

GUEST EDITORIAL

Evolving concepts in angle closure and angle-closure glaucoma

There is a need for studies comparing combined cataract extraction and trabeculectomy in PACG eyes versus separately staged procedures. Glaucoma drainage implant surgery has been shown to work in PACG eyes with previous failed trabeculectomy and when combined with lens extraction.

A common question that is asked of glaucoma specialists is “What is the critical angle below which the iridocorneal angle will very likely close?” This is a valid question because it attempts to predict which of the iridocorneal angles will most likely close and which will remain open.

Angle-closure glaucoma remains an important problem in this region of the world. It is estimated that 15.7 million people will be affected by primary angle-closure glaucoma (PACG) worldwide by 2010.¹ This is projected to increase to 21 million in 2020, with 5.3 million estimated to be bilaterally blind. PACG causes three times more blindness than POAG.² It is unfortunate that up to this time, we have no epidemiologic data to estimate the prevalence of PACG in our country. The most recent National Blindness Survey³ did not classify glaucoma into open-angle and angle-closure types. And although the prevalence appeared small at 0.03%, this should not preclude us from giving attention to this blinding disease, especially since it can be prevented.

The latest Asia-Pacific Glaucoma Guidelines noted that it is not cost-effective to conduct population-based screening for glaucoma because of the expensive equipment and required infrastructure for glaucoma examination. It cannot be performed by technicians or paramedical personnel. The recommended strategy is case detection, which involves conducting a

comprehensive ophthalmologic examination when persons over the age of 35 seek ophthalmic attention for any reason.⁴

To address the question at the start of this editorial, it is unfortunate that the answer is not a simple mathematical one. This is because angle closure involves the interaction of several intraocular factors: 1) the iris-plane configuration (whether it is convex or plateau); 2) the location of iris insertion (whether into the ciliary body or anterior to it); 3) the thickness of the iris which can cause iris crowding when the pupil is dilated; 4) the lens thickness; 5) the position of the lens; 6) the location of the ciliary processes; and possibly other factors.

The availability of anterior-chamber imaging devices has tremendously increased our knowledge of these interactions occurring in angle closure. I have been fortunate to have access to the ultrasound biomicroscopes (UBM) at the Philippine General Hospital–Sentro Oftalmologico Jose Rizal and at the FEU-NRMF Medical Center Eye Center. I have seen patients with lens thickness measuring 5 mm or more, which was larger than the usual lens thickness even in other races,⁵ expecting the iridocorneal angles to close when the pupils were dilated in the dark. The angles surprisingly remained open. One reason was the iris was inserted relatively posterior to the ciliary body. Another lesson was that the iris-plane configuration was not uniform along the entire 360 degrees of the limbus. A patient could have both convex and plateau iris configurations in the same eye.

Even with the wealth of meaningful data from different investigators, there remains no uniform way of classifying PACG as different studies used different criteria.

Correspondence to
Ma. Margarita Lat-Luna, MD
Department of Ophthalmology and Visual Sciences
University of the Philippines–Philippine General Hospital
Taft Avenue, Ermita
Manila, Philippines
Telefax : +63-2-3022491
E-mail : margelatuna@yahoo.com

The International Society of Geographical Epidemiology in Ophthalmology (ISGEO) recently published a classification of primary angle-closure glaucoma by Foster and colleagues⁶ for use in prevalence surveys and other epidemiological research:

1. *Primary Angle-Closure Suspect (PACS)*. An eye in which appositional contact between the peripheral iris and posterior trabecular meshwork is considered possible and $>270^\circ$ of the posterior TM cannot be seen.

2. *Primary Angle Closure (PAC)*. An eye with an occludable drainage angle and features indicating that trabecular obstruction by the peripheral iris has occurred, such as peripheral anterior synechiae, elevated intraocular pressure, iris whorling (distortion of the radially oriented iris fibers), “glaucomflecken” lens opacities, or excessive pigment deposition on the trabecular surface. The optic disc does not have glaucomatous damage.

3. *Primary Angle-Closure Glaucoma (PACG)*. Primary angle closure plus evidence of glaucomatous damage to the optic disc and visual field.

The advantage of this classification system for PACG is that it does not depend on the reliability of the patient’s history, whether acute, subacute or chronic, nor does it depend on the patient’s tolerance for pain. This classification is objective and is determined by the examining ophthalmologist. It provides a framework for classifying cases of glaucoma in cross-sectional, population-based research. However, it does not identify the mechanism of angle closure, nor does it specifically guide the management of PACG. Nevertheless, it is a step in possibly pooling together data from various prevalence studies in the Philippines.

We have always thought of angle closure as an anatomic problem only. Once the closed angle was restored to its open state, we assumed that the intraocular pressures would revert to normal. A study on the fluorophotometric measurements of post-laser iridotomy eyes by Dr. Karlo Jacob et al. showed that this was not always the case.⁷ Prof. Paul Foster declared that the angles of eyes that have had an acute attack of angle closure were damaged already, meaning that even if they were anatomically open after a laser iridotomy, the outflow tract would be functioning suboptimally. The fluorophotometry study showed significant differences in the outflow of eyes that have had an acute attack of angle closure compared to their fellow eyes. In clinical practice, this knowledge should translate to advising post-angle-closure-attack and post-laser-iridotomy patients to continue following up with their ophthalmologist

to monitor possible progression of their glaucoma. Our colleagues should not be complacent and assume that their task has been completed after the iridotomy.

The current consensus statement⁸ recommends laser peripheral iridotomy for the primary treatment of PACG. If the intraocular pressure (IOP) is not optimally controlled after laser iridotomy, the subsequent surgical options are diverse and at present there is no consensus on the best approach. Trabeculectomy with antimetabolites may be performed to lower IOP in eyes with chronic PAC and PACG that are insufficiently responsive to laser or medical therapy. There is no sufficient evidence for performing cataract extraction alone in cases of PACG. Cataract surgery alone may be considered in eyes with less than 180 degrees of peripheral anterior synechiae, mild optic-nerve or visual-field damage, or those that are not on maximal tolerated medical therapy. There is lack of evidence for recommending lens extraction alone in eyes with more advanced PACG. There is a need for studies comparing combined cataract extraction and trabeculectomy in PACG eyes versus separately staged procedures. Glaucoma drainage implant surgery has been shown to work in PACG eyes with previous failed trabeculectomy and when combined with lens extraction.

There is paucity of studies on the surgical management of PACG, and a need for long-term data on the various forms of surgery for PACG. Randomized controlled trials are important to investigate the role of lens extraction and goniosynechialysis.

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