

MEDICAL POLICY

MEDICAL POLICY DETAILS	
Medical Policy Title	Transcranial Doppler Ultrasound
Policy Number	6.01.18
Category	Technology Assessment
Original Effective Date	09/16/99
Committee Approval Date	07/22/00, 09/19/01, 10/16/02
Current Effective Date	12/22/22
Archived Date	10/15/03
Archive Review Date	11/10/05, 11/16/06, 12/20/07, 12/18/08, 12/17/09, 12/16/10, 12/15/11, 12/20/12, 12/19/13, 11/20/14, 12/17/15, 11/17/16, 12/21/17, 12/20/18, 12/19/19, 12/17/20, 12/16/21, 12/22/22
Product Disclaimer	<ul style="list-style-type: none"> • If a product excludes coverage for a service, it is not covered, and medical policy criteria do not apply. • If a commercial product (including an Essential Plan or Child Health Plus product), medical policy criteria apply to the benefit. • If a Medicaid product covers a specific service, and there are no New York State Medicaid guidelines (eMedNY) criteria, medical policy criteria apply to the benefit. • If a Medicare product (including Medicare HMO-Dual Special Needs Program (DSNP) product) covers a specific service, and there is no national or local Medicare coverage decision for the service, medical policy criteria apply to the benefit. • If a Medicare HMO-Dual Special Needs Program (DSNP) product DOES NOT cover a specific service, please refer to the Medicaid Product coverage line.

POLICY STATEMENT

- I. Based upon our criteria and assessment of the peer-reviewed literature, Transcranial Doppler (TCD) ultrasound has been medically proven to be effective and, therefore, is considered **medically appropriate** for the following indications:
- Arteriovenous malformations - detection and assessment of the circulatory patterns of arteriovenous malformations;
 - Brain death - assessing cerebral circulatory arrest as a measure of brain death;
 - Carotid endarterectomy - assessing initial collateral blood flow and immobilization during carotid endarterectomy, to detect severe ischemia so that a shunt can be placed to reduce stroke;
 - Intracranial artery stenosis and occlusion - assessment of patients suspected of having stenosis or occlusion of the intracranial arteries due to a cerebral infarction (stroke) or transient ischemic attack (TIA) of diverse causes;
 - Transient ischemic attack (TIA)/cerebral infarction risk in Sickle Cell Disease - as a tool to determine risk for TIAs or cerebral infarctions in patients with sickle cell disease; or
 - Vasospasm/vasoconstriction - evaluating patients with vasospasm or vasoconstriction of any cause, especially in patients with subarachnoid hemorrhage.
- II. Based upon our criteria and assessment of the peer-reviewed literature, TCD has not been medically proven to be effective and, therefore, is considered **investigational** for:
- Behavioral or developmental disorders - monitoring vasodilator therapy as a treatment of behavioral or developmental disorders, including, but not limited to, attention deficit hyperactivity disorder (ADHD), autism, or Tourette's syndrome;

Medical Policy: TRANSCRANIAL DOPPLER ULTRASOUND

Policy Number: 6.01.18

Page: 2 of 5

- B. Cardiopulmonary bypass surgery - assessing the adequacy of cerebral blood flow and embolic events during cardiopulmonary bypass surgery;
- C. Central nervous system infections - evaluating blood flow patterns in central nervous system infections;
- D. Cerebral flow - evaluating cerebral blood flow after trauma;
- E. Dementia - evaluating dementia;
- F. Extracranial vascular atherosclerosis - evaluating the hemodynamic significance of extracranial vascular atherosclerosis;
- G. Glaucoma - assessing glaucoma;
- H. Headaches - assessing migraine and tension headaches;
- I. Hydrocephalus - assessing hydrocephalus;
- J. Intracranial aneurysms - detection of intracranial aneurysms;
- K. Ischemic stroke - improving the thromboembolic efficacy of recombinant tissue plasminogen activator (rtPA) for treatment of peripheral arterial thrombosis; and
- L. All other indications not identified in Policy Statement I.

Refer to Corporate Medical Policy #11.01.03 Experimental and Investigational Services.

DESCRIPTION

Transcranial Doppler (TCD) is an ultrasound technology that measures physiological parameters of blood flow in the major intracranial arteries. TCD uses a pulsed Doppler system with low frequencies that enables the recording of blood velocities from intracranial arteries through selected cranial foramina and thin regions of the skull. It is a non-invasive test. Advantages of TCD include the ability to perform bedside studies, ease of use in serial studies, “real-time” assessment, ability to detect flow direction (not well seen by computed tomography (CT) or MR (magnetic resonance) angiography), minimal patient risk (no contrast, radiation, invasive component), and its use as an option for people with contraindications for conventional cerebral angiography or CT angiography (dye allergy, metal artifacts in the head), or MRI (claustrophobia, pacemakers, other metal artifacts).

RATIONALE

The FDA has approved several versions of TCD systems. Although this technology has been considered as an alternative to cerebral angiography, MRI, and MRA, published clinical evidence does not support its efficacy for the indications listed as investigational in this policy. Literature remains promising for the use of TCD in assessing the adequacy of cerebral blood flow and embolic events during cardiopulmonary bypass surgery. Clinical studies do not support that the use of TCD for the assessment of migraine or tension headaches improves health outcomes. There is a lack of sufficient scientific evidence that TCD improves health outcomes as a technique to monitor vasodilator therapy in patients with developmental or behavioral disorders. It has been hypothesized that these disorders are related to cerebral vasospasm, which can be relieved by vasodilator therapy. There is a lack of clinical evidence to support that TCD improves the thromboembolic efficacy of recombinant tissue plasminogen activator (rtPA) for treatment of peripheral arterial thrombosis in ischemic stroke. An in vitro study using a human stroke model concluded that combined treatment of clots with rtPA and pulsed-wave Doppler, through temporal bone 1.91 mm thickness, did not significantly enhance thrombolysis over rtPA alone.

CODES

- *Eligibility for reimbursement is based upon the benefits set forth in the member’s subscriber contract.*
- *CODES MAY NOT BE COVERED UNDER ALL CIRCUMSTANCES. PLEASE READ THE POLICY AND GUIDELINES STATEMENTS CAREFULLY.*
- *Codes may not be all inclusive as the AMA and CMS code updates may occur more frequently than policy updates.*

Medical Policy: TRANSCRANIAL DOPPLER ULTRASOUND**Policy Number: 6.01.18****Page: 3 of 5****CPT Codes**

Code	Description
93886	Transcranial Doppler study of the intracranial arteries; complete study
93888	limited study
93890	vasoreactivity study
93892	emboli detection without intravenous microbubble injection
93893	emboli detection with intravenous microbubble injection

*Copyright © 2022 American Medical Association, Chicago, IL***HCPCS Codes**

Code	Description
No code (s)	

ICD10 Codes

Code	Description
D57.00-D57.219	Sickle-cell disease with or without crisis (code range)
D57.80-D57.819	Other sickle-cell disorders with or without crisis (code range)
G45.0-G45.9	Transient cerebral ischemic attacks and related syndromes (code range)
G46.0-G46.2	Vascular syndromes of brain in cerebrovascular diseases (code range)
G93.0-G93.3	Other disorders of brain (code range)
G93.40-G93.49	Other and unspecified encephalopathy (code range)
G93.81-G93.9	Other specified disorders and unspecified disorder of brain (code range)
H34.00-H34.9	Retinal vascular occlusions (code range)
H53.2	Diplopia
I60.00-I60.9	Nontraumatic subarachnoid hemorrhage (code range)
I63.00-I63.9	Cerebral infarction (code range)
I65.01-I66.9	Occlusion and stenosis of precerebral or cerebral arteries, not resulting in cerebral infarction (code range)
I67.2	Cerebral atherosclerosis
I67.84-I67.848	Cerebral vasospasm and vasoconstriction (code range)
Q28.2-Q28.3	Arteriovenous malformation and other malformations of cerebral vessels (code range)
S01.90xA	Unspecified open wound of unspecified part of head, initial encounter
S06.1x0A- S06.1x9A (only A encounters)	Traumatic cerebral edema with or without loss of consciousness (code range)

Medical Policy: TRANSCRANIAL DOPPLER ULTRASOUND

Policy Number: 6.01.18

Page: 4 of 5

Code	Description
S06.340A- S06.369A (only A encounters)	Traumatic hemorrhage of cerebrum with or without loss of consciousness (code range)
S06.6x0A- S06.6x9A (only A encounters)	Traumatic subarachnoid hemorrhage with or without loss of consciousness (code range)

REFERENCES

- *Arenillas JF, et al. Progression and clinical recurrence of symptomatic middle cerebral artery stenosis; a long-term follow-up of transcranial Doppler ultrasound study. Stroke 2001 Dec 1;32(12):2898-904.
- *de Oliveira RS, Machado HR. Transcranial color-coded Doppler ultrasonography for evaluation of children with hydrocephalus. Neurosurg Focus 2003 Oct 15;15(4):ECP3.
- *Hennerici MG, et al. Cerebral embolism and Doppler ultrasound. Cerebrovasc Dis 1999 May-Jun;9(3):188-92.
- Kang D, et al. Can transcranial Doppler ultrasound be used for screening cerebral small vessel diseases in the community? Journal of the Neurological Sciences 2019 Aug;406:116439.
- *Lee JD, et al. Benefits of off-pump bypass on neurologic and clinical morbidity: a prospective randomized trial. Ann Thorac Surg 2003 Jul;76(1):18-25.
- *Ringelstein EB, et al. Consensus on microembolus detection by TCD. International consensus group on microembolus detection. Stroke 1998 Mar;29(3):725-9.
- *Rosengarten B, et al. Cerebrovascular reactivity in adolescents with migraine and tension-type headache during headache-free interval and attack. Headache 2003 May;43(5):458-63.
- Razumovsky AY, et al. ASNM and ASN joint guidelines for transcranial doppler ultrasonic monitoring: an update. J Neuroimaging 2022;32:781-797.
- *Sloan MA, et al. Assessment: transcranial Doppler ultrasonography. Report of the therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology 2004 May 11;62(9):1468-81.
- Soh S, et al. Preoperative transcranial Doppler and cerebral oximetry as predictors of delirium following valvular heart surgery: a case-control study. Journal of Clinical Monitoring and Computing. 2020;34:715-723.
- *Van Zuilen EV, et al. The clinical relevance of cerebral microemboli detection by transcranial Doppler ultrasound. J Neuroimag 1998 Jan;8(1):32-7.
- *Wardlaw JM, et al. Does the size of intracranial aneurysms change with intracranial pressure? Observations based on color "power" transcranial Doppler ultrasound. J Neurosurg 1998 May;88(5):846-50.
- *Watters MP, et al. Reduced cerebral embolic signals in beating heart coronary surgery detected by transcranial Doppler ultrasound. Br J Anaesth 2000 May;84(5):549-51.
- *Key Article

KEY WORDS

Sickle cell anemia, Transcranial Doppler, Ultrasonography

Medical Policy: TRANSCRANIAL DOPPLER ULTRASOUND

Policy Number: 6.01.18

Page: 5 of 5

CMS COVERAGE FOR MEDICARE PRODUCT MEMBERS

Based upon review, there is currently a Local Coverage Determination (LCD) for Non-Invasive Vascular Studies. Please refer to the following LCD website for Medicare Members: