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Interventional Radiology Offers Major Advances in Stroke Prevention and Treatment

Vascular Experts Treat Blocked Carotid Arteries Without Surgery to Prevent Stroke

Stroke occurs when a blood vessel carrying oxygen and nutrients to the brain is blocked by a clot or bursts, causing the brain to starve. If deprived of oxygen for even a short period of time, the brain nerve cells will start to die. Strokes caused by blood clots that block the artery, ischemic (is-KEM-ik) strokes, are the most common type, accounting for between 70-80 percent of all strokes.¹ When a blood vessel ruptures, it causes a bleeding or hemorrhagic (hem-o-RAJ-ik) stroke.¹ Once the brain cells die from a lack of oxygen, the part of the body that section of the brain controls is affected through paralysis, language, motor skills or vision.¹

Prevention and Carotid Stenting

As vascular experts, interventional radiologists treat atherosclerosis, “hardening of the arteries,” throughout the body. In some patients, atherosclerosis, specifically in the carotid artery in the neck, can lead to ischemic stroke. Plaque in the carotid artery may result in a stroke by either decreasing blood flow to the brain or by breaking loose and floating into a smaller vessel, depriving a portion of the brain of blood flow. In patients at high risk of having a stroke, the narrowed section of artery may be reopened by an interventional radiologist through angioplasty and reinforced with a stent, thereby preventing the stroke from occurring. Vascular stents are typically made of woven, laser-cut or welded metal that permits the device to be compressed onto a catheter and delivered directly into the hardened artery. In addition to diagnosing and treating those at risk for stroke, interventional radiologists use their expertise in imaging, angioplasty and stenting to treat those having an acute stroke.

Treatment

Interventional radiologists are a critical part of the stroke team in hospitals. In treating stroke patients, first it must be determined what kind of a stroke the patient has had so the proper treatment can be given. The interventional radiologist interprets non-contrast CT (computed tomography) imaging to determine whether acute stroke patients are candidates for clot-busting drugs. CT is quick, inexpensive and readily available. If the stroke is due to a blood clot, a clot-busting drug, tPA (tissue plasminogen activator), can be given intravenously if the patient is treated within three hours of the onset of symptoms. Currently, most patients arrive at the hospital too late, or make it through the emergency room, hospital processing and differential diagnosis too late to receive this standard treatment.

However, interventional radiologists that specialize in neurological procedures are trained to thread a catheter to the tiny arteries in the brain to place the clot-busting drug directly on the clot or to break up the clot mechanically. When given locally this way, the tPA can be administered up to *six hours* after the onset of stroke symptoms. In many cases, the ambulance drivers will take a stroke victim past the three-hour window directly to the interventional radiology suite for assessment for this direct thrombolytic therapy. Often a significantly disabled stroke patient who receives this treatment can return to normal life with minimal or no aftereffects from the stroke.

The interventional radiologist will also assess what caused the clot, such as a clogged carotid or other artery, and can correct the underlying problem to prevent future strokes from occurring. Unfortunately, many hospitals in this country do not have stroke teams that can rapidly assess patients and provide treatment within the three-hour window. Interventional radiologists are actively involved in creating more stroke teams across the country. Stroke teams generally consist of emergency room physicians, neurologists and interventional radiologists.

Interventional neuroradiologists can also treat ruptured aneurysms inside the brain that are causing hemorrhage into the subarachnoid space, which can cause stroke or death. One recent study in the *Lancet* showed that the minimally invasive interventional technique substantially reduced the relative and absolute risk of subsequent severe disability or death compared to surgical repair, in those patients who were candidates for both procedures.² The interventional neuroradiologist releases tiny coils at the site of the ruptured aneurysm to provide mechanical occlusion of the blood flow. The catheter is withdrawn and the coils remain to provide the occlusion. Surgery had been the primary treatment available until the platinum coil device was approved by the FDA in 1995.

Prevalence

- Stroke is third leading cause of death in United States, behind high blood pressure and cancer
- Every 45 seconds someone in the United States has a stroke
- Every three minutes someone dies from a stroke

Facts

- Nearly half of all stroke fatalities occur before emergency medical personnel arrive.
- 1.1 million Americans live with disabilities caused by a stroke.
- 600,000 Americans will have a new or recurrent stroke each year—of these, 160,000 will die.¹
- Stroke is a medical emergency with a narrow time frame for treatment—people should call 911 immediately.
- Strokes can be treated intravenously with the clot-busting drug, tPA (tissue plasminogen activator), if it is given within three hours of the onset of symptoms.
- Persons who have a transient ischemic attack (TIA), also known as a mini-stroke, are likely to have another one. Transient ischemic attacks cause brief stroke symptoms that go away. People often ignore these symptoms, but they are an early warning sign and 35 percent of those who experience a TIA will have a full-blown stroke if left untreated.

- Stroke is not just an older person's disease—28 percent of strokes occur in people under age of 65.¹
- More men than women have strokes—although more women die from them.
- African Americans are at much higher risk for stroke. In part, this is because African Americans are at increased risk for obesity, high blood pressure and diabetes, which increase the risk of stroke.¹
- May is Stroke Awareness Month.

Stroke Symptoms

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden severe headache with no known cause

Risk Factors

- Obesity, high blood pressure and high cholesterol all increase the risk of stroke. These risk factors can be greatly reduced with healthy lifestyles or medication.
- High blood pressure puts pressure on the arteries, making them more susceptible to rupture and more prone to clot formation, which can block the artery.
- High cholesterol can lead to blockage in the carotid artery that takes blood from the neck to the brain. A piece of this plaque can break off and travel to the brain, causing a stroke.
- Obesity can cause high blood pressure and high cholesterol.
- Untreated atrial fibrillation causes the heart's upper chamber to beat irregularly, which allows the blood pool and clot. If a clot breaks off and enters the blood stream to the brain, a stroke will occur.¹
- Sickle cell anemia makes red blood cells less able to carry blood to the body's tissues and organ, as well as stick to the walls of the blood vessels. These cells can block arteries to the brain, causing a stroke.¹
- Family history
- Smoking

National Efforts to Improve Stroke Response Times

Interventional radiologists are playing vital leadership roles in improving stroke diagnosis and treatment nationwide. SIR, along with other members of the STOP Stroke Coalition, is working with Congress to introduce legislation that would improve stroke care and access to reduce death and disability from our nation's third largest killer.

About Interventional Radiologists

Interventional radiologists are doctors who specialize in minimally invasive, targeted treatments that have less risk, less pain and less recovery time compared to open surgery. They use their expertise in interpreting X-rays, ultrasound, MRI and other diagnostic imaging studies to understand, visualize and diagnose the full scope of the disease's pathology and to map out the procedure tailored to the individual patient. Then during the procedure, they image as they go to guide tiny instruments, such as catheters, through blood vessels or skin, to treat diseases at the site of the illness nonsurgically.

Interventional radiology is a recognized medical specialty by the American Board of Medical Specialties. Interventional radiologists complete preliminary training in Diagnostic Radiology and advanced training in Vascular and Interventional Radiology. The American Board of Radiology certifies their specialized training.

For Further Information

For more information on stroke or interventional radiology, visit the SIR Web site at www.SIRweb.org.

References

1. American Heart Association. Have You Heard the Latest.
2. Higashida R, Dion J. Interventional treatment and management of ischemic stroke. *JVIR* 2004; 15 (suppl):1, part 2.
3. Molyneux, et al. International subarachnoid aneurysm trial (ISAT) of neurosurgical clipping versus endovascular coiling in 2143 patients with ruptured intracranial aneurysms: a randomised trial. *Lancet* 2002; 10:360.