ORIGINAL ARTICLE

Comparison of Contrast Sensitivity and Visual Field Loss in Patients with Glaucoma

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Abstract

In the present study, 80 eyes of 40 patients with glaucoma, glaucoma suspect and ocular hypertension and visual acuity of 6/12 or better were studied. In these patients, contrast sensitivity measurements were done using Pelli-Robson contrast sensitivity chart and were related to visual field loss on perimetry using on Humphrey's visual field analyzer model in order to obtain mean deviation. Mean deviation in decibel was converted in log units (1 dB = 0.1 log units). In the present study, contrast sensitivity losses were noticed in only small number of patients as compared to mean deviation shown by these patients on perimetry. Although contrast sensitivity has proven to be an important test for the early detection/screening of the people for glaucoma in some studies, we observed that contrast sensitivity testing by means of Pelli-Robson chart was not as efficacious as automated threshold perimetry for early detection of glaucoma.

Key Words

Glaucoma, Intraocular Pressure, Contrast Sensitivity, Automated Perimetry

Introduction

Glaucoma is a group of diseases characterised by optic nerve damage and visual field loss. It causes progressive loss of vision from the death of retinal ganglion cells and it is reasonable that the degree of vision loss would be proportional to the amount of cell loss (1).

Snellen letter acuity is by far the best known and most widely used clinical measure of visual spatial processing. However, high contrast letter acuity examines only a limited part of visual system's spatial resolution capabilities. It may be possible to extract additional valuable information about glaucoma diagnosis, progression, treatment or damage mechanism by including low contrast and low luminance stimulus conditions in visual fields (2). Contrast sensitivity is the measure of the ability to detect slight difference in the luminance between two areas. A black letter on a white background is a scene of high contrast whereas a child crossing the road at dusk or a car looming up in fog are scenes of low contrast. Contrast sensitivity testing is fast, easy to perform and inexpensive, as is required for screening, and by the time glaucomatous eyes show the earliest evidence of visual field loss, i.e., one spot of 10 dB loss, contrast sensitivity is greatly reduced when measured in the periphery. Perimetric visual field loss also defines the condition but its sensitivity is not great enough to detect the earliest pathological changes. Forty percent optic nerve axons are already lost before any visual field defect is apparent on perimetry (3).

The present study was undertaken to compare the relationship of contrast sensitivity measurements by the use of Pelli-Robson contrast sensitivity chart with visual field loss measured by automated perimetry on Humphrey's visual field analyzer in patients with glaucoma.

Material and Methods

In the present study, patients included were those with glaucoma - having characteristic visual field loss and optic nerve head changes, glaucoma suspects - having suspicious optic nerve head changes but no characteristic visual field loss and ocular hypertension - having raised intraocular pressure (i.e. IOP > 21 mmHg) but no definite visual field loss or optic nerve head changes. A total of 80 eyes of 40 patients were studied, having visual acuity of 6/12 or better, attending the outpatient unit of Upgraded Department of Ophthalmology, Government Medical College, Jammu.

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