PEER REVIEWED

Optometric Management of Age-Related Macular Degeneration: Recommendations for Ongoing Optometric Care

Stephen H. Sinclair, MD

Once age-related macular degeneration (AMD) is diagnosed in one or both eyes of a patient, the optometrists predominantly involved in delivering primary vision care are focused on monitoring the progression of the disease prior to referring the patient to an appropriate ophthalmologist to administer treatment. However, following this referral they lose the opportunity to follow the patient to manage the common occurrence of continued vision loss due to disease progression. The ophthalmologist, however, is focused upon the intravitreal care delivery of treatment for late stages of AMD and fails to refer the patient back to the diagnosing optometrist or to an appropriate low vision rehabilitation service until it is too late, resulting in poor rehabilitative recovery.

This article recommends that the original diagnosing optometrist should continue to follow the patient, and after referral, continue to manage the vision experienced by providing the low vision rehabilitation or orchestrate the referral to an appropriate provider. While this review discusses several reasons for the current clinical involvement of optometrists in low vision care, those who have recognized this significant need have responded via such a biphasic approach. However, challenges are recognized when comprehensive low vision rehabilitation programs are scarce, or transportation is unavailable. In addition, optometrists may not know of or be able to utilize regional referral resources, such as state agencies for the visually impaired that would be able to address the complex rehabilitative needs involved with a patient's daily living activities. Often, the result is that, despite the optometrist's best clinical efforts, the patient's functional vision goals are not achieved, and patients are not knowledgeable about appropriate resources that could address their specific rehabilitation goals.

This article reviews several programs in progress to improve the rehabilitative care required to meet the vision needs and lifestyles of an elder population with AMD.

Keywords

AMD, gerontology, macular degeneration, optometric education, optometry, vision impairment, vision rehabilitation

Age-related macular degeneration (AMD) is a leading cause of vision loss in those older than 55 years across all income levels and constitutes 6% to 9% of global legal blindness.[1] The progressive visual loss is certainly recognized to affect functional capacity and quality of life, especially in the elderly, and constitutes an important public health problem because of the resulting impaired coordinated motor skills and neural dysfunction that are recognized to cause falls, car accidents, impaired reading and cognitive comprehension deficits, etc.[2]

Once AMD is diagnosed in one or both eyes of a patient, optometrists, predominantly those involved in the delivery of primary vision care, are focused on monitoring the progression within the early disease

stages. When more advanced pathology develops, either geographic atrophy or choroidal neovascularization, this requires referral to an ophthalmologist for the appropriate treatment. Following the referral, optometrists often lose the opportunity to follow the patient to manage the occurring, sequential, progressive vision loss due to the common occurrence of disease progression. The ophthalmologist, on the other hand, focused upon the intravitreal care delivery of treatment,[2] fails to refer the patient back or to a low vision rehabilitation service.[3,4] When the pathology often continues with progressive visual loss that results in loss of visual functionthe treating ophthalmologist may refer the patient to the original referring primary care optometrist so as not to threaten the referral relationship or often optimally refers to a practicing low vision rehabilitation optometrist.[5] However, this is frequently delayed, leaving individuals with visual impairment the responsibility often to search for low vision rehabilitation services on their own.[6]

It is recommended that the original diagnosing optometrist continue to follow the patient, and after referral, continue to interact cooperatively with the treating ophthalmologist to manage the vision experienced by the patient. This may be done by providing the low vision rehabilitation or orchestrating the referral to an appropriate provider. However, in a 2006 American Optometric Association (AOA) Scope of Practice Survey,[7] while 89.9% reported that they managed or co-managed patients with macular degeneration, only 36% indicated that they provided some level of low vision services with 84.6% reporting they referred low vision patients elsewhere for services. Only 25.4% indicated that they accepted low vision referrals from other practitioners.

If the degree of vision impairment is mild, the primary care optometrist certainly should provide some degree of rehabilitative support, and if beyond their capabilities, should refer appropriately. There are a range of possible explanations for the current, limited clinical involvement of optometrists in low vision care, including start-up costs, reimbursement rates, breadth of low vision rehabilitation knowledge and referrals and a range of perceptions about low vision practice. One such perception is that all aspects of clinical low vision rehabilitation fall within a highly specialized area of optometric practice that requires advanced training and credentialing, and, therefore, are not within the clinical scope of primary care optometry. Optometrists, who have recognized the significant need for low vision care, have responded via such a biphasic approach, either delivering what low vision care of which they are capable or by referring to a low vision rehabilitation program. These comprehensive low vision rehabilitation programs, however, are scarce and often do not meet the geographic need for low vision rehabilitation services throughout the US, Canada and Puerto Rico.[6] To address the low vision needs of their patients, primary care optometrists without low vision rehabilitation experience, to some degree utilize their basic optometric training, clinical experience and informal post-graduate studies in the management of their patients' low vision issues. However, due to variations in clinical low vision experience throughout the optometry programs, these doctors may not have the clinical experience or resources to offer more extensive low vision rehabilitation care. They may also not utilize regional referral resources, such as state agencies for the visually impaired, which would be able to address their patients' complex rehabilitative needs such as difficulties with activities of daily living or orientation and mobility. The result is that a patient's functional vision goals are not achieved, despite the optometrists' best clinical efforts. Certainly, patients are not knowledgeable about appropriate resources that could address their specific rehabilitation goals.

Over 25 years ago, there was a recommended plan for an educational program from the Associations of Schools and Colleges of Optometry (ASCO) that included a comprehensive curriculum for low vision rehabilitation, including the development and standardization of specific competencies and learning objectives for both entry-level and advanced-level low vision care curricula that reflect the need for two tiers of optometric low vision rehabilitation.[7] The first tier, entry-level competency, is incorporated in the four-year optometric programs of existing basic science and clinical practice curricula and should foster in the students the perception that their patients' low vision issues must be incorporated into primary care practice and clinical management strategies. Primary low vision care must include an awareness of

comprehensive rehabilitation resources and strategies, necessitating the inclusion in the curricula of concepts that highlight appropriate patient guidance, education and referral, if necessary, for comprehensive care. In a small pilot study, Kammer and Jones reported that approximately 36% of the "low vision" patients seen in optometric practices, although categorized by visual acuity, may in fact need only entry-level low vision care, and that this need could be met by training optometrists to address a large segment of this visually impaired population.[8] The courses to develop such entry level practitioner competencies were developed and finalized during cooperative meetings of ASCO and committees sponsored by the American Academy of Ophthalmology.[9]

The second-tier competency would serve individuals with moderate to severe visual impairment who have special rehabilitative needs that cannot be addressed within the primary care practice. Additionally, individuals who have both visual impairments and other physical or cognitive impairments, necessitating specialized examination and management strategies, would be managed by these second-tier practitioners. Certainly, education about the role of comprehensive low vision rehabilitation services and clearly defined referral criteria are critical for appropriate care of patients who may fall outside the scope of entry-level practice.[5]

It is recognized that a major impediment to the low vision rehabilitation practice is the scarcity of monetary support for low vision devices and rehabilitative services outside of optometry. Each state has an agency for the visually impaired, with varying levels of support for devices and rehabilitation. These varying levels depend upon vocational and financial status, age and other variables. An additional impediment to the provision of functional vision improvement is the failure to demonstrate that providing such devices and training results in acceptable improvement in the patient's functioning. A major cause of this is the focus for such rehabilitation on magnification devices to solve the provider perceived "vision impairment" as measured by chart best corrected visual acuity, contrast sensitivity or by contrasted spot automated perimetry. These are all conducted under photopic conditions, but as explained above, fail to define the ocular or brain functionality (e.g. such as coordinated, inter-ocular saccades and fixation tracking stability[10]) which enable the person to perform the tasks he or she wishes to accomplish in common environmental conditions.[11]

The functional difficulties, due to the parafoveal and mid macular abnormalities that occur early in the disease process, as well as progression,[6] restrict the functional field of view to perceive targets and their surround within environments of even mildly reduced luminance and contrast because of the pathologic effect primarily involving the rods, outside of the small 1^{o}-3^{o} dense cluster of cones. The optometrist needs to evaluate these effects to understand the difficulties the patient commonly experiences during such tasks and the necessary rehabilitation required. Research studies in this regard have focused primarily on patient reported endpoints, such as those of visual function questionnaires (such as the National Eye Institute's Visual Function Questionnaire 15). However, most often the endpoints reported are for distance facial recognition or near reading speed but without recognizing that the multiple vision tasks require different interactions within the usual field of view and under environments of different luminance (e.g. walking on uneven pavement or reading a menu or eating in a restaurant). All such tasks are differently affected by paraxial versus more peripheral visual field defects that frequently occur binocularly in symmetric or asymmetric patterns.[10-16]

The promotion of such recommendations for optometrists to manage patients with vision loss will necessarily require further development of continuing education courses with accompanying hands-on learning of device management and will ultimately require the clinical adoption of testing methods that demonstrate improved correlation with patient reported vision task difficulties. Such testing methods are currently in development including resolution visual fields conducted with target contrasts presented against background luminance that are commonly encountered when performing such tasks.[17,18] In addition, there are early studies of questionnaires that examine task management under dimmed lighting conditions that have demonstrated improved adoption and correlation with quantified imaging and rod

photoreceptor loss.[19] Hopefully, these will not only identify abnormalities of a patient's dysfunction in commonly encountered tasks earlier in the disease course, but also improve understanding of the rehabilitation methods required. Finally, these recommendations should also result in improved communication between the optometrist providing ongoing care for the patient and the ophthalmologist performing the necessary interventions.

References

1. Fleckenstein M, Schmitz-Valckenberg S, Chakravarthy U. Age-related macular degeneration: A review. JAMA. 2024 Jan 9;331(2):147–157. doi:1001/jama.2023.26074
2. Borkar D, Rahimy E, Khan MA, et al. Functional outcomes and quality of life in geographic atrophy in the clinical setting. Ophthalmol Retina. 2025 Mar;9(3):299–301. doi:1016/j.oret.2024.11.013
3. Casten RJ, Rovner BW, Fontenot JL. Targeted vision function goals and use of vision resources in ophthalmology patients with age-related macular degeneration and comorbid depressive symptoms. J Vision Impairment & Blindness. 2016 Nov;110(6):413-424. doi: 1177/0145482X1611000604
4. Sunness JS, Schartz RB, Thompson JT, Sjaarda RN, Elman MJ. Patterns of referral of retinal patients for low vision intervention in the anti-VEGF era. Retina. 2009 Jul-Aug,29(7):1036 –1039. doi: 10.1097/IAE.0b013e3181a91da8
5. Dalzotto K, Banghart M, Thomas-Virnig C, Mondal S. Assessment of low vision referrals before and after establishment of a low vision program at an academic medical center. Optom Vis Sci. 2022 Dec 1;99(12):885-889. doi: 1097/OPX.0000000000001958
6. Carlson AM, Hinkley SB. The status of low vision rehabilitation and certification in the state of Michigan. Optometry. 2011 Nov;82(11):697-709. doi: 10.1016/j.optm.2011.06.006
7. Pieper B. The 2006 American optometric association third-party/managed care survey. Optometry. 2006 Nov;77(11):563-565. doi: 10.1016/j.optm. 2006.09.001
8. Kammer R, Sell C, Jamara RJ, Kollbaum E. Survey of optometric low vision rehabilitation training methods for the moderately visually impaired. Optometry. 2009 Apr;80(4):185-92. doi: 1016/j.optm.2008.10.015.
9. Fontenot JL, Bona MD, Kaleem, MA, et al. Vision Rehabilitation Preferred Practice Pattern, Ophthalmology 2018 Jan;125(1):P228-278. doi: 1016/j.ophtha.2017.09.030
10. Gazanchian M, Jansonius N. Effect of nonoverlapping visual field defects on vision-related quality of life in glaucoma. Ophthalmol Glaucoma. 2024 Jul-Aug;7(4):401-409. doi: 10.1016/j.ogla.2024.01.007
11. Hu M, Freedman VA, Ehrlich JR, Reed NS, Billington C, Kasper JD. Collecting objective measures of visual and auditory function in a national in-home survey of older adults. J Surv Stat Methodol. 2021 Feb 14;9(2):309–334. doi:1093/jssam/smaa044
12. Van Nispen RM, Virgili G, Hoeben M, et al. Low vision rehabilitation for better quality of life in visually impaired adults. Cochrane Database of Syst Rev. 2020 Jan 27;1(1):CD006543. doi: 10.1002/14651858.CD006543.pub2
13. Künzel SH, Lindner M, Sassen J, et al. Association of reading performance in geographic atrophy secondary to age-related macular degeneration with visual function and structural biomarkers. JAMA Ophthalmol. 2021 Nov 1;139(11):1191-1199. doi: 10.1001/jamaophthalmol.2021.3826
14. Künzel SH, Broadbent E, Moller PT, et al. Association of lesion location and functional parameters with vision-related quality of life in geographic atrophy secondary to age-related macular degeneration. Ophthalmol Retina. 2024 Aug:8(8):794-803. doi: 1016/j.oret.2024.01.025
15. McGwin Jr G, Owsley C. Vision screening for motor vehicle collision involvement among older drivers. Ophthalmology. 2022 Sep;129(9):1022-1027. doi: 10.1016/j.ophtha.2022.04.013
16. Singh, RP, Patel, SS, Nielsen, JS, Schmier, JK, Rajput, Y. Patient-, caregiver-, and eye care professional-reported burden of geographic atrophy secondary to age-related macular degeneration. Am J Ophthalmic Clin Trials. 2019 Apr;2(1):1-6. doi: 25259/AJOCT-9-2018

17. Luttrull J, Samples JR, Kent D, Lum BJ. Panmacular subthreshold diode micropulse laser (SDM) as neuroprotective therapy in primary open-angle glaucoma. In: Samples J, Knepper P. Glaucoma Research 2018-2020. Amsterdam, The Netherlands: Kugler Publications, 2018**.** pp 281–294.
18. Gutstein W, Sinclair S, Presti P, North RV. Interactive thresholding of central acuity under conditions of contrast and luminance simulating real world environments: Evaluation of the effects of aging and optical correction. J Comput Sci Syst Biol. 2015 Jun;8(4):225-232. doi: 10.4172/jcsb.1000193
19. Owsley C, McGwin Jr G, Scilley K, Kallies K. Development of a questionnaire to assess vision problems under low luminance in age-related maculopathy. Invest Ophthalmol Vis Sci. Feb;47(2):528–535. doi: 10.1167/iovs.05-1222.

Stephen H. Sinclair, MD, practiced in vitreoretinal surgery for 20 years at the University of Pennsylvania, then at Drexel-Hahnemann Medical School and then in private practice, but remains as Adjunct Professor at the Pennsylvania College of Optometry, Drexel University. His research continues in the development of diagnostic devices including the laser doppler measurement of retinal blood flow, the measurement of resolution visual fields under luminance and contrast conditions of real-world tasks and the development of new retinal imaging and vision rehabilitation devices.