
FACTORS ASSOCIATED WITH 5-YEAR GLAUCOMATOUS PROGRESSION IN GLAUCOMA SUSPECT EYES: A RETROSPECTIVE LONGITUDINAL STUDY

ARAVINDH NIRMALAN BE, SHIBANDRI DAS MD, NARIMAN NASSIRI MD MPH, VAAMA PATEL MD, DHIR PATWA BS, ALEXANDRA HERIFORD MS, CHAESIK KIM BSEE, HAOXING CHEN MD, FAISAL RIDHA AL-TIMIMI MD, JUSTIN R. TANNIR MD, ANJU GOYAL MD, MARK S. JUZYCH MD MHSA, & BRET A. HUGHES MD.



Kresge Eye Institute, Wayne State
University School of Medicine

BACKGROUND

- Glaucoma is a multifactorial progressive optic neuropathy that is characterized by progressive neurodegeneration of retinal ganglion cells and their axons
- The development of glaucoma has been associated with several factors such as age, family history of glaucoma, diabetes, hypertension, and more
- Early diagnosis and treatment of glaucoma can significantly delay vision loss if factors associated with progression are addressed



PURPOSE

- To identify factors potentially associated with glaucomatous progression in glaucoma suspect eyes



METHODS

- A 5-year longitudinal retrospective study was performed
- Optical Coherence Tomography (OCT) parameters included retinal nerve fiber layer thickness (RNFL) of the superior, inferior, nasal, temporal, and average regions, cup volume, disc and rim area.
- We calculated the percentage of glaucoma suspect eyes that progressed to glaucoma within 5 years
- The study subjects were divided into two groups: eyes that progressed to glaucoma and those that did not.



SELECTION CRITERIA

Inclusion Criteria:

- glaucoma suspect eyes (i.e., suspicious cup-to-disc ratio and/or intraocular pressure >21 mm Hg)
- age ≥ 30 years old
- follow-up time of 5 years
- best-corrected visual acuity 20/100 or better
- spherical equivalent better than -8 diopters
- astigmatism less than 3 diopters

Exclusion Criteria

- eyes with glaucoma, which was determined by at least 2 consecutive reliable visual field tests
- eyes with any significant retinal or neurological disease



RESULTS

- A total number of 365 eyes of 288 patients were analyzed (323 eyes with suspicious cup-to-disc ratio and 42 eyes with ocular hypertension).
- Overall, 55 (15.07%) eyes progressed to glaucoma within average \pm SD of 19.12 ± 4.23 months.
- Bivariate analysis showed eyes that progressed to glaucoma had significantly thinner average, superior and inferior RNFL, and more severe average, superior, and inferior RNFL damages at baseline.
- OCT parameters showed no statistically significant difference between the study groups in terms of nasal and temporal RNFL thicknesses, cup volume, disc area and rim area at baseline.
- Logistic regression analysis showed severe inferior RNFL damage was significantly associated with 5-year glaucomatous progression



DISCUSSION

- In our study, we found eyes in the progressed group have significantly thinner baseline average, superior and inferior RNFL thicknesses in bivariate analysis.
- However, the logistic regression analysis did not show any significant association between average, superior and inferior RNFL thicknesses and 5-year progression of glaucoma
- In bivariate analysis, we found that the progressed group had significantly more severe average, superior and inferior RNFL damage.
- Interestingly, the logistic analysis showed that only severe inferior RNFL damage was significantly associated with 5-year glaucomatous damage
- In conclusion, we found that severe baseline inferior RNFL damage was significantly associated with 5-year glaucomatous progression in glaucoma suspect eyes.



SIGNIFICANCE

- Identifying factors related to glaucoma progression early can lead to better patient outcomes
- More factors in the future can be tested for and can help us catch glaucoma progression and treat accordingly
- Patient for example with thinner RNFL at baseline can be treated for future progression of glaucoma sooner rather than later





REFERENCES

- Gordon MO, Beiser JA, Brandt JD, et al. The ocular hypertensive treatment study: baseline factors that predict the onset of primary open-angle glaucoma. *Arch Ophthalmol* 2002;120:714–720
- Tielsch JM, Katz J, Sommer A, et al. Family history and risk of primary open-angle glaucoma: the Baltimore eye study. *Arch Ophthalmol* 1994;112:69–73.
- Mitchell P, Smith W, Chey T, et al. Open angle glaucoma and diabetes. *Ophthalmology* 1997;104:712–718
- Kass MA, Heuer DK, Higginbotham EJ, et al. The ocular hypertension treatment study. A randomized trial determines that topical ocular hypotensive medication delays or prevents the onset of primary open-angle glaucoma. *Arch Ophthalmol* 2002;120:701-713; discussion 829-830