Ocular Hypertension is defined as an IOP > 21 mmHg without any evidence of glaucomatous optic nerve damage or visual field defects. There is no underlying ocular or systemic cause of elevated intraocular pressure. Individuals with ocular hypertension are 8 times more susceptible for the development of primary open angle glaucoma (POAG) as compared to normal subjects. Therefore, early diagnosis and initiation of ocular hypotensive medication in high risk group may reduce the incidence of POAG and subsequent visual disability.

**Epidemiology**

The prevalence of ocular hypertension varies in different ethnic groups. Its prevalence increases with age. Highest prevalence of 12.6% was reported amongst Afro-Caribbean population in one study\(^1\). In the Framingham Eye Study conducted in Whites, its prevalence was 6.2% amongst under 65 age group, while 8.7% in individuals above 75 years of age\(^2\). In southern India prevalence of 1.1% in individuals above 40 years of age has been reported\(^3\).

**Risk Factors for Subsequent Conversion to POAG**

Valuable data about significant risk factors contributing to progression of ocular hypertension to POAG and effect of ocular hypotensives on the disease course has been obtained from Ocular Hypertension Treatment Study (OHTS). OHTS is a long term, multi-centre, randomized clinical trial started in 1994. It included 1636 participants aged between 40-80 years and IOP values between 24-32 mm Hg in one eye without any evidence of glaucomatous damage were randomized to treatment and observation group. The study determined that the rate of progression to POAG was reduced to 4.4% in the treatment group in contrast to 9.4% in observation group in 5 years\(^4\). Suggested risk factors are discussed below.

1. **Central Corneal Thickness (CCT)** – CCT was found to be a powerful predictor for the development of POAG\(^5\). IOP assessed by applanation tonometry may be overestimated or underestimated in thicker and thinner corneas, respectively. CCT less than 555μ were found to be at greater risk than eyes with CCT more than 588μ. The relative risk of POAG increased by 81% for every 40μ decrease in CCT.

2. **IOP** - Studies have revealed the normal IOP range of 10-21 mmHg\(^6\). Although, IOP readings may show considerable variations among glaucoma patients, IOP reading more than 22 mmHg is a positive predictive factor for the development of POAG.

3. **Age** – Age is an independent risk factor for the development of POAG. Individuals with older age had a greater risk for conversion to glaucoma. OHTS found an increased risk of POAG with age (per decade), of 43% in the univariate analysis and 22% in the multivariate analysis.

4. **Pattern Standard Deviation (PSD)** - Although the patients with ocular hypertension may not have visual field defects on Standard Automated Perimetry (SAP), OHTS found that greater PSD on SAP correlated with increased risk of progression to POAG. With 0.2dB increase in PSD, 22% increase in relative risk was found in OHTS.
5. Optic Nerve – Although OHT patients have no apparent glaucomatous disc changes, increased vertical and horizontal cup-disc ratio is a risk factor for progression to POAG. Increase in cup-disc ratio by 0.1 leads to 32% and 27% increase in relative risk in vertical and horizontal cupping, respectively.

6. Family history and Black race were not found to be significant in multivariate analysis in OHTS. However, other studies have shown them to play significant role in the development of POAG\textsuperscript{7,8}.

**Diagnosis**

Ocular hypertension is a diagnosis of exclusion. Thorough ocular examination including tonometry, gonioscopy, optic disc evaluation and visual field testing should be done to rule out any underlying cause of IOP elevation. History of ocular trauma and steroid use should be ruled out.

**Treatment**

Only 1-2% patients progressed to POAG in a yearly follow-up in OHTS trial. Considering the low rate of progression to POAG, cost of ocular hypotensive medications, long term compliance issues and side effect of drugs, not every case of ocular hypertension is subjected to treatment with ocular hypotensives. Therefore, treatment is recommended only in high risk group. Lowering of IOP by at least 20% is recommended. Topical beta blockers or prostaglandin analogues are usually the preferred agents. Patients with moderate risk of progression should be monitored closely and treatment is initiated with the earliest sign of glaucomatous damage. While once in a 2 year follow-up is recommended for low risk individuals. Suggested risk criteria for progression to POAG is described below.

**High risk:** Requires treatment. Aim for at least 20% IOP reduction.
1. Retinal nerve fiber layer defects.
2. Parapapillary changes.
3. IOP > 30 mmHg
4. IOP > 26 mmHg with central corneal thickness < 555 microns.
5. Vertical cup-disc ratio 0.4:1 or more with central corneal thickness < 555 microns.

**Moderate risk:** Annual follow-up. Treatment initiated at the earliest documented glaucomatous damage.
1. IOP 24-29 mmHg without retinal nerve fibre layer damage.
2. IOP 22-25 mmHg with central corneal thickness < 555 microns.
3. Vertical cup-disc ratio 0.4:1 or more with central corneal thickness between 555-588 microns.
4. Family history of POAG in first degree relative.
5. High Myopia.

**Low risk:** Follow-up every 2 years.
1. IOP 22-23 mmHg with central corneal thickness more than 588 microns.
2. Vertical cup-disc ratio 0.4 or more with central corneal thickness more than 588 microns.

Hence, early recognition and treatment of high risk patients can limit the visual disability due to POAG. Frequency doubling perimetry (FDP) or short wavelength automated perimetry (SWAP) detects glaucomatous damage at a very early stage, 4 years before the changes appear in white-on-white perimetry. Hence, for patients under monitoring, FDP or SWAP may be beneficial in early initiation of treatment.

**References**