Evaluation of peripapillary retinal nerve fiber layer thickness in relation to axial length in myopic eyes using the optical coherence tomography

Thesis
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LIST OF ABBREVIATIONS

Abb.	Definition
3D	3 dimensional
ARP	Atypical retardation pattern
AXL	Axial length
BCVA	Best corrected visual acuity
C/D	Cup/disc
CCT	Central corneal thickness
cm	Centimeter
D	Diopters
dB	Decibel
DM	Diabetes mellitus
DR	Diabetic retinopathy
ECC	Enhanced corneal compensation
FD	Fourier domain
Fig	Figure
GAT	Goldmann applanantion tonometer
GCC	Ganglion cell complex
GCL	Ganglion cell layer
IOP	Intraocular pressure
mm	Millimeters

mmHg	Millimeter mercury
NFL	Nerve fiber layer
OCT	Optical coherence tomography
OD	Optic disc
OHT	Ocular hypertension
ONH	Optic nerve head
POAG	Primary open angle glaucoma
PPA	Peripapillary atrophy
RGC	Retinal ganglion cell
RNFL	Retinal nerve fiber layer
RNFLT	Retinal nerve fiber layer thickness
RPE	Retinal pigment epithelium
SD	Spectral domain
SE	Spherical equivalent
SLO	Scanning laser ophthalmoscope
SLP	Scanning laser polarimetry
TD	Time domain
VCC	Variable corneal compensation
VF	Visual field
µm	Micrometer

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INTRODUCTION

Myopia is the most common ocular abnormality worldwide. Studies have shown the prevalence of myopia in adults to be as high as 26%. **(Leung et al, 2006)** The ocular morbidity related to myopia presents a major concern from clinical and socioeconomic perspectives. High myopia may be associated with posterior vitreous detachment, myopic macular degeneration, peripheral retinal breaks, degeneration and retinal detachment, and possibly glaucoma. **(Seet et al, 2001)**

One of the potentially blinding ocular diseases associated with myopia is glaucoma; myopic eyes are at a 2 to 3 times greater risk of developing glaucoma than emmetropic eyes. **(Hoh et al, 2006)**

An important approach to detecting early structural change in glaucoma is based on assessment of the retinal nerve fiber layer (RNFL). Numerous studies have confirmed that RNFL measurement is sensitive for detection of glaucoma, and the extent of RNFL damage correlates with the severity of functional deficit in the visual field. **(Leung et al, 2005) (Medeiros et al, 2004)**

The histopathological changes that accompany high myopia are well documented and include greater axial length, scleral thinning, chorioretinal atrophy, myopic crescent. The optic discs are frequently abnormal in shape; they are mostly much larger than normal, horizontally oval, or tilted disc, all these may be predisposing factors for localized nerve fiber layer defects. **(Özdek et al, 2000) (Schweitzer et al, 2009)**

The optical coherence tomographer (OCT) is a modern imaging device which provides reproducible cross sectional images of the human retina in a noncontact and noninvasive manner, with high axial scanning resolution. **(Budenz et al, 2005)**

The OCT is able to measure the RNFL in an objective, quantifiable, and reproducible fashion. These measurements are of great clinical value in the early detection and follow up of glaucoma. **(Varma et al, 2003)**

Although thinning of the RNFL is indicative of glaucoma, it remains uncertain whether RNFL thickness varies with the refractive status of the eye**.** To date, there are several reports in the literature concerning the relationship between myopia and RNFL thickness, with various results. **(Hoh et al, 2006) (Schweitzer et al, 2009)**

It is therefore important to investigate whether any correlation exists between RNFL measurements and axial length/refractive error in myopia, with regard to the observation that the risk of development of glaucoma increases with an increasing degree of myopia. **(Mitchell et al., 1999) (Grodum et al., 2001)**

Aim of the work

To evaluate the relationship between the peripapillary retinal nerve fiber layer (RNFL) thickness profiles measured using the optical coherence tomography(OCT) and the axial length and refractive error in subjects with myopia.

Patients and Methods

The study will include forty myopic eyes of healthy Egyptian subjects who meet the inclusion criteria. All subjects will be examined in the ophthalmology department-Ain Shams University.

Myopic patients will be further categorized according to their refractive error into two groups:

- ***Group I:*** Myopic patients with low to moderate myopia (spherical equivalent between -0.50 D and -6.00D), axial length between 24 and 26 mm.
- ***Group II:*** Myopic patients with high myopia (spherical equivalent more than -6.00 D). axial length more than 26 mm.

Inclusion criteria:

- Healthy subjects with myopia (of spherical equivalent more than -0.50 D)
- Clear optic media.
- Eyes with no concurrent disease.
- Best corrected visual acuity of at least 6/12 (0.5).

Exclusion criteria:

- Subjects with spherical equivalent less than -0.50 D.