Medical Coverage Policy | Ophthalmologic Techniques for Evaluating Glaucoma

EFFECTIVE DATE: 01|01|2017
POLICY LAST UPDATED: 12|06|2016

OVERVIEW
Several techniques have been developed to measure the thickness of the optic nerve and retinal nerve fiber layer (RNFL) as a method to diagnose and monitor glaucoma. Measurement of ocular blood flow is also being evaluated as a diagnostic and management tool for glaucoma.

This policy is applicable to Commercial Products only. For Blue CHiP for Medicare, see related policy section.

MEDICAL CRITERIA
Not applicable

PRIOR AUTHORIZATION
Commercial Products
Prior authorization review is not required.

POLICY STATEMENT
Commercial Products
Analysis of the optic nerve/retinal nerve fiber layer in the diagnosis and evaluation of patients with glaucoma or glaucoma suspects may be considered medically necessary when using scanning laser ophthalmoscopy, scanning laser polarimetry, and optical coherence tomography.

The measurement of ocular blood flow, pulsatile ocular blood flow, or blood flow velocity with Doppler ultrasonography is considered not medically necessary in the diagnosis and follow-up of patients with glaucoma due to a lack of peer-reviewed scientific literature demonstrating the efficacy of the service.

COVERAGE
Benefits may vary between groups/contracts. Please refer to the appropriate Benefit Booklet, Evidence of Coverage, or Subscriber Agreement for applicable diagnostic testing benefits/coverage and limitations of benefits/coverage when services are not medically necessary.

BACKGROUND
Glaucoma is a disease characterized by degeneration of the optic nerve (optic disc). Elevated intraocular pressure (IOP) has long been thought to be the primary etiology, but the relationship between IOP and optic nerve damage varies among patients, suggesting a multifactorial origin. For example, some patients with clearly elevated IOP will show no optic nerve damage, while others with marginal or no pressure elevation will show optic nerve damage. The association between glaucoma and other vascular disorders such as diabetes or hypertension suggests vascular factors may play a role in glaucoma. Specifically, it has been hypothesized that reductions in blood flow to the optic nerve may contribute to the visual field defects associated with glaucoma.

A comprehensive ophthalmologic exam is required for the diagnosis of glaucoma, but no single test is adequate for establishing the diagnosis. A comprehensive ophthalmologic examination includes assessment of the optic nerve by fundoscopy, evaluation of visual fields, and measurement of ocular pressure. The presence

of characteristic changes in the optic nerve or abnormalities in visual field, together with increased IOP, is sufficient for a definitive diagnosis. However, some patients will show ophthalmologic evidence of glaucoma with normal IOPs, therefore an elevated IOP is not essential for diagnosis.

Conventional management of patients with glaucoma principally involves drug therapy, to control elevated IOPs, and serial evaluation of the optic nerve to follow disease progression. Standard methods of evaluation include careful direct examination of the optic nerve using ophthalmoscopy or stereophotography, or evaluation of visual fields. There is interest in developing more objective, reproducible techniques both to document optic nerve damage and to detect early changes in the optic nerve and RNFL before the development of permanent visual field deficits. Specifically, evaluating changes in the thickness of the RNFL has been investigated as a technique to diagnose and monitor glaucoma. In addition, there is interest in measuring ocular blood flow as a diagnostic and management tool for glaucoma.

Techniques to Evaluate the Optic Nerve and RNFL

Confocal Scanning Laser Ophthalmoscopy (CSLO)
CSLO is an image acquisition technique intended to improve the quality of the examination compared with standard ophthalmologic examination. A laser is scanned across the retina along with a detector system. Only a single spot on the retina is illuminated at any time, resulting in a high-contrast image of great reproducibility that can be used to estimate the thickness of the RNFL. In addition, this technique does not require maximal mydriasis, which may be a problem in patients with glaucoma. The Heidelberg Retinal Tomography is probably the most common example of this technology.

Scanning Laser Polarimetry (SLP)
The RNFL is a birefringent, causing a change in the state of polarization of a laser beam as it passes. A 780-nm diode laser is used to illuminate the optic nerve. The polarization state of the light emerging from the eye is then evaluated and correlated with RNFL thickness. Unlike CSLO, SLP can directly measure the thickness of the RNFL. GDx® is a common SLP device. GDx contains a normative database and statistical software package to allow comparison with age-matched normal subjects of the same ethnic origin. The advantages of this system are that images can be obtained without pupil dilation, and evaluation can be completed in 10 minutes. Current instruments have added enhanced and variable corneal compensation technology to account for corneal polarization.

Optical Coherence Tomography (OCT)
OCT uses near-infrared light to provide direct cross-sectional measurement of the RNFL. The principles employed are similar to those used in B-mode ultrasound except light, not sound, is used to produce the 2-dimensional images. The light source can be directed into the eye through a conventional slit-lamp biomicroscope and focused onto the retina through a typical 78-diopter lens. This system requires dilation of the patient's pupil. OCT® is an example of this technology. OCT analysis software is being developed to include optic nerve head parameters with spectral domain OCT, analysis of macular parameters, and hemodynamic parameters with Doppler OCT and OCT angiography.

Techniques to Measure Ocular Blood Flow

Pulsatile Ocular Blood Flow
The pulsatile variation in ocular pressure results from the flow of blood into the eye during cardiac systole. Pulsatile ocular blood flow can thus be detected by the continuous monitoring of IOP. The detected pressure pulse can then be converted into a volume measurement using the known relation between ocular pressure and ocular volume. Pulsatile blood flow is primarily determined by the choroidal vessels, particularly relevant to patients with glaucoma, because the optic nerve is supplied in large part by choroidal circulation.

Doppler Ultrasonography

Color Doppler imaging has also been investigated as a technique to measure the blood velocity in the retinal and choroidal arteries.

Data on use of ocular blood flow, pulsatile ocular blood flow, and/or blood flow velocity are currently lacking, and their relation to clinical outcomes is unclear. The evidence is insufficient to determine the effects of the technology on health outcomes, and the service is therefore considered not medically necessary.

CODING

Commercial Products

The following CPT code is medically necessary when filed with the ICD-10 diagnosis codes below. Other indications are considered not medically necessary.

92133

ICD-10 Diagnosis Code Range H40 - H42

The following CPT code is considered not medically necessary.

0198T

RELATED POLICIES

BlueCHiP for Medicare National and Local Coverage Determinations Policy
CPT Category III Codes
Optical Coherence Tomography of the Anterior Eye Segment

PUBLISHED

Provider Update, January 2017
Provider Update, August 2015
Provider Update, March 2011
Policy Update, October 2001
Policy Update, October 1999

REFERENCES

1. Cioffi GA. Three assumptions: ocular blood flow and glaucoma. J Glaucoma. Oct 1998;7(5):299-300. PMID 9786556
2. Fontana L, Poinoosawmy D, Bunce CV, et al. Pulsatile ocular blood flow investigation in asymmetric normal tension glaucoma and normal subjects. Br J Ophthalmol. Jul 1998;82(7):731-736. PMID 9924361
3. James CB. Pulsatile ocular blood flow. Br J Ophthalmol. Jul 1998;82(7):720-721. PMID 9924358
4. Kaiser HJ, Schoetzau A, Stumpfig D, et al. Blood-flow velocities of the extraocular vessels in patients with hightension and normal-tension primary open-angle glaucoma. Am J Ophthalmol. Mar 1997;123(3):320-327. PMID 9063241
5. Rankin SJ, Walman BE, Buckley AR, et al. Color Doppler imaging and spectral analysis of the optic nerve vasculature in glaucoma. Am J Ophthalmol. Jun 1995;119(6):685-693. PMID 7785681
6. Ervin AM, Boland MV, Myrowitz EH, et al. Screening for Glaucoma: Comparative Effectiveness. Comparative Effectiveness Review No. 59 (Prepared by the Johns Hopkins University Evidence-based Practice Center under Contract No. 290-2007-10061.) AHRQ Publication No. 12-EHC037-EF. Rockville, MD: Agency for Healthcare Research and Quality; April 2012.
7. Michelessi M, Lucenteforte E, Oddone F, et al. Optic nerve head and fibre layer imaging for diagnosing glaucoma. Cochrane Database Syst Rev. 2015(11):CD008803. PMID 26618332
8. Zangwill LM, Weinreb RN, Berry CC, et al. The confocal scanning laser ophthalmoscopy ancillary study to the ocular hypertension treatment study: study design and baseline factors. Am J Ophthalmol. Feb 2004;137(2):219-227. PMID 14962409
9. Zangwill LM, Weinreb RN, Beiser JA, et al. Baseline topographic optic disc measurements are associated with the development of primary open-angle glaucoma: the Confocal Scanning Laser

Ophthalmoscopy Ancillary Study to the Ocular Hypertension Treatment Study. Arch Ophthalmol. Sep 2005;123(9):1188-1197. PMID 16157798
10. Kwartz AJ, Henson DB, Harper RA, et al. The effectiveness of the Heidelberg Retina Tomograph and laser diagnostic glaucoma scanning system (GDx) in detecting and monitoring glaucoma. Health Technol Assess. Nov 2005;9(46):1-132, iii. PMID 16303099
11. Mohammadi K, Bowd C, Weinreb RN, et al. Retinal nerve fiber layer thickness measurements with scanning laser polarimetry predict glaucomatous visual field loss. Am J Ophthalmol. Oct 2004;138(4):592-601. PMID 15488786