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Scheduled on: (DATE) _____ @ (TIME) _____

Transcranial Doppler (TCD)

A Transcranial Doppler (TCD) is a noninvasive method of analyzing blood flow in the brain.

The blood that flows through the brain distributes nutrients to the brain and removes wastes. This flow maintains the high rate of metabolism necessary for the brain to function. Restrictions in blood flow may occur from vessel narrowing (stenosis), clot formation (thrombosis), blockage ([embolism](#)), or blood vessel rupture (hemorrhage). Lack of sufficient blood flow ([ischemia](#)) threatens brain tissue and may cause a [stroke](#).

The flow of blood through the arteries in the brain can be analyzed using Transcranial Doppler Ultrasonography (TCD). TCD is a form of ultrasound, in which high frequency sound waves bounce off or pass through body tissues. While most other types of Ultrasonography create images of the tissue being studied, the results of TCD are audible sounds that the Technician listens to and records.

Doppler Ultrasonography uses what is called the Doppler Effect to measure the rate and direction of blood flow in the vessels. Just as a siren's pitch sounds higher when its source is moving toward you and lower as it moves away, so will ultrasound waves change pitch, or frequency, as they bounce off the red blood cells moving in the blood. It is these pitch changes that produce the audible sounds during exam.

Changes in frequency can be used to measure both the direction and the speed of blood flow. Faster blood flow causes a greater change in frequency. Combined with other tests, this information can be used to locate restrictions in the blood vessels in the brain, and to track changes in blood flow over time. In this way, TCD gives valuable information about the site of a stroke and the patient's progress after a stroke. TCD is also used to evaluate the contraction of blood vessels that can occur if a blood vessel ruptures.

Preparation

Please arrive 15 minutes before your appointment time. If you are more than 10 minutes late you will be rescheduled.

The patient should remove contact lenses; avoid the use of eye makeup, and all facial make-up. If you have long hair, please adjust hair above neck.

What to expect

TCD is done with either one or two probes placed against the skin. The Technician spreads a clear gel on the areas of the head where the probe will be placed. Usually, the probes are placed on the temple, on the base of the skull at the back of the neck, and over the closed eyelid. In these places, there is the least amount of thick protective bone and the sound waves can penetrate the best. The Technician adjusts the probe position and orientation to direct the sound waves toward the blood vessels of interest. Finding the best approach may take some time. A compression test may be performed during the exam. In this test, the main artery in the neck (carotid artery) is briefly compressed, and changes in blood flow patterns are observed. A full TCD exam may last 30-45 minutes and often longer in patients with disease. Ultrasonography procedures are safe, noninvasive, and painless. No special precautions are necessary.

Aftercare

The gel is washed off with soap and water. No other after care is needed. Results are usually available in one week. You must schedule a follow-up appointment for test results.