

CORRELATION OF STRUCTURAL AND FUNCTIONAL CHANGES IN OCULAR HYPERTENSION AND EARLY GLAUCOMA

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

لَسْبَدَانِكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدق الله العظيم

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LIST OF ABBREVIATIONS

Abb.	Full Term
BCVA.....	best corrected visual acuity
CCT.....	central corneal thickness
C/D RATIO.....	cup/disc ratio
FDT.....	frequency doubling technology
HRA.....	Heidelberg retinal angiography
HRT.....	Heidelberg retinal tomography
ICG.....	indocyanine green
IOP.....	intraocular pressure
IQR.....	inter-quartile range
LV.....	loss of variance
MD.....	mean defect
MS.....	mean sensitivity
OCT.....	optical coherence tomography
OPC.....	outpatient clinic
POAG.....	primary open angle glaucoma
RGC.....	retinal ganglion cell
RNFL.....	retinal nerve fiber layer
SD.....	standard deviation
SWAP.....	shortwave automated perimetry

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INTRODUCTION

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Glaucoma is a progressive degenerative neuropathy. It is one of the main causes of irreversible legal blindness worldwide and more specifically the second cause of loss of vision in patients over 40 years of age in the developed countries,¹ with an important impact on quality of life.^{2,3,4} In the first stages, glaucoma-induced structural alterations (apoptosis of ganglion cells, nerve fiber loss, and optic disc alteration) are asymptomatic and cannot be diagnosed clinically until functional changes are detected such as early scotomas in the visual field. It is demonstrated that 40%–50% of axonal loss may occur before any change in visual function is detected with perimetry.⁵

Ocular hypertension can be used as a generic term referring to any situation, in which intraocular pressure (IOP) is greater than 21 mmHg, the widely accepted upper limit of normal intraocular pressure in the general population. It is a condition in which the following criteria are met: IOP greater than 21 mmHg in one or both eyes, as measured by applanation tonometry on 2 or more occasions, absence of glaucomatous defects on visual-field testing, normal appearance of the optic disc and nerve fiber layer, anatomically normal & open angles on gonioscopy and

absence of ocular conditions contributing to the elevation of pressure, such as narrow angles, neovascular conditions, and uveitis.⁶

Recognition of glaucoma, in its initial stages, before variations in the visual field, permits a progressively accurate therapy with the objective of functional support and safeguarding of visual field with least damage.^{7,8} There is an adequate proof that with the adequate treatment of ocular hypertension, the relative threat of switching to glaucoma is lessened by 14%, for each mmHg minimization in intraocular pressure.⁹

Optical Coherence Tomography (OCT) represents a type of imaging modality of quantitative assessment of nerve fiber thickness and optic disc parameters. It is used as a more sensitive method for detection of early structural glaucomatous nerve alterations that precede optic disc and visual field damage.¹⁰

Automated perimetry is a generally accepted method for monitoring visual field damage in glaucoma patients and suspects. Glaucoma patients suffer a loss of about 40% of their retinal ganglion cells before this loss is picked up on perimetry.¹¹

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This study aims to evaluate the relationship between the retinal nerve fiber layer thickness measurements; using optical coherence tomography, and the corresponding retinal sensitivity changes; using visual field perimetry, in cases of ocular hypertension and early glaucoma.

REVIEW OF
BENEFIT OF
LITERATURE
TELEVISION