

Advances in technology helps in early detection of vision disorders

Dear Friends,

We come to the end of another eventful year with successful publication of monthly issues here in the *Indian Journal of Ophthalmology* (IJO).

This issue deals with several interesting subjects, one of them being "Dietary and lifestyle risk factors associated with age-related macular degeneration (AMD)" by Nidhi *et al.*

AMD is a progressively debilitating degeneration of the macula that can lead to permanent blindness typically occurring in older adults (age > 50 years). Curative options for AMD are limited, which necessarily means that prevention and early detection combined with management of factors that contribute to AMD remain the only defense against this medical condition.

Significant evaluations of AMD have been achieved via the age-related eye diseases study (AREDS) study commissioned by the National Eye Institute in the USA. The predominant factors that contribute toward the development of AMD are smoking and hypertension. Other lifestyle factors that contribute to the development and progression of AMD include alcohol consumption, hyperopia, lens opacities, female gender, Caucasian ethnicity, obesity (including high body mass index), and lesser education status. Prescription usage of thyroid hormones and antacids may also be associated with the development of geographic AMD in some individuals.^[1-7]

Interventional strategies emergent from this large-scale clinical trial have mandated dietary supplementation with beta-carotene, vitamins C and E, copper, and zinc (collectively known as the AREDS formulation). Intake of omega-3 polyunsaturated fatty acids can also help to lower the risk of development/progression of AMD from having a limited number of drusen to central geographic atrophy.^[2,3]

Consumption of long-chain omega-3 polyunsaturated fatty acids can lower the risk of progression of AMD by 30%. The AREDS formula has been modified to include supplementation with lutein, zeaxanthin, and long-chain omega-3 polyunsaturated fatty acids, based on the findings of the AREDS2 study.^[2] Consumption of white meat such as chicken was shown to be associated with a lower risk of development of AMD, in an Australian study.^[8]

Studies have also demonstrated a correlation between presence of age-related eye diseases and resultant visual impairment, physical impairment and diminished cognitive abilities and mental health.^[9] Although a clear cut causal relationship between all three conditions is not clear, the association does indicate the importance of physical activity and access to neuropsychological care to halt the progression of AMD in elderly patients.

A recent hospital-based survey of 3549 patients, reported in this issue, has confirmed these findings. In this study, doctors at Sushrut Eye Hospital, Mysore, India, have confirmed that higher odds of suffering from AMD are associated with advanced age, alcoholism, smoking, and co-morbidities, such as diabetes, in the Indian population. A positive association between the dietary intake of carotenoids and reduced risk for development of AMD has also been noted by these authors.^[10]

The results of this study are consistent with those from studies conducted in Caucasian populations in the world. The risk factors for AMD in the Indian cohort of this study are similar to those recorded from other ethnic groups^[10] suggesting that common precipitator molecular mechanisms may be at work.

However, in contrast with results from Caucasian studies, the risk of developing AMD with increasing age was higher for men than for women in this study. The present study has not shed light on the reasons for these differences.

Cessation of smoking should be advised to patients diagnosed with AMD. However, a UK-based study has shown that although ophthalmologists and optometrists advocate inclusion of dietary supplements, advice related to cessation of smoking is not adequately delivered.^[11]

In the absence of curative options for geographic as well as neo-vascular AMD, modifications of diet and lifestyle remain the best options for prevention as well as management of AMD in elderly individuals. A recent study by the AREDS2 HOME study research group showed that persons at high risk for CNV benefit from the home monitoring strategy, which aims at earlier detection of CNV development. This strategy improves outcome after intravitreal anti-VEGF therapy in the form of better visual acuity.^[12]

In India, another condition that affects nearly 11–12 million people is glaucoma, which, if undetected, can eventually lead to blindness. Four epidemiological studies (The Andhra Pradesh Eye Disease Study (APEDS), The Aravind Comprehensive Eye Survey (ACES), the Chennai Glaucoma Study (CGS), and the Vellore Eye Study (VES)) have identified 11.9 million cases of glaucoma in central India alone.^[13,14] These statistics indicate a low rate of detection and diagnosis for glaucoma, although individuals examined in these surveys had undergone prior ophthalmic evaluation. The high rate of prevalence of glaucoma mandates the need for enhanced detection of glaucoma in India.

Assessment of the peripapillary retinal nerve fiber layer (RNFL) thickness is an accurate method of identifying neuronal damage even in normal tension glaucomatous eyes. Typically, the assessment of the RNFL can be made by using techniques such as optical coherence tomography (OCT), scanning laser polarimetry using GDx VCC (variable corneal compensation), and Heidelberg retinal tomograph. These noninvasive techniques can provide accurate estimations of RNFL and help to adjudge incipient vision loss problems.^[15-17]

In India, glaucoma is also the cause of childhood blindness in 2.5% of the population. Since the prevention of blindness and reducing the progression of glaucoma hinges on early detection, assessment of the thickness of RNFL is a vital parameter.^[18]

In this issue of IJO, Drs. Khamar, Vasavada, Trivedi, Shah, and Thomas have presented their assessments of RNFL thickness in normal Indian children. Data presented in their paper included 200 children (average age 8.6 years), and shows that the superior average and inferior average values for RNFL thickness were similar and were not dependent on gender-based differences. The TSNIT (temporal-superior-nasal-inferior-temporal) and nerve fiber index (NFI) parameters also did not vary between male and female children.^[19]

These results are similar to measurements made in adult individuals in other ethnic groups as well. A small cohort size is a definite drawback of the study. Assessment of parameters from a larger cohort that includes special ocular conditions, with the aim of establishing a database of reference values, is necessary.^[19]

However, the study has definitely provided some reference values to compare against when assessing conditions such as incipient glaucoma or vitamin B12 deficiency, both of which can be presented in the form of reduced RNFL thickness. Specifically, for the treatment of glaucoma, these measurements from normal children can be used for reference in order to mandate periodic ophthalmic evaluation and patient guidance.

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