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The ROYAL COLLEGE of OPHTHALMOLOGISTS

EDITORIAL

Asian perspective of eye diseases

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Asia is the world's most populated continent and contains over 60% of the world's population. Due to various genetic and environmental risk factors, certain eye diseases are particularly prevalent in Asian populations. These include high myopia, angle-closure glaucoma, pachychoroid eye diseases such as central serous chorioretinopathy and polypoidal choroidal vasculopathy (PCV), and certain non-infectious uveitis like Vogt–Koyanagi–Harada disease, sarcoidosis, and Behcet's disease. Although some Asian countries and regions are well-developed urban populations, many parts of Asia are still relatively underdeveloped. Due to the lack of good sanitation, poor hygiene standards, and infrastructure, an overcrowded living environment, together with high rainfall and humidity in these underdeveloped areas, infectious uveitis due to tuberculosis, and mosquito-borne diseases such as dengue and chikungunya are more commonly found in these parts of Asia. The higher prevalence of these conditions in Asia created excellent opportunities for clinicians and scientists in the region to investigate and study the epidemiology, pathogenesis, diagnosis, and treatment of these eye diseases. In this Special Asian Perspective Issue of *Eye*, review articles prepared by experts in Asia and beyond summarized key aspects of these eye conditions more commonly found in the region.

Pachychoroid eye disease is a relatively new term describing changes in the choriocapillaris due to dilated choroidal veins associated with abnormal thickening of the choroid [1]. In a review article by Cheung et al., [2] the clinical characteristics, imaging features, and management considerations of various pachychoroid conditions will be discussed. A notable challenge in the study of choroidal features is the lack of unified definition of pachychoroid. The authors of the review highlighted that subfoveal choroidal thickness alone is not the key defining feature of pachychoroid. Rather, morphological features which suggest compression of the inner choroid and choriocapillaris are more important to be recognized. Advances in imaging will no doubt continue to improve both qualitative and quantitative measures of the choroid in a volumetric manner and recognize variations in different locations of this three-dimensional structure.

In a related article by Yanagi et al., [3] the authors highlighted and explored the differences in the basic pathogenic mechanisms of PCV and typical age-related macular degeneration (AMD). Recently, Spaide proposed that choroidal thickness may influence the expression of AMD[4]. For example, patients with thin choroid have a propensity to develop reticular pseudodrusen and type 3 neovascularization, whereas patients with thick choroid are predisposed to develop pachydrusen and PCV. Thus, variations in choroidal thickness may explain some of the differences in the sub-phenotypes of AMD between different populations. The factors that determine choroidal thickness however, are not well understood yet, but both genetic and environmental factors have been proposed.

As highlighted by Wu et al. in their review article on myopia and the use of atropine for myopia control, [5] the condition is no longer a problem limited to East Asia as the prevalence of myopia is increasing rapidly worldwide. With the potential development of sight-threatening complications including macular atrophy, myopic choroidal neovascularization, and myopic traction maculopathy arising from high myopia, [6] it has thus become a major epidemiological problem globally. Despite low-dose atropine being proven as an effective and safe method in controlling myopia progression in well-designed randomized controlled trials, the lack of approved licensed preparation of low-dose

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atropine due to insufficient financial interest from the pharmaceutical industry has led to a considerable barrier in its uptake in the prevention of myopia. The clinical implementation of low-dose atropine in European countries is still rather limited at present. Randomized clinical trials to evaluate the efficacy, safety, and tolerability of low-dose atropine in children of European descent are currently ongoing. The results of these studies will be valuable to inform on the applicability of low-dose atropine in these patient populations. A global concerted effort to tackle the increasing impact of myopia is thus urgently needed.

With the rapid urbanization and socioeconomic changes occurring in many parts of Asia, the incidence of diabetes mellitus is growing exponentially. For example, the prevalence of type 2 diabetes mellitus in South Asia is expected to increase by 150% between 2000 and 2035 [7]. The demand for screening of diabetic retinopathy will therefore also increase tremendously and will put substantial burden in areas already having insufficient eye care providers. With the recent advancements in computing and imaging technologies, the use of artificial intelligence in the detection of diabetic retinopathy might provide a solution in providing a cost-effective method in screening a large population of diabetic patients. In the review by Raman et al., [8] the authors compared and discussed how deep learning models with artificial intelligence neural networks can help in the diagnosis of diabetic retinopathy. Future integration of artificial intelligence technology into existing imaging systems will hopefully allow early detection of sight-threatening diabetic retinopathy so that prompt referral of patients to ophthalmologists can be offered for effective treatment.

Compliance with ethical standards

Conflict of interest Dr. Lai has received honoraria for consultancy, lecture fee, and grant support from Allergan, Bayer, Roche, and Novartis. Dr. Cheung has received honoraria for consultancy, lecture fee, and grant support from Allergan, Bayer, Novartis, Roche, Samsung, and Topcon. The authors declare that they have no conflict of interest.

References

1. Dansingani KK, Balaratnasingam C, Naysan J, Freund KB. En face imaging of pachychoroid spectrum disorders with swept-source optical coherence tomography. Retina. 2016;36:499–516.
2. Cheung CMG, Lee WK, Koizumi H, Dansingani K, Lai TYY, Freund KB. Pachychoroid disease. Eye (Lond). E-pub ahead of print, 11 July 2018.; https://doi.org/10.10138/s4144-018-0158-4.
3. Yanagi Y, Foo VHX, Yoshida A. Asian age-related macular degeneration: from basic science research perspective. Eye (Lond). E-pub ahead of print, 12 October 2018; https://doi.org/10.1038/s41433-018-0225-x.
4. Spaide RF. Improving the age-related macular degeneration construct: a new classification system. Retina. 2018;38:891–9.
5. Wu PC, Chuang MN, Choi J, Chen H, Wu G, Ohno-Matsui K, et al. Update in myopia and treatment strategy of atropine use in myopia control. Eye (Lond); e-pub ahead of print, 11 July 2018. s41433-018-0139-7.
6. Ohno-Matsui K, Lai TY, Lai CC, Cheung CM. Updates of pathologic myopia. Prog Retin Eye Res. 2016;52:156–87.
7. Nanditha A, Ma RC, Ramachandran A, Snehalatha C, Chan JC, Chia K, et al. Diabetes in Asian and the Pacific: implications for the global epidemic. Diabetes Care. 2016;39:472–85.
8. Raman R, Srinivasan S, Virmani S, Sivaprasad S, Rao C, Rajalakshmi R. Fundus photograph-based deep learning algorithms in detecting diabetic retinopathy. Eye (Lond); e-pub ahead of print 6 November 2018; https://doi.org/10.1038/s41433-018-0269-y.