Comparison between results of Short wave automated perimetry (SWAP) and Standard automated perimetry (SAP) in early cases of Diabetic retinopathy

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Introduction

Diabetic retinopathy is the single most common cause of blindness in the developed world **(1**). The prevalence of diabetes is increasing and potential blindness is threatening a rapidly growing number of working age individuals. Currently, there is a one in 300–500 chance for a child developing type 1 diabetes by 18–20 years of age (2-5). Of these, 98% will show evidence of retinal microvascular changes 15–20 years after diagnosis **(3).**

In the 21st century we are nearing the time when treatment of ocular disease is becoming a reality. As such, the ability to monitor disease progression and/or disease recovery is as important as the ability to detect disease related ocular change .

Direct, non-invasive neuro-retinal function testing of the human visual system demonstrates functional changes in the neuro-retina of individuals with diabetes**(10).**

Short Wavelength Automated Perimetry (SWAP), represents a recent and exciting advance in the early identification of visual field loss. It differs from standard automated static perimetry only in that a carefully chosen wavelength of blue light is used as the stimulus, and a specific color and brightness of yellow light is used for the background illumination**(10)**

Except for these differences, blue-yellow perimetry is still a basic threshold perimetry test, in which standard Goldmann stimuli are presented in the conventional way **(10).**

Gilmore and co-workers have described the measurement variability of the short wavelength (SW) automated perimetry (SWAP) in patients with diabetes (9). SWAP has been used primarily to detect vision loss and to monitor progressive visual field loss **(12).**

Colour processing, in particular the processing of short wavelength stimulus, is abnormal in diabetes **(6-8).** Adults with type 1 diabetes show reduced blue-yellow colour vision discrimination before the onset of retinopathy**(9).** The deficit in the short wavelength pathway was the focus

of the study by Gilmore and colleagues, who tested frequency of seeing (FOS) areas of known decreased SW sensitivity. The importance of this SW sensitivity loss in diabetes is probably linked to the abnormal function of the SW cones. Yamamoto *et al* demonstrated that the short wavelength (S) cones were compromised selectively in adults with type 1 diabetes. These changes were evident with or without evident retinal vasculopathy. A significant ($p<0.001$) selective reduction in the amplitude of the short wavelength cone response suggests a defect at the level of the S-cone photoreceptor.

Aim of the work

To investigate the value of short-wavelength automated perimetry (SWAP) compared with standard automated perimetry in early cases of Diabetic retinopathy.

Patients & Methods

Twenty patients with diabetic retinopathy will be tested repeatedly with both standard automated perimetry (SAP) and short-wavelength automated perimetry (SWAP).. The association between visual field loss and degree of retinopathy outside fovea was analyzed.

Diabetic patients are ranging in age from 30 to 60 years with disease duration of 5-20 years. Patients will be classified as:
Group I: Diabetic patients without retinopathy (10 patients).
Group II: Diabetic patients with non proliferative diabetic retinopathy (10 patients).

Inclusion criteria:
• Corrected visual acuity 0. 5
• Clear optic media
• Absence of diabetic peripheral and autonomic neuropathy.

Exclusion criteria:
1. Patients with glaucoma.
2. Opaque media
3. Corrected visual acuity less than 0. 5.

All patients underwent the following monocular examinations, testing the right eye first:

1. Corrected visual acuity assessment.
2. IOP measurements
3. Slit lamp examination to assess anterior segment and exclude media opacity.
4. Fundus examination.
5. Fundus photography
6. Standard automated perimetry (SAP)
7. short-wavelength automated perimetry (SWAP)

All patients data will be collected and statistically analyzed.

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