

Classical Ophthalmology Revisited

Risk Assessment in patients With Ocular Hypertension

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Management of patients with ocular hypertension is complicated by the unpredictable course of the disease and by evidence that only a subset of these patients with ocular hypertension will develop OAG during their lifetimes. According to the Ocular Hypertension Treatment Study(OHTS) findings the cumulative probability of developing glaucoma after 5 years is 9.5% in eyes with untreated ocular hypertension. Frequently it is difficult for ophthalmologists to decide which patients to treat and how aggressively to treat a patient with ocular hypertension.

Even after the valuable contributions from the OHTS, particularly in identifying risk factors for progression to glaucoma, in individual patient over given time periods, or perhaps more importantly over a patient's lifetime, are

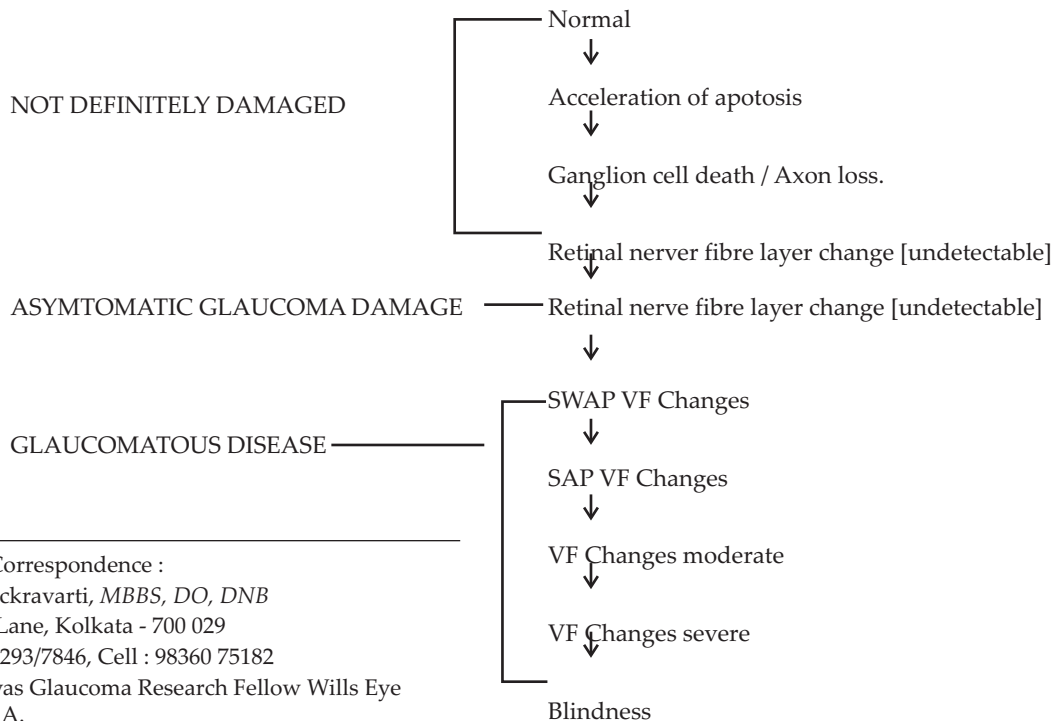
not yet available. Factors like, elevated IOP and increased cup-to-disk ratio, older age, and thinner corneas appear to be the most useful indicator of progression.

Increased cup-to-disk ratio possibly is indicating early structural damage in an individual with ocular hypertension. The thinner corneas are associated with increased risk, and measurements of central corneal thickness is becoming a standard for patients at risk for ocular hypertension and glaucoma progression.

The glaucoma process

Glaucoma is a neurodegenerative disease of the optic nerve. The goal of treatment is to arrest, delay, or limit

THE GLAUCOMA PROCESS



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progression of predisposing ocular hypertension or early optic nerve damage to significant visual impairment in the early stage of the disease.

Glaucoma risk factor assessment: Lessons from Coronary Heart Disease

Chronic Heart Disease and Glaucoma are chronic and progressive diseases.

Both diseases are associated with modifiable risk factors. Epidemiological research in preventing cardiology for more than 50 years initially identified elevated cholesterol level as a primary risk factor for CHD. This experience of cardiovascular disease prevention may be useful to examine when playing development of risk factor assessment for prevention of visual field loss due to glaucoma. CHD model is used to find out the risk factor assessment in to the management of ocular hypertension.

Risk factors for the progression from ocular hypertension to primary open angle glaucoma.

- Mean IOP : There is strong evidence that an elevated IOP level is associated with progression from ocular hypertension to primary open angle glaucoma. Some studies have not found higher IOP level to be associated with risk of disease progression. In the OHTS, univariate and multivariate analysis found that every 1 mm of Hg increase in mean IOP was associated with a 10% increase risk of progression from OHTS to Glaucoma.
- Greater Cup to Disk ratio: There is consistent and strong evidence that increased cup to Disk ratio is an independent risk factor for the progression of ocular hypertension to glaucoma. Greater cup-to -disk ratio(>0.4/>0.5) also has been identified as a baseline risk factor for disease progression.
- Central Corneal Thickness: Central corneal thickness has been a strong and independent risk factor for progression from ocular hypertension to POAG. That there is a potential correlation between corneal thickness and ocular hypertension has been established on the basis of a cross sectional, observational study. The patients with ocular hypertension and visual field loss detected by SWAP had significantly lower corneal thickness measurements than the patients with ocular hypertension and normal visual field results. None of the patients with central corneal thickness > 600µm had

abnormal SWAP findings.

- Age: there is strong evidence that older age is an independent risk factor for the progression of ocular hypertension and glaucoma.
- ?Black Race: Studies have reported a notably higher prevalence of glaucoma in individual of black race when compared with other racial groups.
- Family History: Evidence reported to date suggests that a family history of glaucoma increases the risk of an individual developing the disease, but the evidence for progression is weak.
- Diabetic Mellitus: Analysis of the OHTS results suggested that diabetes protects against progression to glaucoma.

Questions answered and unanswered

- There are few marked differences between CHD and Glaucoma risk assessment and preventions. The OHTS findings are based on a relatively small select population of patients with ocular hypertension, making the study less generalized and nor applicable to screening or population based intervention. Glaucoma prevention presently is limited to modifying a single risk factor (decreasing IOP level) where as CHD has multiple modifiable risk factors.
- Though Ophthalmologists increasingly are able to measure IOP accurately and are beginning to understand the factors that affect IOP levels, many unknowns still exist. For example the effect of fluctuation in diurnal IOP and nocturnal IOP on disease progression remains unclear and needs further evaluation. It is possible that period of diurnal or nocturnal IOP fluctuations, which were not assessed in the OHTS may add to the risk of progression.
- Again IOP asymmetry was not assessed in the OHTS. Large differences in IOP levels between eyes was associated with progression from ocular hypertension to glaucoma. In an another study such large disparities between the two eyes were reported to be more common in patients with ocular hypertension (33%) and POAG (36%) than in normal subjects(6%).
- It is possible to argue that large cup-to-disk ratios in ocular hypertension patients may be an indication of early structural damage and not a risk factor. In fact, the finding of short-wavelength automated perimetry (SWAP) defects in 20% of patients at OHTS baseline indicate that limitations in detection may have allowed

at least some of the OHTS patients with existing optic nerve damage to enter the trial.

- Patients having thicker corneas may represent structural difference in the optic nerve architecture which are protective against the development of glaucoma. An alternative possibility is that those with

thicker corneas and measured IOP elevations that did not actually have ocular hypertension and another subgroup with thin corneas that may have had higher IOP levels than measured.

- Strong support for an association between family history and progression from ocular hypertension to OAG is lacking. Family history of glaucoma was not

References:

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3. Girkin A. Christopher, Kannel B. William, Friedman S. David, Weinreb N. Robert. Glaucoma Risk Factor Assessment and Prevention: Lessons from Coronary Heart Disease. Am J Ophthalmol 2004; 138:S11-S18.
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Answers to Photo - Quiz

Ans 1: Type I Duane's retraction syndrome of the right eye. Note the inability to abduct the right eye beyond the midline, the retraction of the right eye on abduction and the widening of the palpebral fissure on attempted abduction. The eyes are straight in primary position and this child could maintain BSV in primary gaze with a very slight head posture. The parents were reassured and no surgical intervention was advised in this case.

Ans 2: Posterior cilio retinal artery occlusion

Ans 3:

- OCT1 – Epi retinal membrane with taut posterior hyaloid membrane
- OCT2 – CRNVM
- OCT3- Very large pigment epithelial detachment
- OCT4 – Organised pre-macular hemorrhage
- OCT5 – lamellar hole