Carotid Artery Stenting

Carotid artery stenting (CAS) is a procedure in which a stent is inserted into a diseased artery supplying blood flow to the brain to reduce risk of stroke.

Carotid Artery Stenosis

The carotid arteries are located on each side of the neck and carry blood and oxygen to the brain. Over time, these arteries may become diseased with atherosclerosis, and plaque can build up on the inside, leading to narrowing of the vessels (carotid artery stenosis). Risk factors for carotid artery stenosis include age, smoking, diabetes, high cholesterol, and high blood pressure, among others.

Most patients with carotid artery stenosis never have symptoms, but some may be at risk of stroke. The diagnosis of carotid artery stenosis is made with ultrasound, but sometimes computed tomography (CT) or magnetic resonance imaging (MRI) angiography is needed to see the anatomy of the blood vessels. Patients with 50% stenosis of the artery and symptoms or patients with no symptoms but 70% stenosis may be considered for surgery. The risks and benefits of surgery should be discussed with a clinician, as not every patient benefits from surgery.

What Is Carotid Artery Stenting?

Carotid artery stenosis is usually treated with carotid endarterectomy, an operation that allows the plaque to be physically removed from the artery. However, if someone has had previous surgery or radiation on the neck or has severe cardiac or pulmonary disease, or if the plaque is in a difficult place, surgery may not be feasible or safe. In these cases, endovascular CAS may be used. A stent is a hollow tube that covers the walls of a blood vessel but allows blood to flow through. In an endovascular procedure, access to the inside of the blood vessel is obtained using long wires and catheters placed through an artery elsewhere in the body (usually in the groin). Patients are often awake but sedated during the procedure, similar to a colonoscopy.

A small filter basket is inserted past the diseased area to catch any plaque that might be broken off during the procedure to minimize risk of stroke. Then a stent is placed through the area where the plaque is to open the artery. The filter that has any dislodged pieces of plaque is then removed.

Carotid artery stenting has a higher risk of stroke than surgery. A newer procedure called trans-carotid artery revascularization (TCAR) has shown some promise in reducing strokes. During TCAR, a small incision is made in the neck to access the carotid artery directly. A device is connected to the blood vessel to reverse blood flow during the procedure so any debris or fragments of plaque are carried away from the brain rather than toward it. A stent is then placed in the carotid artery, and the flow reversal device is removed. The risk of stroke with TCAR is similar to that of open surgery (approximately 2%) but lower than with CAS (approximately 4%).

Special Considerations

Patients who undergo CAS are monitored in the hospital overnight to make sure that their heart rate and blood pressure are normal and there is no bleeding or sign of stroke. After going home, patients often need to take medications such as aspirin and clopidogrel to prevent a blockage of the stent.

FOR MORE INFORMATION

A JAMA Patient Page on testing for carotid stenosis was published in the January 13, 2015, issue of JAMA.