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Subject: Transcranial Doppler Studies

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DESCRIPTION:

Transcranial Doppler ultrasound is a non-invasive ultrasound for measuring blood flow within the arteries of the brain and evaluation of vascular blood flow in relation to blockage in the head and neck.

Summary and Analysis of Evidence: Rasulo et al. (2019) Transcranial Doppler is a bedside procedure that measures linear cerebral blood flow velocity (CBFV) and the pulsatility index through the intracranial circulation. Transcranial color-coded duplex Doppler (TCCD) provides both CBFV and B-mode functions. In this review they are both referred to as brain ultrasound TCCD. Brain ultrasound can be applied in various environments, including out-of-hospital, emergency room, surgery, intensive care, and ward settings. The most common neurologic disease processes evaluated with TCCD are subarachnoid hemorrhage, traumatic brain injury, and ischemic and hemorrhagic stroke. Also, TCCD is used outside the neuroenvironment for diseases such as sickle cell anemia or for cerebral hemodynamic assessment during the cardiovascular perioperative period. In these applications, TCCD can be used for the detection of cerebral vessel occlusion, estimation of cerebrovascular reactivity, right-to-left cardiac shunts, noninvasive estimation of cerebral perfusion and intracranial pressure, optic nerve sheath diameter, midline shift, hydrocephalus, and the presence of foreign objects. TCCD has a high accuracy in confirming total cerebral circulatory arrest and has been used as an ancillary test to support clinical diagnosis of brain death. Other indications for TCCD include assessment of collateral blood flow and embolization during carotid endarterectomy, assessment of patterns and extent of collateral circulation in severe stenosis or occlusion, assessment of patent foramen ovale/paradoxical embolism, assessment of arteriovenous malformations and studying their supply arteries and flow patterns, assessment of noncardiac right-to-left shunts, assessment of severe stenosis in the arteries of the circle of Willis, and assessment of vertebral artery dissection.

Kulkarni, Sharma (2016) Transcranial Doppler (TCD) is the only noninvasive modality for the assessment of real-time cerebral blood flow. It complements various anatomic imaging modalities by providing physiological-flow related information. It is relatively cheap, easily available, and can be performed at the bedside. It has been suggested as an essential component of a comprehensive stroke centre. In addition to its importance in acute cerebrovascular ischemia, its role is expanding in the evaluation of cerebral hemodynamics in various disorders of the brain. The "established" clinical indications for the use of TCD include cerebral ischemia, sickle cell disease, detection of right-to-left shunts, subarachnoid hemorrhage, periprocedural or surgical monitoring, and brain death.

POSITION STATEMENT:

Transcranial Doppler studies **meet the definition of medical necessity** when performed for **ANY** of the following conditions:

- Monitoring for vasospasm in association with subarachnoid hemorrhage
- Intraoperative use during carotid endarterectomy for assessing collateral perfusion and embolization
- Assessment of members suspected of having steno-occlusive disease of the intracranial arteries
- As a tool to determine risk for transient ischemic attacks (TIA) or cardiovascular accidents (CVA) in members with sickle cell disease
- Evaluation of very low birth weight preterm infants with gestational age less than 30 weeks.

Transcranial Doppler studies are considered **experimental or investigational**. The evidence is insufficient to determine the effects of the technology on health outcomes.

- Evaluation of the hemodynamic significance of extracranial vascular atherosclerosis
- Evaluation of cerebral blood flow following trauma
- Assessment of cerebral circulatory arrest as a measure of brain death
- Assessment of migraine and tension headaches
- Assessment of the adequacy of cerebral blood flow and embolic events during cardiopulmonary bypass surgery
- Evaluation of blood flow patterns in central nervous system infections
- Evaluation of dementia
- Evaluation of glaucoma
- Assessment of hydrocephalus
- Monitoring cerebral vascular resistance and the effects of vasodilators and other drugs in the treatment of stroke and other brain damage.

BILLING/CODING INFORMATION:

CPT Coding:

93886	Transcranial Doppler study of the intracranial arteries; complete study
93888	Transcranial Doppler study of the intracranial arteries; limited study

93892	Transcranial Doppler study of the intracranial arteries; emboli detection without intravenous microbubble injection
93893	Transcranial Doppler study of the intracranial arteries; venous-arterial shunt detection with intravenous microbubble injection

ICD-10 Diagnosis Codes That Support Medical Necessity:

D57.00 – D57.02	Hb-SS disease with crisis
D57.1	Sickle-cell disease without crisis
D57.20	Sickle-cell/Hb-C disease without crisis
D57.211 – D57.219	Sickle-cell/Hb-C disease with crisis
D57.80	Other sickle-cell disorders without crisis
D57.811 – D57.819	Other sickle-cell disorders with crisis
G45.0	Vertebro-basilar artery syndrome
G93.9	Disorder of brain, unspecified
G93.81– G93.89	Other specified disorders of brain
I60.00 – I60.02	Nontraumatic subarachnoid hemorrhage from carotid siphon and bifurcation
I60.10 – I60.12	Nontraumatic subarachnoid hemorrhage from middle cerebral artery
I60.2	Nontraumatic subarachnoid hemorrhage from anterior communicating artery
I60.30 – I60.32	Nontraumatic subarachnoid hemorrhage from posterior communicating artery
I60.4	Nontraumatic subarachnoid hemorrhage from basilar artery
I60.50 – I60.52	Nontraumatic subarachnoid hemorrhage from vertebral artery
I60.6	Nontraumatic subarachnoid hemorrhage from other intracranial arteries
I60.7	Nontraumatic subarachnoid hemorrhage from unspecified intracranial artery
I60.8	Other nontraumatic subarachnoid hemorrhage
I60.9	Nontraumatic subarachnoid hemorrhage, unspecified
163.011 – I63.019	Cerebral infarction due to thrombosis of vertebral artery
I63.02	Cerebral infarction due to thrombosis of basilar artery
I63.031 – I63.039	Cerebral infarction due to thrombosis of carotid artery
I63.09	Cerebral infarction due to thrombosis of other precerebral artery
I63.10	Cerebral infarction due to embolism of unspecified precerebral artery
I63.111 – I63.119	Cerebral infarction due to embolism of vertebral artery
I63.12	Cerebral infarction due to embolism of basilar artery
I63.131 – I63.139	Cerebral infarction due to embolism of carotid artery
I63.211 – I63.219	Cerebral infarction due to unspecified occlusion or stenosis of unspecified vertebral arteries
I63.22	Cerebral infarction due to unspecified occlusion or stenosis of basilar arteries
I63.231 – I63.239	Cerebral infarction due to unspecified occlusion or stenosis of unspecified carotid arteries
I63.30	Cerebral infarction due to thrombosis of unspecified cerebral artery
I63.311 – I63.319	Cerebral infarction due to thrombosis of middle cerebral artery
I63.321 – I63.329	Cerebral infarction due to thrombosis of anterior cerebral artery
I63.331 – I63.339	Cerebral infarction due to thrombosis of posterior cerebral artery
I63.341 – I63.349	Cerebral infarction due to thrombosis of cerebellar artery

I63.39	Cerebral infarction due to thrombosis of other cerebral artery
I63.40	Cerebral infarction due to embolism of unspecified cerebral artery
I63.50	Cerebral infarction due to unspecified occlusion or stenosis of unspecified cerebral artery
I63.59	Cerebral infarction due to unspecified occlusion or stenosis of other cerebral artery
I63.411 – I63.419	Cerebral infarction due to embolism of middle cerebral artery
I63.421 – I63.429	Cerebral infarction due to embolism of anterior cerebral artery
I63.431 – I63.439	Cerebral infarction due to embolism of posterior cerebral artery
I63.441 – I63.449	Cerebral infarction due to embolism of cerebellar artery
I63.49	Cerebral infarction due to embolism of other cerebral artery
I63.511 – I63.519	Cerebral infarction due to unspecified occlusion or stenosis of middle cerebral artery
I63.521 – I63.529	Cerebral infarction due to unspecified occlusion or stenosis of anterior cerebral artery
I63.531 – I63.539	Cerebral infarction due to unspecified occlusion or stenosis of posterior cerebral artery
I63.541 – I63.549	Cerebral infarction due to unspecified occlusion or stenosis of cerebellar artery
I63.59	Cerebral infarction due to unspecified occlusion or stenosis of other cerebral artery
I63.6	Cerebral infarction due to cerebral venous thrombosis, nonpyogenic
I63.81	Other cerebral infarction due to occlusion or stenosis of small artery
I63.89	Other cerebral infarction
I63.9	Occlusion and stenosis of unspecified precerebral artery
I65.01 – I65.09	Occlusion and stenosis of vertebral artery
I65.1	Occlusion and stenosis of basilar artery
I65.21 – I65.29	Occlusion and stenosis of carotid artery
I65.8	Occlusion and stenosis of other precerebral arteries
I65.9	Occlusion and stenosis of unspecified precerebral artery
I66.01 – I66.09	Occlusion and stenosis of middle cerebral artery
I66.11 – I66.19	Occlusion and stenosis of anterior cerebral artery
I66.21 – I66.29	Occlusion and stenosis of posterior cerebral artery
I66.3	Occlusion and stenosis of cerebellar arteries
I66.8	Occlusion and stenosis of other cerebral arteries
I67.2	Cerebral atherosclerosis
P05.00 – P05.08	Newborn light for gestational age
P05.10 – P05.18	Newborn small for gestational age
P07.00 – P07.03	Extremely low birth weight newborn
P07.10 – P07.18	Other low birth weight newborn
P07.20 – P07.25	Extreme immaturity of newborn
P07.30	Preterm newborn, unspecified weeks of gestation
P07.31	Preterm newborn, gestational age 29 completed weeks
P07.33	Preterm newborn, gestational age 30 completed weeks

Q28.2	Arteriovenous malformation of cerebral vessels
Q28.3	Other malformations of cerebral vessels

REIMBURSEMENT INFORMATION:

A complete transcranial Doppler evaluation includes ultrasound examination of the right and left anterior circulation and the posterior circulation, including the vertebral arteries and basilar artery. A limited transcranial Doppler evaluation includes two or less of the above mentioned areas.

Excludes hand-held Dopplers that do not provide a hard copy or vascular flow bidirectional analysis.Includes complete transcranial Doppler (TCD) study. Includes patient care required to perform/supervise studies and interpret results. Includes ultrasound evaluation of right/left anterior circulation territories and posterior circulation territory.

PROGRAM EXCEPTIONS:

Federal Employee Program (FEP): Follow FEP guidelines.

State Account Organization (SAO): Follow SAO guidelines.

Medicare Advantage products: The following Local Coverage Determination (LCD) was reviewed on the last guideline reviewed date: Transcranial Doppler Studies, (L33977) located at fcso.com.

If this Medical Coverage Guideline contains a step therapy requirement, in compliance with Florida law 627.42393, members or providers may request a step therapy protocol exemption to this requirement if based on medical necessity. The process for requesting a protocol exemption can be found at Coverage Protocol Exemption Request.

DEFINITIONS:

Embolism: sudden blockage of an artery by a clot or foreign material, which has been brought to the site by the blood stream.

Transcranial: blood vessels of the head are difficult to visualize through the cranial bone (skull), but can be viewed through certain areas such as the eye sockets, the temple, and the base of the skull, where a sound wave probe can visualize cerebral or intracranial blood vessels.

RELATED GUIDELINES:

None applicable.

OTHER:

Other names used to report transcranial Doppler studies:

Transcranial Doppler (TCD) ultrasound

REFERENCES:

1. ACR–AIUM–SPR–SRU Practice Parameter for the Performance of Transcranial Doppler Ultrasound, Revised 2017.
2. Blue Cross Blue Shield Association Medical Policy Reference Manual. 6.01.07 Transcranial Doppler Ultrasound, 06/12/08.
3. Bonow RH, Young CC, Bass DI et al. Transcranial Doppler ultrasonography in neurological surgery and neurocritical care. Neurosurg Focus 2019 Dec 1; 47(6): E2.
4. Kulkarni AA, Sharma VK. Role of transcranial Doppler in cerebrovascular disease. Neurol India. 2016 Sep-Oct;64(5):995-1001.
5. Ment LR, Bada HS, Barnes P, Grant PE, Hirtz D, Papile LA, Pinto-Martin J, Rivkin M, Slovis TL. Practice parameter: neuroimaging of the neonate: report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society. Neurology. 2002 Jun 25; 58(12): 1726-38.
6. Rasulo FA, Bertuetti R. Transcranial Doppler and Optic Nerve Sonography. J Cardiothorac Vasc Anesth. 2019 Aug;33 Suppl 1:S38-S52. [Abstract]
7. Sarkar S, Ghosh S, Ghosh SK et al. Role of transcranial Doppler ultrasonography in stroke. Postgraduate Medical Journal 2007 Nov; 83(985):683-689.
8. Sloan MA, Alexandrov AV, Tegeler CH, Spencer MP, Caplan LR, Feldmann E, Wechsler LR, Newell DW, Gomez CR, Babikian VL, Lefkowitz D, Goldman RS, Armon C, Hsu CY, Gooding DS. 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.

COMMITTEE APPROVAL:

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Medical Policy and Coverage Committee on 09/26/24.

GUIDELINE UPDATE INFORMATION:

07/15/01	Medical Coverage Guideline Reformatted and Revised.
12/15/02	Review and revision of guideline; ICD-9 diagnosis code corrected; references updated.
12/15/03	Review and revision of guideline consisting of updated references.
12/15/04	Review and revision of guideline consisting of updated references.
01/01/05	Annual HCPCS update; consisting of addition of 93890, 93892 and 93893.
02/15/06	Review and revision of guideline consisting of updated references.
02/15/07	Review and revision of guideline consisting of updated references.
06/15/07	Reformatted guideline.
02/15/08	Review and revision of guideline consisting of updated references.
02/15/10	Review and revision of guideline consisting of updated references.
01/15/11	Revision; related ICD-10 codes added.
12/01/11	Update; added related ICD-10 codes.
02/15/12	Scheduled review. Revised description section for clarification of technology. No change in position statements.
04/01/12	Update; added related ICD-10 codes.

01/01/14	Revision; Program Exceptions section updated.
10/01/15	Revision; updated ICD9 and ICD10 coding section.
11/01/15	Revision: ICD-9 Codes deleted.
10/01/16	Quarterly code update; deleted I60.20-I60.22; added I60.2.
08/15/18	Review; no change in position statement. Updated references.
10/01/18	ICD-10 coding update; deleted I63.8; added I63.81 and I63.89.
10/15/20	Review; no change to position statement. Updated description and references.
10/15/22	Review; no change to position statement.
05/22/23	Update to Program Exceptions section.
10/15/24	Review; update position statement. Updated references.
01/01/25	Annual CPT/HCPCS coding update. Revised 93893. Deleted 93890.