

At the Petznick Stroke Center at Barrow Neurological Institute, we offer a variety of cerebrovascular tests. These tests allow us to diagnose and monitor conditions affecting the blood vessels inside and around the brain.

Diagnostic Transcranial Doppler Ultrasound (TCD)

Transcranial Doppler ultrasound (TCD) uses soundwaves to evaluate blood flow in the Circle of Willis, an important junction of blood vessels at the base of the brain. The real-time information provided by TCD can be used in the diagnosis and monitoring of a variety of vascular conditions. These include:

- Intracranial stenosis, the narrowing of blood vessels due to a buildup of fatty deposits
- Ischemic strokes and transient ischemic attacks (TIAs), which are caused by blockages
- Hemorrhagic strokes, resulting from ruptured blood vessels

TCD is used extensively in the management of patients following hemorrhagic strokes due to its ability to detect vasospasm. This sudden narrowing of blood vessels is a common complication of subarachnoid hemorrhage (SAH) and can cause a secondary stroke. SAH describes bleeding that occurs between the brain and the thin tissues that cover it.

Diagnostic TCD is also used in the assessment of sickle cell disease, in which misshapen red blood cells can get stuck in blood vessels and cause strokes.

Cerebrovascular Duplex Evaluation (CVE)

A cerebrovascular duplex evaluation (CVE) is a detailed, two-part exam that provides real-time information about blood flow in the head and neck. First, it uses duplex ultrasound (a combination of traditional 2D ultrasound with Doppler interrogation) to access all arteries outside the skull that carry blood from the heart to the brain. Then, TCDI (transcranial Doppler imaging) is used to access the major arteries within the skull.

A CVE provides a noninvasive way to document and monitor disease or abnormalities. It is used to assess many medical conditions, including TIA/stroke,

cerebrovascular disease, syncope, dizziness, atypical headaches/migraines, visual defects, and single-sided weakness/numbness.

Embolic Detection Monitoring (EMB)

Embolic detection monitoring (EMB) is a technique of transcranial Doppler ultrasound used to detect even the smallest of emboli—objects that travel through the bloodstream and block vessels. These objects include blood clots, fatty deposits called plaques, and air bubbles.

Right-to-Left Atrial/Pulmonary Shunt Evaluation with Transcranial Doppler (PFO-TCD)

Right-to-left atrial/pulmonary shunt evaluation with transcranial Doppler (PFO-TCD) is the most sensitive noninvasive method for evaluating patent foramen ovale (PFO). PFO is a hole in the heart that doesn't close properly after birth and can be a risk factor for stroke. PFO-TCD can help assess the risk the hole poses to a patient and determine if a procedure to close the hole is justified.

Vasomotor Reactivity Testing

Vasomotor reactivity testing uses transcranial Doppler ultrasound to measure changes in blood flow in response to changes in carbon dioxide levels. This can help determine if chronic blood vessel narrowing is causing dangerously low blood flow in the brain.

Head-Turn Syncope/Positional Evaluation

Head-turn syncope/positional testing uses imaging and nonimaging transcranial Doppler to evaluate changes in blood flow caused by compressed arteries or changes in body position. It has traditionally been used in patients with vertebral artery disease, but it has also proven to be a valuable tool for evaluating decreased cardiac output, increased pressure within the skull, and positional issues.