Prevalence of Glaucoma among High Myopia

Thesis

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List of Abbreviations

Abb.	Full term
AUC	*Area under Curve*
BCVA	*Best Corrected Viual Acuity*
CCD	*Change- Coupled Device*
dB	*Decibels*
EDI	*Enhanced Depth Imaging*
G	*Glaucoma*
HM	*High Myopia*
IOP	*Intraocular Pressure*
IQR	*Inter- Quartile Range*
MD	*Mean Defect*
MMD	*Myopic Macular Degenerations*
NG	*Non- Glaucoma*
NRR	*Neuroretina Rim*
NTG	*Normotensive Glaucoma*
OAG	*Open Angle Glaucoma*
OCT	*Optical Coherence Tomography*
ONH	*Optic Nerve Head*
OR	*Odds Ratio*
POAG	*Open Angle Glaucoma Primary*
PPA	*Peripapilary Atrophy*
PPV	*Positive Predictive Value*
PSD	*Pattern Standard Deviation*
RNFL	*Retinal Nerve Fiber Layer*
ROC	*Receiver Operating Characteristic Curve*
RPE	*Retinal Pigment Epithelium*
SAP	*Standard Automated Perimetry*
SD	*Spectral Domain*
SITA	*Swedish Interactive Threshold Algorithm*

List of Abbreviations (Cont...)

Abb.	Full term
SLP	*Scanning Laser Polaimetry*
SPSS	*Statistical Package for Social Science*
TD	*Time- Domain*
TIGR	*Trabecular Meshwork Induced Glucocorticoid Respone Protein*
UCVA	*Uncorrected Visual Acuity*
VF	*Visual field*
VFI	*Visual Field Index*

ABSTRACT

Background: Glaucoma is an optic neuropathy that is characterized by the selective loss of retinal ganglion cells and their axons, which manifests as the loss of the retinal nerve fiber layer (RNFL). Numerous studies have shown that the extent of RNFL damage correlates with the severity of functional deficit in the visual field (VF), and that RNFL measurement by optical coherence tomography (OCT) has good sensitivity for the detection of glaucoma.

Purpose: To assess the prevalence of glaucoma among high myopic patients and the association between them using standard automated perimetry (SAP) and optical coherence tomography (OCT).

Patients and Methods: A prospective observational randomized cross sectional study included a total of 80 eyes with high myopia, in the period from November 2017 to April 2018. This cross sectional study included 44 subjects with 80 eyes regarding high myopia using the outpatient services of the Qlawoon Hospital, Cairo, who satisfied the inclusion and exclusion criteria between November 2017 and April 2018 aiming to determine the prevalence of glaucoma in high myopic patients.

Results: In our study, we depended on the following highly significant parameters in detection of prevalence of glaucoma among high myopic patients: Spherical equivalent median is -12, Vertical cup/disc ratio mean is 0.55, MD median of visual field is – 5.38, PSD mean of visual field is 3.53, GHT is 64.7% outside normal limits, 17.6% border line and 17.6% general reduction of sensitivity and RNFL thickness mean is; for average thickness is 86.37, for superior thickness is 90.06 and for inferior thickness is 82.68 a highly significant P-value.

Conclusion: Prevalence of glaucoma among our study group is 42.5% depending on Spherical equivalent median, Vertical cup/disc ratio mean, MD median of visual field, PSD mean of visual field, GHT and RNFL thickness.

Keywords: *Glaucoma - high myopia - intraocular pressure - myopic macular degenerations*

INTRODUCTION

Glaucoma is an optic neuropathy that is characterized by the selective loss of retinal ganglion cells and their axons, which manifests as the loss of the retinal nerve fiber layer (RNFL). Numerous studies have shown that the extent of RNFL damage correlates with the severity of functional deficit in the visual field (VF), and that RNFL measurement by optical coherence tomography (OCT) has good sensitivity for the detection of glaucoma ***(Teng et al., 2017).***

High myopia (6 D or more) is a known risk factor for open angle glaucoma ***(Chen et al., 2012).***

Previous hospital-based studies and population-based investigations have shown that myopia, in particular high axial myopia, can be a risk factor for glaucomatous optic neuropathy ***(Morgan et al., 2012).***

It has remained unclear, which factors associated with myopia were responsible for the increased susceptibility for glaucomatous optic nerve damage in myopic eyes. Histological studies reported on morphological particularities in eyes with axial high myopia. These features included a thinning and stretching of the lamina cribrosa in the highly myopic secondary macrodiscs (also called megalodiscs), and an elongation and thinning of the peripapillary scleral flange in the parapapillary region of highly myopic optic nerve heads ***(Jonas et al., 2013).***

Clinical diagnosis of glaucoma in this group of patients is often difficult because of the variation in the sizes, shapes, tilt of the optic nerve head, and the presence of large peripapillary atrophy (PPA) in these eyes. In high myopia, RNFL loss also occurs more frequently in a generalized or diffuse pattern rather than in a localized pattern. These characteristics of highly myopic eyes make it difficult to accurately determine the cup-to-disc ratio and the extent of RNFL damage in susceptible patients ***(Chang et al., 2013).***

An early detection and follow up of glaucoma require functional testing using standard automated perimetry (SAP) as gold standard, particularly the 24–2 Swedish Interactive Threshold Algorithm (SITA) strategy, as well as structural testing which can be based on ophthalmic findings. But, one of the most reliable methods for objective and precise structural measurements of glaucomatous damage is the optical coherence tomography (OCT) which provides both quantitative and qualitative measurements of the RNFL thickness. OCT in diagnostics of the ONH structural changes became a part of standard procedure for diagnosis and monitoring of patients with retinal pathology. OCT is also highly sensitive in differentiating glaucomatous from non-glaucomatous ONH changes ***(Hsu et al., 2015).***