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Age-related macular degeneration and polypoidal choroidal vasculopathy in Asians

Chee Wai Wong [a, b, c], Yasuo Yanagi [a, b, c], Won-Ki Lee [d], Yuichiro Ogura [e], Ian Yeo [a, b, c], Tien Yin Wong [a, b, c, *], Chui Ming Gemmy Cheung [a, b, c]

[a] Singapore National Eye Centre, Singapore
[b] Singapore Eye Research Institute, Singapore
[c] Duke-NUS Medical School, National University of Singapore, Singapore
[d] Department of Ophthalmology, Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, South Korea
[e] Department of Ophthalmology, Nagoya City University, Nagoya, Japan

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ABSTRACT

Age-related macular degeneration (AMD) is the leading cause of irreversible blindness in elderly people globally. It is estimated that there will be more Asians with AMD than the rest of the world combined by 2050. In Asian populations, polypoidal choroidal vasculopathy (PCV) is a common subtype of exudative AMD, while choroidal neovascularization secondary to AMD (CNV-AMD) is the typical subtype in Western populations. The two subtypes share many common clinical features and risk factors, but also have different epidemiological and clinical characteristics, natural history and treatment outcomes that point to distinct pathophysiological processes. Recent research in the fields of genetics, proteomics and imaging has provided further clarification of differences between PCV and CNV-AMD. Importantly, these differences have manifested as disparity in response to intravitreal injections of anti-vascular endothelial growth factor (anti-VEGF) treatment between PCV and CNV-AMD, emphasizing the need for accurate diagnosis of PCV and in distinguishing PCV from CNV-AMD, particularly in Asian patients. Current clinical trials of intravitreal anti-VEGF therapy and photodynamic therapy will provide clearer perspectives of evidence-based management of PCV and may lead to paradigm shifts in therapeutic strategies away from those currently employed in the treatment of CNV-AMD. Further research is needed to clarify the relative contribution of specific pathways in inflammation, complement activation, extracellular matrix dysregulation, lipid metabolism and angiogenesis to the pathogenesis of PCV. Findings from this research, together with improved diagnostic technology and new therapeutics, will facilitate more optimal management of Asian AMD.

Contents

* Corresponding author. Singapore National Eye Center, 11 Third Hospital Avenue, 16851, Singapore.
E-mail address: wong.tien.yin@snec.com.sg (T.Y. Wong).

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1. Introduction

Age-related macular degeneration (AMD) is a condition that primarily affects people over the age of 50, and is the leading cause of irreversible blindness in elderly people in the world (Lim et al., 2012b). AMD is manifested in two principle forms: early AMD (characterized by drusen and retinal pigment epithelial disturbance) and late AMD, which is further differentiated into exudative AMD ("wet" AMD) and geographic atrophy (GA) (late "dry" AMD).

There is increasing data and understanding of the epidemiology of AMD in Asians. The prevalence of early and late AMD among Asian populations aged 40 to 79 is estimated at 6.8% (Kawasaki et al., 2010). Importantly, the number of people affected is expected to increase dramatically during the coming decades with aging Asian populations; based on United Nation projections, nearly a quarter of Asians will be aged 60 years or older by 2050. Thus, it is estimated that there will be more Asians with AMD than the rest of the world combined by 2050 (Wong et al., 2014b).

Polypoidal choroidal vasculopathy (PCV) is a vascular disease of the choroid first described in the l990s and thought to be part of the spectrum of manifestation of AMD (Yannuzzi et al., 1990). In Asian populations, there are increasing data to show PCV is a common subtype of exudative AMD, in contrast to occult choroidal neovascularization secondary to AMD (CNV-AMD), which is the predominant form in Western populations (Lim et al., 2013; Lim et al., 2013). While the two subtypes share many common clinical features and risk factors (Laude et al., 2010), they also have different epidemiological and clinical characteristics, natural history and treatment outcomes that point to distinct pathophysiological processes. Recent research in the fields of genetics, proteomics and imaging suggest that PCV may not be as closely related to the CNV-AMD as previously thought (Ma et al., 2015; Miyake et al., 2015; Sakurada et al., 2010; Sasaki et al., 2012; Tong et al., 2006; Warrow et al., 2013). Importantly, these differences have manifested as a disparity in response to anti-vascular endothelial growth factor (anti-VEGF) treatment between PCV and CNV-AMD, emphasizing the need for accurate diagnosis of PCV and in distinguishing PCV from CNV-AMD in the approach and management of patients with exudative AMD, particular in Asians. Current ongoing clinical trials of PCV will provide clearer perspectives of