



A Step Towards Reducing Global Glaucoma Blindness - How does Gonioscopy Help?

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Glaucoma is a leading cause of irreversible blindness worldwide. It has been estimated that 76 million people would have developed glaucoma in 2020 and the number is likely to reach 111.8 million by 2040 [1]. Asia accounts for more than half of the world's overall glaucoma burden and more than three-quarters of the global Primary Angle Closure Glaucoma (PACG) population [1,2]. A recent systemic review and meta-analysis of population-based studies reported that 64.7% of PACG cases were previously undetected in Asia [3]. Although Primary Open Angle Glaucoma (POAG) is the most common subtype of glaucoma, the increased propensity of PACG to cause permanent blindness makes it a pressing public health issue, especially in Asia [4,5]. It is reported that angle closure glaucoma is associated with a three-fold increased risk of bilateral visual impairment [6].

The currently accepted classification of Primary Angle Closure Disease (PACD) [7,8] can be put in simple terms as follows:

- Primary Angle Closure Suspect (PACS) – Eyes with $\geq 180^\circ$ of iridotrabeular contact (ITC), with no raise in Intra Ocular Pressure (IOP)/Peripheral Anterior Synecchia (PAS)
- Primary Angle Closure (PAC) – Eyes with $\geq 180^\circ$ of iridotrabeular contact (ITC) with raised IOP and/or PAS, but with no evidence of glaucomatous optic neuropathy
- PACG – Eyes with PAC together with evidence of glaucomatous optic neuropathy.

As it is evident from the above classification, identifying individuals early in the spectrum of the disease (PACS and PAC) and administering timely intervention to the predisposed eyes is of

profound importance in reducing the burden of glaucoma-related visual impairment. One has to keep in mind that visual impairment in PAC and PACG can also be due to non-glaucomatous reasons (corneal decompensation, cataract and ischemic optic neuropathy) that can be prevented by early diagnosis and appropriate management [9].

Tonometry helps in identifying ocular hypertensives and PAC patients with increased IOP. Clinical disc evaluation, functional (perimetry) and structural imaging (OCT) tests help in identifying patients with OAG and those that fall into the PACG category. However, these tests tend to miss the eyes predisposed to angle closure (PAC with no IOP raise). Hence it is needless to emphasize that assessing the angle status is an integral part of a comprehensive ophthalmic examination.

The slit-lamp based central anterior chamber depth assessment alone may be misleading. The Limbal Anterior Chamber Depth Assessment by Van Herick test is accepted as a clinic-based screening technique to identify the eyes predisposed to angle closure [9]. However, this test does not accurately diagnose or rule out the pathology [10].

At present, gonioscopy under standard lighting conditions, remains the gold standard for angle assessment and for identifying angle closure. It is not only needed to label a case of glaucoma as 'open' or 'closed' angle, but also to identify any underlying secondary angle pathology (new vessels, angle recession, retained lens particles, IOL haptic impinging on angle, foreign body, and subtle anterior segment angle tumors) that is leading to IOP

raise in different case scenarios. Population-based and hospital-based studies have reported higher detection rate of angle closure when gonioscopy was performed as a part of comprehensive eye examination in all study subjects [11-13].

Ideally, gonioscopy has to be performed on every patient who is above 40 years of age, presenting to the out-patient department for regular ophthalmic examination, presbyopic correction or with any other visual complaint. It is an indispensable test for the preliminary and follow-up examination of glaucoma suspects and patients, irrespective of the presumed angle status (open or closed). It is also a mandatory procedure in patients with risk factors of developing glaucoma. The list includes, but is not limited to, patients with increasing age, myopes, hyperopes, increased IOP, shallow anterior chamber, reduced Central Corneal Thickness (CCT), greater lens thickness, diabetes mellitus, family history of glaucoma, history of ocular trauma, uveitis, pigment dispersion, pseudoexfoliation, neovascularization of iris etc.

Angle evaluation by gonioscopy plays a crucial role in the diagnosis and management of glaucoma, more so in PACD. Incorporating the procedure into routine ophthalmic practice can prove useful in identifying angle closure disease earlier in the spectrum, thus helping to reduce the burden of glaucoma-related blindness.

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