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OVERVIEW

Several techniques have been developed to measure the thickness of the optic nerve/retinal nerve fiber layer (RNFL) as a method to diagnose and monitor glaucoma.

MEDICAL CRITERIA

Not applicable

PRIOR AUTHORIZATION

BlueCHiP for Medicare and Commercial Products

Prior authorization review is not required.

POLICY STATEMENT

BlueCHiP for Medicare and Commercial Products

Analysis of the optic nerve (retinal nerve fiber layer, or RNFL) 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.

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, nonetheless, 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 an examination 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 the patient 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/RNFL

Confocal Scanning Laser Ophthalmoscopy (CSLO)

CSLO is a laser-based image acquisition technique, which is 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 example of an SLP. 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 done in approximately 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.

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 relationship 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.

CODING

BlueCHiP for Medicare and 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

RELATED POLICIES

Not applicable

PUBLISHED

Provider Update, August 2015

Provider Update, March 2011

Policy Update, October 2001

Policy Update, October 1999

REFERENCES

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