MASSACHUSETTS

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Medical Policy

Ophthalmologic Techniques That Evaluate the Posterior Segment for Glaucoma

Table of Contents

Policy Number: 053

BCBSA Reference Number: 9.03.06 (For Plan internal use only)

Related Policies

Optical Coherence Tomography of the Anterior Eye Segment, #084

Policy[1]

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity

Retinal nerve fiber analysis (RNFA), also known as scanning computerized ophthalmic diagnostic imaging (SCODI), which includes two methods of SCODI (confocal scanning laser ophthalmoscopy and scanning laser polarimetry), in addition to posterior segment optical coherence tomography, may be **MEDICALLY NECESSARY** for the following indications:

- To diagnose early glaucoma and monitor glaucoma treatment,
- To differentiate causes of other optic nerve disorders when a diagnosis is in doubt,
- To diagnose and manage the patient's condition when visual field results are insufficient; or when reliable visual field testing cannot be performed, due to visual, physical, mental, or age constraints,
- To differentiate when a discrepancy exists between the clinical appearance of the optic nerve and the visual fields,
- To detect further loss of optic nerve or retinal nerve fiber layer changes in the presence of advanced optic nerve damage and advanced visual field loss,
- To diagnose and manage medically and surgically retinal and neuro-ophthalmic diseases which involve changes in the optic nerve, subretinal and intraretinal changes, vitreo-retinal relationships, and changes in the nerve fiber layer, and
- To follow glaucoma suspects.

Retinal nerve fiber analysis and SCODI (also known as confocal scanning laser polarimetry and scanning laser polarimetry), including optical coherence tomography, for conditions not listed above (including, but not limited to, screening) is **INVESTIGATIONAL**.

The measurement of ocular blood flow, pulsatile ocular blood flow, or blood flow velocity in the diagnosis and follow-up of individuals with glaucoma is **INVESTIGATIONAL**.

Prior Authorization Information

Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

	Outpatient
Commercial Managed Care (HMO and POS)	Prior authorization is **not required**.
Commercial PPO and Indemnity	Prior authorization is **not required**.

CPT Codes / HCPCS Codes / ICD Codes

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

The following codes are included below for informational purposes only; this is not an all-inclusive list.

The above medical necessity criteria MUST be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:

CPT Codes

CPT codes:	Code Description
92133	Computerized ophthalmic diagnostic imaging (eg, optical coherence tomography [OCT]), posterior segment, with interpretation and report, unilateral or bilateral; optic nerve
92134	Scanning computerized ophthalmic diagnostic imaging, posterior segment, with interpretation and report, unilateral or bilateral; retina
92137	Computerized ophthalmic diagnostic imaging (eg, optical coherence tomography [OCT]), posterior segment, with interpretation and report, unilateral or bilateral; retina, including OCT angiography

The following CPT code is considered investigational for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:

CPT Codes

CPT codes:	Code Description
0198T	Measurement of ocular blood flow by repetitive intraocular pressure sampling, with interpretation and report

Description

Diagnosis and Management

A comprehensive ophthalmologic exam is required for the diagnosis of glaucoma, but no single test is adequate to establish diagnosis. A comprehensive ophthalmologic examination includes assessment of the optic nerve, 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 intraocular pressure (IOP), is sufficient for a definitive diagnosis. However, some patients will show ophthalmologic evidence of

glaucoma with normal IOPs. These cases of normal-tension glaucoma are considered to be a type of primary open-angle glaucoma. Angle-closure glaucoma is another type of glaucoma associated with an increase in IOP. The increased IOP in angle-closure glaucoma arises from a reduction in aqueous outflow from the eye due to a closed angle in the anterior chamber. Diagnosis of angle-closure glaucoma is detailed in policy #084.

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 stereo photography 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 retinal nerve fiber layer before the development of permanent visual field deficits. Specifically, evaluating changes in retinal nerve fiber layer thickness has been investigated as a technique to diagnose and monitor glaucoma. However, IOP reduction is not effective in decreasing disease progression in a significant number of patients, and in patients with normal-tension glaucoma, there is never an increase in IOP. It has been proposed that vascular dysregulation is a significant cause of damage to the retinal nerve fiber layer, and there is interest in measuring ocular blood flow as both a diagnostic and a management tool for glaucoma. Changes in blood flow to the retina and choroid may be particularly relevant for diagnosis and treatment of normal-tension glaucoma. A variety of techniques have been developed, as described below. (Note: This evidence review only addresses techniques related to the evaluation of the optic nerve, retinal nerve fiber layer, or blood flow to the retina and choroid in patients with glaucoma.)

Techniques to Evaluate the Optic Nerve and Retinal Nerve Fiber Layer

Confocal Scanning Laser Ophthalmoscopy
Confocal scanning laser ophthalmoscopy is an image acquisition technique intended to improve the quality of the eye 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 retinal nerve fiber layer thickness. In addition, this technique does not require maximal mydriasis, which may be problematic in patients with glaucoma. The Heidelberg Retinal Tomograph is a commonly used technology.

Scanning Laser Polarimetry
The retinal nerve fiber layer is birefringent (ie, biorefractive), meaning that it causes 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 retinal nerve fiber layer thickness. Unlike confocal scanning laser ophthalmoscopy, scanning laser polarimetry can directly measure the thickness of the retinal nerve fiber layer. GDx is a common scanning laser polarimetry device. GDx contains a normative database and statistical software package that compares scan results 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
Optical coherence tomography uses near-infrared light to provide direct cross-sectional measurement of the retinal nerve fiber layer. 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. Optical coherence tomography analysis software is being developed to include optic nerve head parameters with spectral domain optical coherence tomography, analysis of macular parameters, and hemodynamic parameters with Doppler optical coherence tomography and optical coherence tomography angiography.

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.

Techniques to Measure Ocular Blood Flow
A number of techniques have been developed to assess ocular blood flow. They include laser speckle flowgraphy, color Doppler imaging, Doppler Fourier domain optical coherence tomography, laser Doppler velocimetry, confocal scanning laser Doppler flowmetry, and retinal functional imaging.[1,]

Laser Speckle Flowgraphy
Laser speckle is detected when a coherent light source such as laser light is dispersed from a diffusing surface such as retinal and choroidal vessels and the circulation of the optic nerve head. The varying patterns of light can be used to determine red blood cell velocity and retinal blood flow. However, due to differences in the tissue structure in different eyes, flux values cannot be used for comparisons between eyes. This limitation may be overcome by subtracting background choroidal blood flow results from the overall blood flow results in the region of interest.

Color Doppler Imaging
Color Doppler imaging has also been investigated as a technique to measure the blood flow velocity in the retinal and choroidal arteries. This technique delivers ultrasound in pulsed Doppler mode with a transducer set on closed eyelids. The examination takes 30 to 40 minutes and is most effective for the mean velocity of large ophthalmic vessels such as the ophthalmic artery, the central retinal artery, and the short posterior ciliary arteries. However, total blood flow cannot be determined with this technique, and imaging is highly dependent on probe placement.

Doppler Fourier Domain Optical Coherence Tomography
Doppler Fourier domain optical coherence tomography is a noncontact imaging technique that detects the intensity of the light scattered back from erythrocytes as they move in the vessels of the ocular tissue. This induces a frequency shift that represents the velocity of the blood in the ocular tissue.

Laser Doppler Velocimetry
Laser Doppler velocimetry compares the frequency of reflected laser light from a moving particle with stationary tissue.

Confocal Scanning Laser Doppler Flowmetry
Confocal scanning laser Doppler flowmetry combines laser Doppler flowmetry with confocal scanning laser tomography. Infrared laser light is used to scan the retina, and the frequency and amplitude of Doppler shifts are determined from the reflected light. Determinations of blood velocity and blood volume are used to compute the total blood flow and create a physical map of retinal flow values.

Summary

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

Summary of Evidence
For individuals who have glaucoma or suspected glaucoma who receive imaging of the optic nerve and retinal nerve fiber layer, the evidence includes studies on diagnostic accuracy. Relevant outcomes are test accuracy, symptoms, morbid events, functional outcomes, and medication use. Confocal scanning laser ophthalmoscopy, scanning laser polarimetry, and optical coherence tomography can be used to evaluate the optic nerve and retinal nerve fiber layer in patients with glaucoma and suspected glaucoma. Numerous articles have described findings from patients with known and suspected glaucoma using confocal scanning laser ophthalmoscopy, scanning laser polarimetry, and optical coherence tomography. These studies have reported that abnormalities may be detected on these examinations before functional changes are noted. The literature and specialty society guidelines have indicated that optic nerve analysis using confocal

scanning laser ophthalmoscopy, scanning laser polarimetry, and optical coherence tomography are established add-on tests that may be used to diagnose and manage patients with glaucoma and suspected glaucoma. These results are often considered along with other findings to make diagnostic and therapeutic decisions about glaucoma care, including the use of topical medication, monitoring, and surgery to lower intraocular pressure. Thus, an accurate diagnosis of glaucoma would be expected to reduce the progression of glaucoma. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have glaucoma or suspected glaucoma who receive an evaluation of ocular blood flow, the evidence includes association studies. Relevant outcomes are test accuracy, symptoms, morbid events, functional outcomes, and medication use. Techniques to measure ocular blood flow or ocular blood velocity are used to determine appropriate glaucoma treatment options. The data for these techniques remain limited. Literature reviews have not identified studies addressing whether these technologies improve diagnostic accuracy or whether they improve health outcomes in patients with glaucoma. Some have suggested that these parameters may inform understanding of the variability in visual field changes in patients with glaucoma (ie, they may help explain why patients with similar levels of intraocular pressure develop markedly different visual impairments). However, data on the use of ocular blood flow, pulsatile ocular blood flow, and/or blood flow velocity are currently lacking. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

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Policy History

Date	Action

5/2025	Annual policy review. Policy updated with literature review through January 31, 2025; no references added. Policy statements unchanged.
1/2025	Clarified coding information.
5/2024	Annual policy review. References updated. Policy statements unchanged.
5/2023	Annual policy review. Minor editorial refinements to policy statements; intent unchanged.
4/2022	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
4/2021	Annual review. Policy statements unchanged.
1/2021	Medicare information removed. See MP #132 Medicare Advantage Management for local coverage determination and national coverage determination reference.
5/2020	Annual review. Description, summary, and references updated. Policy statements unchanged.
4/2019	Annual review. Description, summary, and references updated. Policy statements unchanged.
4/2018	Annual review. New references added. Summary clarified.
5/2017	Annual review. Doppler ultrasonography removed from the third policy statement. The intent of the policy statement is unchanged. Title changed.
12/2016	Clarified coding information.
11/2016	Clarified coding information.
10/2016	Annual review. New references added.
10/2016	Clarified coding information.
4/2015	Clarified coding information.
3/2015	Annual review. New references added.
9/2014	Coding information clarified.
6/2014	Updated Coding section with ICD10 procedure and diagnosis codes, effective 10/2015.
5/2014	Annual review. New references added
4/2014	Clarified coding information.
11/2011-4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.
4/2011	Annual review. Changes to policy statements.
2/2011	Reviewed - Medical Policy Group - Psychiatry and Ophthalmology. No changes to policy statements.
1/2011	Annual review. No changes to policy statements.
2/2010	Reviewed - Medical Policy Group - Psychiatry, Ophthalmology, Pediatrics and Endocrinology. No changes to policy statements.
10/2009	Annual review. Changes to policy statements.
2/2009	Annual review. Changes to policy statements.
2/2009	Annual review. Changes to policy statements.
2/2009	Reviewed - Medical Policy Group - Psychiatry, Ophthalmology, and Endocrinology. No changes to policy statements.
11/2008	Medical Policy 053 describing covered and non-covered indications. Effective 11/01/2008.
11/2008	Annual review. Changes to policy statements.
8/2008	Annual review. Changes to policy statements.
2/2007	Reviewed - Medical Policy Group - Psychiatry, Ophthalmology, and Endocrinology. No changes to policy statements.
7/2006	Annual review. Changes to policy statements.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:

Medical Policy Terms of Use

Managed Care Guidelines

Indemnity/PPO Guidelines
Clinical Exception Process
Medical Technology Assessment Guidelines

References

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Endnotes

[1] Based on expert opinion