Trends in Medical Research

ISSN 1819-3587

Academic Journals Inc.

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Retinal Nerve Function May Be Key to Early Glaucoma Detection

Catching glaucoma as early as possible-before it destroys the optic nerve-is vital to preventing vision loss. Now a research team at Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, has shown that a test that measures the functionality of the eye's retinal nerve cells may be a key to early detection. Eventually, the test may also help evaluate how well glaucoma treatments are working.

The research, led by Mitra Sehi, PhD, and David Greenfield, MD, was based on the knowledge that Retinal Ganglion Cells (RGCs) become dysfunctional as glaucoma progresses and that such changes can be measured using the Pattern Electroretinogram Optimized for Glaucoma Screening (PERGLA). PERGLA measures the electrical activity of a patient's retina as he or she views an alternating pattern of black and white lines. (The retinal area in the back of the eye receives images and transmits them to the optic nerve.) Other studies had shown that abnormal changes in RGCs begin early in the glaucoma process, so PERGLA is potentially valuable as a non-invasive detection tool.

The Bascom Palmer study included 47 patients (47 eyes) in whom Intraocular Pressure (IOP) could not be controlled with medication and who therefore had surgery to prevent optic nerve damage. All patients had two PERGLA evaluations (as well as complete ocular exams, optic nerve assessment, and blood pressure measurement), one before surgery and one at three months post surgery. IOP and PERGLA measurements of the patients' fellow, non-glaucomatous, non-treated eyes were stable before and after surgeries. The surgeries improved fluid drainage in the eyes to reduce IOP; 34 eyes had trabeculectomy and 13 had glaucoma drainage implants.

PERGLA results showed that RGC dysfunction was reversed and IOP was reduced in all patients following surgery. The patients' central visual field tests improved, as well. Dr. Sehi says these results should be interpreted cautiously until confirmed by larger studies. She calls for longitudinal studies to clarify the relationship between reduced IOP and increased RGC response and to further investigate PERGLA assessment of RGC dysfunction as a biomarker for glaucoma.

The research is published in the December issue of Ophthalmology, the journal of the American Academy of Ophthalmology.