Review: Measurement Techniques for Intraocular Pressure

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Abstract

The literature on intra-ocular pressure dynamics is reviewed, including tonometer design and calibration, the influence of corneal-scleral mechanics, and scleral rigidity factors. Drugs that influence the outflow facility of the trabecular meshwork (TM) are discussed. Transmural pressure drop across the lamina cribosa (LC) is an important parameter, in terms of quantifying potential glaucoma damage to the optic nerve.

Keywords:

By comparison, tonographs, a different type of device can be used to measure the outflow facility. Quigley [2] reviewed the world-wide prevalence and incidence of glaucoma. Wang et al. [11-13] discussed ROP (often associated with rapid juvenile myopia rates) and glaucoma related studies.Direct and remote intra-ocular pressure measuring techniques were reviewed by Downs [14], Nuyen et al. [15], Okaforet

U = uveo-scleral outflow rate [mm^3/min]

R (t) = axial myopia [diopters] at age t [yrs]

TM = trabecular meshwork

ROP = retinopathy of prematurity

LC = lamina cribosa ONH = optic nerve head

w = sqr [3 (1 – v^2)] P a / (E × h^2), corneal indentation, a = radius, h = thickness [70]

Pcrit = E * h^3 / (a x sqr [3 (1 – v^2)]), corneal buckling, (Timoshenko et al. [70])

S crit = P crit R/2h, spherical buckling load for sclera (von Karman [22]), R = radius

1 atm. = 760 mmHg = 29.92 inch-Hg = 14.7 lb/in^2 = 101.3 KPa = pressure conversions\

Conflict of Interest Statement

The authors have no proprietary or financial conflicts of interest.

References

1. Hasnain SS (2016) Pathogenesis of Orderly Loss of Nerve Fibers in Glaucoma. Optom open access 1: 1-4.
2. Quigley HA (2011) Glaucoma. Lancet 377: 1367-1377.
3. Goldmann H (1954) A new applanation tonometer. Bull Mem Soc Fr Ophtalmol 67: 474-477.
4. Cridland B (1917) The tonometer of schiotz. Br J Ophthalmol 1: 352-358.
5. Perkins ES (1965) Hand-held applanation tonometer. Br J Ophthalmol 49: 591-593.
6. Mackay RS, Marg E, Oechsli R (1960) Automatic tonometer with exact theory: various biological applications. Science 131 :1668-1669.
7. Myers KJ, Scott CA (1975) The non-contact ("air puf") tonometer: variability and corneal staining. Am J Optom Physiol Opt 52: 36-46.
8. Zarbin MA, Arlow T, Ritch R (2013) Regenerative nanomedicine for vision restoration. Mayo Clin Proc 88: 1480-1490.
9. Friedenwald JS (1937) Contribution to the theory and practice of tonometry. American Journal of Ophthalmology 20 :985-1024.
10. Özcura

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