OPHTHALMOLOGIC TECHNIQUES OF EVALUATING GLAUCOMA
OTH903.004

COVERAGE:

The following procedures are considered investigational and are not eligible for coverage in the diagnosis and follow-up treatment of patients with glaucoma:

- Optic Nerve Head Analyzers;
- Scanning Laser Ophthalmoscopies;
- Scanning Laser Polarimetry; and
- Measurement of pulsatile ocular blood flow or blood flow velocity with Doppler ultrasonography.

DESCRIPTION:

Glaucoma is a disease characterized by degeneration of the optic disc. Elevated intraocular pressure has long been thought to be the primary etiology, but the relationship between intraocular pressure and optic nerve damage varies among patients, suggesting a multifactorial origin. For example, some patients with clearly elevated intraocular pressure will show no damage to the optic nerve, while other patients 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.

Conventional management of the patient with glaucoma involves drug or surgical therapy to control elevated intraocular pressures and serial evaluation of the optic nerve and the retinal fiber layer to detect glaucomatous changes.

Standard methods of evaluation include careful direct examination of the optic nerve using the opthalmoscope or stereophotography, or evaluation of visual fields. There has been interest in developing more objective, reproducible techniques both to document optic nerve damage and to detect early changes in the optic nerve and nerve fiber layer before the development of permanent visual field deficits. In addition, there has been interest in measuring ocular blood flow as a diagnostic and management tool for glaucoma. A variety of new techniques have been developed, as described below:

**Optic Nerve Head Analyzers**

Optic nerve head analyzers were introduced to provide detailed topographic maps of the optic nerve head and peripapillary retina. Probably the most common example of these devices is the GLAUCOMA SCOPE, which uses an infrared light source that projects lines onto the optic nerve head. The measured
deflection of the light is proportional to the depth of the optic disc.

**Scanning Laser Ophthalmoscopes**

Scanning laser ophthalmoscopy is a laser-based image acquisition technique, which is intended to improve the quality of the examination compared to 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. In addition, this technique does not require maximal mydriasis, which may be a problem in patients with glaucoma. The TopSS (topographic scanning system) device is probably the most common example of this technology.

**Scanning Laser Polarimetry**

While examination of the optic nerve head is considered the "gold standard," assessment of the thickness of the surrounding retinal nerve fiber layer (NFL) has been investigated as a way of identifying early glaucomatous change. In scanning laser polarimetry a scanning laser ophthalmoscope is coupled with a polarimeter, which indirectly measures the NFL thickness by measuring the rotation of a polarized laser beam reflected from the retina. The NERVE FIBER ANALYZER/LDT (Gdx) 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 intraocular pressure. 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 glaucomatous patients, since the optic nerve is supplied in large part by the 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.

**RATIONALE:**

A variety of ophthalmologic devices have been developed to provide a more objective measure of damage to the optic nerve and retinal nerve fiber layer in patients with glaucoma. These devices include the Nerve Fiber Analyzer, the Glaucoscope, and the TopSS device and techniques to measure ocular blood flow.

While all of the above technologies have been shown to be technically feasible, there are no data from published clinical trials to document how these devices should be incorporated into clinical practice and whether treatment decisions based on the use of these devices result in improved patient outcomes compared with the conventional methods of evaluation, i.e., ophthalmologic examination, stereophotography, and visual field examination. Regarding nerve fiber layer thickness, additional research is required to
identify the most appropriate indices of NFL damage and to examine temporal relationships between NFL damage and visual field loss. Regarding pulsatile ocular blood flow or blood flow velocity, additional information is needed to:

- document the association between blood flow and glaucoma,
- determine the relevant vessels for study considering the complex blood supply to the optic nerve, and
- to establish the range of normal values, particularly in relation to other factors such as blood pressure, heart rate, and compliance of the blood vessels.

Finally, it must be shown how diagnostic information on ocular blood flow can be used to improve the management of the patient with glaucoma.

DISCLAIMER:

State and federal law, as well as contract language, including definitions and specific inclusions/exclusions, takes precedence over Medical Policy and must be considered first in determining coverage. The member’s contract benefits in effect on the date that services are rendered must be used. Any benefits are subject to the payment of premiums for the date on which services are rendered. Medical technology is constantly evolving, and we reserve the right to review and update Medical Policy periodically.

HMO Blue Texas physicians who are contracted/affiliated with a capitated IPA/medical group must contact the IPA/medical group for information regarding HMO claims/reimbursement information and other general polices and procedures.

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