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Are the Ocular Biometric Factors Important for Intraocular Pressure Assessment?

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Glaucomatous optic neuropathy is characterized by raised intraocular pressure, visual field defects and optic disc changes and of these; intraocular pressure is the principle modifiable risk factors for the development and progression of glaucoma [1]. Regulation of intraocular pressure is a complex physiological trait that depends on the production of aqueous humor, resistance to aqueous humor outflow and episcleral venous pressure [2]. Intraocular pressure is the hydrostatic pressure exerted by the aqueous humor.

The complex physiology involved in aqueous humor formation and its maintenance indicates its dependence on other systemic, physical, physiological and environmental factors and as the intraocular pressure is also dependent on aqueous humor, therefore, indirectly the intraocular pressure is also dependent on these factors. Ocular biometric factors reported to be involved with the intraocular pressure are central corneal thickness [3,4] corneal curvature, axial length, anterior chamber depth, Shaffer's angle and grade and refractive error [5-7].

Opinions regarding relationship between central corneal thickness (CCT) and intraocular pressure (IOP) are quite controversial. A reduced corneal thickness of 0.45 mm could produce an underestimation of the intraocular pressure by up to 4.7 mm Hg, whereas increased central corneal thickness of 0.59 mm could cause an overestimation of 5.2 mm Hg when the actual intraocular pressure is 20 mm Hg by Goldman applanation tonometer [8].

In the current issue, Garg et.al. Have shown a weak positive and a significant correlation between central corneal thickness (CCT) and intraocular pressure (IOP) ($r=0.092$, $p<0.001$) as do other studies [9,10]. Mean CCT showed an incremental trend with the increasing intraocular pressure categories and mean intraocular pressure of those having central corneal thickness >600 µm was significantly higher as compared to that of patients with CCT<540 µm.

As there are multiple variables that might affect the intraocular pressure, therefore, the association derived on univariate assessment seems to be vague and may be the effect of some confounder. In order to elaborate the role of independent factors associated with intraocular pressure, a multivariate analysis is a must, as done by Garg et al. In their research the IOP is projected as a dependent variable with age, gender, central corneal thickness, axial length and anterior chamber depth as independent variables. Out of this younger age, male gender, thicker central corneal thickness, steeper corneal curvature and short anterior chamber depth were seen to be predictors of higher intraocular pressure, as has been shown [10]. But different researchers have viewed and assessed the association of IOP with many variables using a unique predictive model. Hence, there is a need to come up with a set of stronger predictors present in all the studies.

Therefore, it is recommended that as intraocular pressure is a very important and first line assessment for glaucoma diagnosis, it should be calculated keeping in mind the various ocular, anthropometric and systemic factors which have an association with it.

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