PERSPECTIVE

Epidemiology and Disease Burden of Pathologic Myopia and Myopic Choroidal Neovascularization: An Evidence-Based Systematic Review

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• PURPOSE: To summarize the epidemiology of pathologic myopia and myopic choroidal neovascularization (CNV) and their impact on vision.
• DESIGN: Systematic literature review of all English-language studies evaluating the epidemiology and visual burden of pathologic myopia or myopic CNV.
• METHODS: PubMed and EMBASE were searched with no time limits using predefined search strings for English-language studies evaluating the epidemiology and visual burden of pathologic myopia and myopic CNV.
• RESULTS: In total, 39 relevant publications were identified. Population-based studies reported pathologic myopia to be the first to third most frequent cause of blindness. The prevalence of pathologic myopia was reported to be 0.9%-3.1%, and the prevalence of visual impairment attributable to pathologic myopia ranged from 0.1%-0.5% (European studies) and from 0.2%-1.4% (Asian studies). The prevalence of CNV in individuals with pathologic myopia was reported to be 5.2%-11.3%, and was bilateral in approximately 15% of patients. All studies of visual outcome in patients with myopic CNV (duration ranging from less than 3 months to 21.5 years) reported deterioration in best-corrected visual acuity over time. Older age, subfoveal CNV location, and larger baseline lesion size were predictors of worse visual outcomes.
• CONCLUSIONS: Pathologic myopia is an important cause of vision loss worldwide, affecting up to 3% of the population. Of these, a substantial proportion of patients develop myopic CNV, which mostly causes a significant progressive decrease in visual acuity. This condition should therefore be a target for new treatment strategies. (Am J Ophthalmol 2014;157:9–25. © 2014 by Elsevier Inc. All rights reserved.)

MYOPIA IS A COMMON EYE CONDITION, AFFECTING 20%-40% of adults, which poses a significant public health burden and cost to society.[1,2] A proportion of people with myopia have pathologic myopia, which is characterized by excessive and progressive elongation of the globe, and is now considered to be an important cause of impaired vision and blindness worldwide. Choroidal neovascularization (CNV) is a frequent complication associated with pathologic myopia that threatens vision, and is characterized by the occurrence of newly formed abnormal blood vessels that grow under the retinal pigment epithelium or retina and can penetrate the Bruch membrane to extend into the subretinal space, with subsequent scarring.[3] The precise pathogenesis of CNV in eyes with pathologic myopia is unclear, and a range of hypotheses were discussed in detail in a recent review.[4] CNV is acutely symptomatic, is associated with the occurrence of a central scotoma, and can result in a rapid deterioration of central vision; hence, there is a need for urgent clinical treatment.

Data on the epidemiology of pathologic myopia and CNV secondary to pathologic myopia (myopic CNV) in the literature are inconsistent, and the impact of this condition on vision remains unclear; hence, we conducted a systematic review to describe the epidemiology and visual burden of pathologic myopia and myopic CNV.

METHODS

• SOURCES AND METHODS OF LITERATURE SEARCH: We conducted a systematic review of all English-language studies that evaluated the epidemiology and visual burden of pathologic myopia or myopic CNV. A core search string was developed to identify all English-language human studies examining pathologic myopia or myopic CNV. Medical Subject Heading terms and keywords were used and included the following: degenerative myopia,

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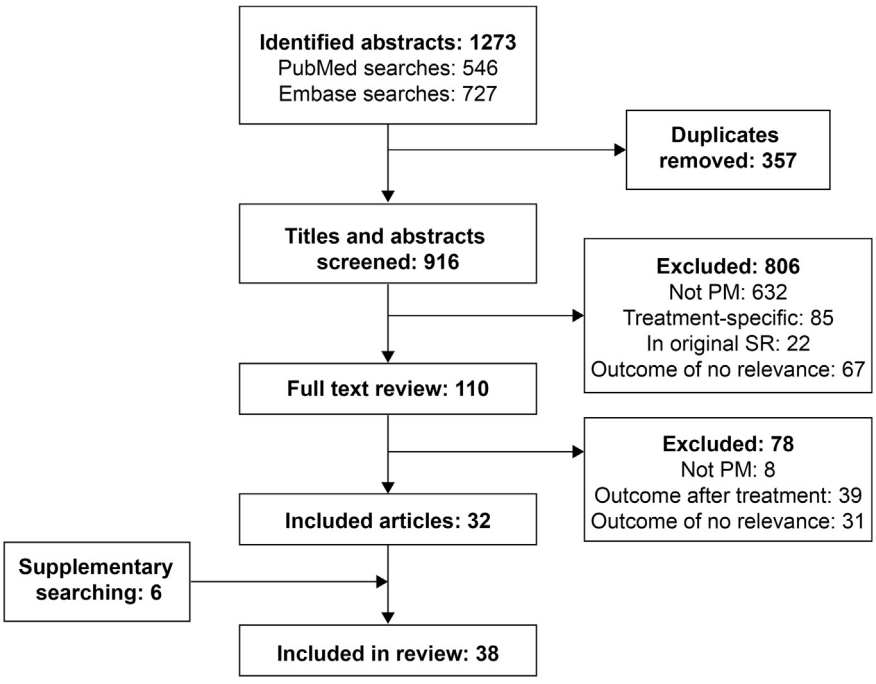

FIGURE 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram representing the flow of citations reviewed in the systematic searches for the systematic review of the epidemiology of pathologic myopia and myopic choroidal neovascularization. SR = systematic review; PM = pathologic myopia.

neovascular, CNV, choroidal, pathologic, degenerative, progressive, and neovascularization. Filters were added to the core search string to create searches with the aim of identifying papers that examined epidemiology, prevalence, and visual burden. Search results were combined and reviewed. Searches were conducted in PubMed and EMBASE in March 2011 with no time limits and were updated on June 29, 2012. To supplement the primary search, the Cochrane Library and the University of York Centre for Reviews and Disseminations databases were interrogated using disease terms for pathologic myopia and CNV. Reference lists of included studies were also reviewed.

• STUDY SELECTION AND DATA EXTRACTION: Articles identified from the searches were screened by a single researcher and checked by a second researcher; discrepancies were resolved through discussion with a third researcher. There is no single widely used definition for pathologic myopia; some have suggested that pathologic myopia could be defined by a refractive error of at least −6.0 diopters or an axial length of at least 26 mm with the presence of 1 or more typical fundus lesions.[4] Studies were included if they were considered to concern pathologic myopia, defined as described above, or if they concerned pathologic, degenerative, progressive, and malignant myopia (all referred to as pathologic myopia here). All references to high myopia (and myopia gravis) were reviewed to verify that they concerned high myopia with fundus changes (studies referring to high myopia only were excluded). If the terms myopic degeneration, myopic maculopathy, myopic macular degeneration, and myopic retinopathy were used, references were reviewed to verify that they met the definition of pathologic myopia. All references to CNV secondary to pathologic myopia, myopic CNV, subretinal neovascularization, Fuchs spot, Forster–Fuchs retinal spot, or disciform degeneration in pathologic myopia were considered to refer to myopic CNV. The categorizations of people as blind or visually impaired were taken directly from the articles and, therefore, used the definitions applied in the original articles. In the majority of articles, visual impairment and blindness were defined using best-corrected visual acuity (BCVA) cut-offs according to the US or World Health Organization (WHO) definitions. Thus, while the cut-offs vary somewhat, in most cases, visual impairment in this report is defined as BCVA <20/40 to >20/200 (logMAR 0.30 to <1.00; US) or BCVA <20/60 to >20/400 (logMAR 0.50 to <1.20; WHO). Blindness was defined as BCVA <20/200 (logMAR 1.00; US) or <20/400 (logMAR 1.20; WHO).

A total of 736 citations were identified in the March 2011 search and 537 were identified in the June 2012 update, resulting in 1273 citations to be reviewed (Figure 1). After removing duplicates, 916 citations were reviewed, of which 110 were deemed suitably relevant to be reviewed as full papers. After reviewing the full publications, a further 78 papers were excluded, resulting in 32