Proportion of undetected narrow angles or angle closure in cataract surgery referrals

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ABSTRACT • RÉSUMÉ

Objective: To determine the proportion of patients referred for cataract surgery consultation who had undetected narrow angles (primary angle closure suspect [PACS], primary angle closure [PAC], or primary angle closure glaucoma [PACG]).

Design: Retrospective chart review.

Participants: Phakic patients referred by eye care providers (optometrists and ophthalmologists) to a tertiary centre for cataract management between July 1, 2010 and June 30, 2012 were identified and reviewed.

Methods: Demographic, referral, and specialist assessment information, as well as biometric data, including anterior segment optical coherence tomography, were collected. Patients with undetected narrow angles were identified. Univariate tests and multivariable analyses were performed to determine risk factors for narrow angles or angle closure.

Results: A total of 1229 patients were included. The mean patient age was 67.8 ± 13.0 years, 53.9% of patients were female, and 26.8% were Asian or South Asian. Of the sample population, 139 (11.3%) patients had PACS, 7 (0.6%) had PAC, and 12 (1.0%) had PACG. Overall, 158 (12.9%) patients had narrow angles or angle closure. Multivariable logistic regression using generalized estimating equations confirmed 3 independent predictors of PACS/angle closure: Asian race (odds ratio 2.82, $p < 0.001$), shorter axial length (AL) (odds ratio 1.25, $p = 0.03$), and smaller anterior chamber depth (ACD; odds ratio 33.3, $p < 0.001$). A patient of Asian race referred for cataract surgery with ACD <2.8 mm and AL <23 mm had a 52% probability of having PACS/angle closure (range 42%–62%) versus 3% if these 3 factors were not present.

Conclusions: Of patients referred for cataract surgery, 1.5% were found to have undetected narrow angles or angle closure, implying that gonioscopy may not be adequately performed in this patient population.

Objet : Déterminer la proportion de patients, parmi ceux qu'on a orientés vers un centre tertiaire aux fins d'une consultation en vue d'une chirurgie de la cataracte, avaient un angle étroit (fermeture primitive de l'angle soupçonnée [PACS], fermeture primitive de l'angle [PAC] ou glaucome primitif à angle fermé [PACG]) non détecté.

Nature : Examen rétrospectif de dossiers médicaux.

Participants: On a examiné les dossiers de patients phaques qui avaient été adressés, par un optométriste ou ophtalmologiste, à un centre tertiaire pour la prise en charge d'une cataracte entre le 1er juillet 2010 et le 30 juin 2012.

Méthodes : On a recueilli des données démographiques et des détails sur l'orientation vers le centre tertiaire et l'évaluation faite par le spécialiste, ainsi que des données biométriques, y compris les résultats de l'OCT du segment antérieur. On a repéré les patients porteurs d'un angle étroit non détecté. Des tests univariés et des analyses multivariées ont été effectués pour cerner les facteurs de risque d'angle étroit ou de fermeture de l'angle.

Résultats : L'examen a porté sur 1229 patients dont l'âge moyen était de 67,8 +/− 13 ans; 53,9 % étaient des femmes, et 26,8 % étaient d'origine asiatique ou sud-asiatique. Dans la population évaluée, 139 (11,3 %) patients présentaient une PACS, 7 (0,6 %), une PAC et 12 (1 %), un PACG. En tout, 158 (12,9 %) patients présentaient un angle étroit ou une fermeture de l'angle. Grâce à une analyse de régression logistique multivariée comportant des équations d'estimation généralisées, on a cerné trois facteurs prédictifs indépendants de PACS/fermeture de l'angle : la race asiatique (rapport de cotes [RC] de 2,82; p < 0,001), longueur axiale plus courte (RC de 1,25; p = 0,03) et moindre profondeur de la chambre antérieure (RC de 33,3; p < 0,001). Ainsi, parmi les patients dirigés vers une chirurgie de la cataracte, la probabilité de PACS/fermeture de l'angle atteignait en moyenne 52 % (de 42 à 62 %) chez ceux de race asiatique dont la profondeur de la chambre antérieure était < 2,8 mm et la longueur axiale, < 23 mm, comparativement à 3 % en l'absence de ces trois facteurs.

Conclusions : Parmi les patients orientés vers une chirurgie de la cataracte, 1,5 % présentaient un angle étroit ou une fermeture de l'angle non détecté. Voilà qui laisse croire que la gonioscopie pourrait ne pas être effectuée adéquatement chez cette population.

Glaucoma affects 60 million people worldwide.[1] The vast majority of glaucomas are asymptomatic, and even in developed countries, 50% of glaucoma patients remain undiagnosed.[2,3]

Rates of narrow angles or primary angle closure suspect (PACS) vary by race and have been estimated at 1.64% in North Americans and 2.6% in South Asians.[4,5] Angle closure is the underlying mechanism in one-third of primary glaucomas[3] but is responsible for half of all blindness from glaucoma.[6] Risk factors for angle closure include smaller eyes,[7] female sex, Asian or Indian descent, and increasing age. The vast majority of angle closure glaucoma (ACG) is chronic and asymptomatic.[8]

Angle status is determined by gonioscopy, a basic component in the optometric and ophthalmic eye examination.[9,10] There is an increasing body of research evaluating anterior segment imaging as a method of angle assessment, but gonioscopy remains the gold standard in

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these studies, and is the current standard of practice.[9–11] In a U.S. study, gonioscopy was performed in only 49% of patients before undergoing glaucoma surgery.[11] Our companion study found that 8.9% of patients referred by ophthalmologists with a diagnosis of open-angle glaucoma were found to have undetected ACG on evaluation by a glaucoma subspecialist.[12] This suggests that gonioscopy is likely underperformed, and therefore a great deal of angle closure may be missed. Missed angle closure has significant implications because subsequent glaucoma progression is permanent and often preventable with laser peripheral iridotomy.[13–15] Left untreated, ACG causes blindness in at least 1 eye of up to 75% of affected individuals.[6]

One method to assess the quality of angle assessment by eye care providers would be to compare findings from incoming referrals with expert or objective angle assessment. However, many referrals do not provide gonioscopy information. An alternative method would be to assess the level of PACS or angle closure in a defined population. One would expect that if proper gonioscopy were performed and an angle were found to be closed, with or without peripheral anterior synechiae (PAS) or elevated intraocular pressure (IOP), this would be a highly relevant detail to be provided as part of any referral. Lack of this information in a referral would imply lack of adequate angle assessment or undetected angle closure or that the referring physician decided to omit this detail in his or her referral.

Patients referred for cataract surgery are a relatively uniform and well-defined group in whom rates of undetected narrow angles or angle closure can be determined. Although highly selected, this group represents a significant segment of many comprehensive ophthalmology practices and is therefore a relevant group in whom to explore rates of undetected angle closure.

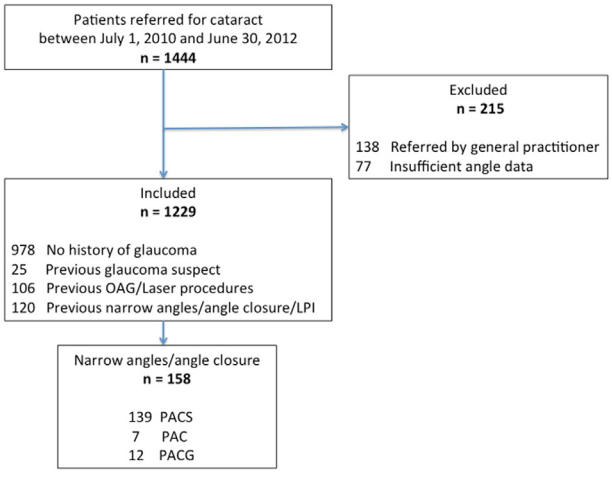

Fig. 1—Overview of included and excluded patients. OAG, open-angle glaucoma; PACS, primary angle closure suspect; PAC, primary angle closure; PACG, primary angle closure glaucoma.

Methods

We conducted a retrospective chart review of all new cataract surgery referrals to a tertiary referral centre between July 1, 2010 and June 30, 2012. Records were analyzed from 2 glaucoma and cataract specialists. The Institutional Review Board Services div. 1373737 Ont. Ltd provided ethics approval for this study, including a waiver of consent for the retrospective collection of data on patients referred for cataract surgery. This study adhered to the tenets of the Declaration of Helsinki.

Inclusion and Exclusion Criteria

Phakic patients referred by optometrists or ophthalmologists for assessment and/or management of cataracts were included. Patients with pre-existing diagnoses of narrow angles, angle closure, glaucoma, glaucoma suspect, or ACG were identified and included to avoid selection bias. Patients with a history of peripheral iridotomy or other glaucoma laser procedures were also identified and included for the same reason. In patients who were pseudophakic or aphakic in 1 eye, biometry was included for the phakic eye only.

Referrals from general practitioners were excluded. Patients with limitations that prevented adequate positioning at the slit lamp for gonioscopic evaluation were also excluded. Use of systemic medications that may predispose to angle closure was not an exclusion criterion. The study protocol is summarized in Figure 1.

Data Collection

A standardized worksheet was created to facilitate data collection, which was performed by SNK. New cataract surgery referrals were identified from clinic schedules during the specified period. The referral letter and ocular history were reviewed. The referral source was noted. Specialist assessment and biometric data were reviewed for patients meeting the inclusion and exclusion criteria. Demographic information, including age at the time of assessment, sex, and ethnicity, was collected. Spherical equivalent refraction (SER) was noted from manifest refraction or from neutralizing the patient's spectacles. IOP was measured by Goldmann applanation tonometry and recorded. Gonioscopy was performed using a Sussman 4-mirror gonioscopy lens (Model G-4; Volk Optical Inc, Mentor, OH). Gonioscopic angle grading using a modified Shaffer classification was documented for each quadrant by a glaucoma specialist. Grade 4 angle was defined by 45+ degrees, grade 3 by 35 degrees, grade 2 by 20 degrees, grade 1 by 10 degrees, and grade 0 by appositional closure (trabecular meshwork not visible). If present, PAS were noted. Anterior segment optical coherence tomography (OCT) and ultrasound biomicroscopy (UBM) are not insured services under the Ontario Health Insurance Plan; patients in whom angle closure was suspected were offered these additional anterior segment