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IOP, ITS MEASUREMENT, INTERPRETATION AND "ADJUSTMENT"

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ABSTRACT

IOP remains the major modifiable risk factor for glaucomatous optic neuropathy (GON). Its measurement is therefore of paramount important in management of patients. However, manometric studies of accuracy of tonometric estimates of IOP have shown considerable errors exist. Applanation tonometry agrees well with invivo manometry when IOP = 20 mm Hg, and central corneal thickness (CCT) = 520 nm. However, variation in CCT and IOP may cause errors in excess of 6 mm Hg. In Chinese people, there is a mean error (underestimate) of 4 mm Hg using applanation tonometry, suggesting that assumptions regarding inter-racial validity of tonometry may be flawed.

In addition to in vivo work, clinic-based and population-based studies of factors influencing measurement bias have identified CCT as a major source of error. In European and Asian people, the magnitude of variation in IOP attributable to CCT is consistent. The CCT-related error hypothesis has been somewhat complicated recently by the finding that thin CCT is a risk factor for development of GON, independent of IOP. However, it remains eminently biologically plausible. Nomograms have been developed to allow "correction" of IOP. These all have a weakness- they are not able to correct for all factors in a mechanically complex structure. Forces in the cornea are non-isotropic, non-linear and visco-elastic. A robust correction algorithm is not available yet.We can be fairly certain that in individuals, a rise or fall in IOP estimates do indeed represent a genuine change. The exact magnitude may not be possible to measure without further innovation.

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