ways to collaborate. All politics are local, and I think that medical politics are extremely local. ■