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PRIMARY eyecare

September is Save our Sight month

The sad thing is, around the world, an adult goes blind every five seconds and a child goes blind every minute.

The World Health Organisation estimates that the number of people with visual impairment is 285 million. Of these, 246 million have low vision and 39 million are estimated to be blind.

The top four causes of visual impairment are uncorrected refractive errors, cataract, glaucoma, and age-related macular degeneration.

The top three causes of blindness are cataract, glaucoma and age-related macular degeneration.

In New Zealand it is estimated that 20% of those registered blind are blind from preventable causes.

People in New Zealand are going blind because the diseases that rob them of their sight are not being detected early enough to prevent blindness

The positive news is that research is finding new ways to treat, minimise, and even prevent eye disease.

Recently the National Eye Institute, part of the National Institutes of Health in the US, released details of results from the AREDS 2 study which provides much needed clarity on supplements for protection against AMD.

The first Age-Related Eye Disease Study (AREDS 1) which concluded in 2001, established that daily high doses of vitamins C and E, beta-carotene, and the minerals zinc and copper—called the AREDS formulation—can help slow the progression to advanced AMD. However, beta-carotene use has been linked to a heightened risk of lung cancer in smokers. And there have been concerns that the high zinc dose in AREDS could cause minor side effects, such as stomach upset, in some people.

In 2006 the NEI launched AREDS2, a five-year study designed to test whether the original AREDS formulation could be improved by adding omega-3 fatty acids; adding lutein and zeaxanthin; removing beta-carotene; or reducing zinc. The study also examined how different combinations of the supplements performed.

In the first AREDS trial, participants with AMD who took the AREDS formulation were 25 percent less likely to progress to advanced AMD over the five-year study period, compared with participants who took a placebo. In AREDS2, there was no overall additional benefit from adding omega-3 fatty acids or a 5-to-1 mixture of lutein and zeaxanthin to the formulation. However, the investigators did find some benefits when they analyzed two subgroups of participants: those not given beta-carotene, and those who had very little lutein and zeaxanthin in their diets.

The fact is regular eye examinations can save sight

save OUR sight

N·Z·A·O

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"When we looked at just those participants in the study who took an AREDS formulation with lutein and zeaxanthin but no beta-carotene, their risk of developing advanced AMD over the five years of the study was reduced by about 18 percent, compared with participants who took an AREDS formulation with beta-carotene but no lutein or zeaxanthin," said Emily Chew, M.D., deputy director of the NEI Division of Epidemiology and Clinical Applications and the NEI deputy clinical director. "Further analysis showed that participants with low dietary intake of lutein and zeaxanthin at the start of the study, but who took an AREDS formulation with lutein and zeaxanthin during the study, were about 25 percent less likely to develop advanced AMD compared with participants with similar dietary intake who did not take lutein and zeaxanthin."

Normal Vision

Because carotenoids can compete with each other for absorption in the body, beta-carotene may have masked the effect of the lutein and zeaxanthin in the overall analysis, Chew said. Indeed, participants who took all three nutrients had lower levels of lutein and zeaxanthin in their blood compared to participants who took lutein and zeaxanthin without beta-carotene.

Removing beta-carotene from the AREDS formulation did not curb the formulation's protective effect against developing advanced AMD, an important finding because several studies have linked taking high doses of beta-carotene with a higher risk of lung cancer in smokers. Although smokers were not given a formulation with beta-carotene in AREDS2, the study showed an association between beta-carotene and risk of lung cancer among former smokers. About half of AREDS2 participants were former smokers. "Removing beta-carotene simplifies things," said Wai T. Wong, M.D., Ph.D., chief of the NEI Neuron-Glia Interactions in Retinal Disease Unit and a co-author of the report. "We have identified a formulation that should be good for everyone regardless of smoking status," he said. Adding omega-3 fatty acids or lowering zinc to the AREDS formulation also had no effect on AMD progression.

The same scene as viewed by a person with age-related macular degeneration

More than 4,000 people, ages 50 to 85 years, who were at risk for advanced AMD participated in AREDS2 at 82 clinical sites across the country. Eye care professionals assess risk of developing advanced AMD in part by looking for yellow deposits called drusen in the retina. The appearance of small drusen is a normal part of aging, but the presence of larger drusen indicates AMD and a risk of associated vision loss. Over time, the retina begins to break down in areas where large drusen are present during a process called geographic atrophy. AMD can also spur the growth of new blood vessels beneath the retina, which can leak blood and fluid, resulting in sudden vision loss. These two forms of AMD are often referred to as dry AMD and wet AMD respectively.

In a separate study, published online today in JAMA Ophthalmology, the AREDS2 Research Group evaluated the effect of the various AREDS formulas on cataract, a common condition caused by clouding of the eye's lens. Globally, cataract is the most common cause of blindness and is a major health problem in areas where cataract surgery is unavailable or unaffordable. About 24.4 million Americans are directly affected by cataract.

The original AREDS formulation from 2001 does not protect against cataract. In AREDS2, none of the modified formulations helped reduce the risk of progression to cataract surgery, although a subgroup of participants with low dietary lutein and zeaxanthin gained some protection. While a healthy diet promotes good eye health and general well-being, based on overall AREDS2 data, regular high doses of antioxidant supplements do not prevent cataract.

Many factors contribute to the development of AMD and cataract, including genetics, diet, and smoking. Scientists are unsure how supplements in the AREDS formulation exert their protective effects. However, an April 2013 report in the journal Ophthalmology by the AREDS Research Group shows the beneficial effects of taking the AREDS vitamins are long-lasting. The report describes a follow-up study of AREDS participants. Those who took the AREDS formulation during the initial five -year trial were 25 to 30 percent less likely to develop advanced AMD—mostly due to a reduction in the number of neovascular, or wet, AMD cases—over the next five years, compared with participants who took placebo during AREDS. Seventy percent of all participants were taking the original AREDS formula by the end of the follow-up period.

"Long-term use of AREDS supplements appears safe and protective against advanced AMD," said Chew. "While zinc is an important component of the AREDS formulation, based on evidence from AREDS2 it is unclear how much zinc is necessary. Omega-3 fatty acids and beta-carotene clearly do not reduce the risk of progression to advanced AMD; however, adding lutein and zeaxanthin in place of beta-carotene may further improve the formulation."

The AREDS2 study results provide physicians and patients with new information about preventing vision loss from AMD. The NEI notes that people over 60 years old should get a dilated eye exam at least once a year and should discuss with their eye care professional whether taking AREDS supplements is appropriate.

References:

- AREDS2 Research Group. "Lutein/Zeaxanthin and Omega-3 Fatty Acids for Age-Related Macular Degeneration. The Age-Related Eye Disease Study 2 (AREDS2) Controlled Randomized Clinical Trial." JAMA, published online May 5, 2013.
- AREDS2 Research Group. "Lutein/Zeaxanthin for the Treatment of Age-Related Cataract." JAMA Ophthalmology, published online May 5, 2013.
- Chew et al. "Long-Term Effects of Vitamins C, E, Beta-Carotene and Zinc on Age-Related Macular Degeneration." Ophthalmology, published online April 11, 2013.

The National Eye Institute, part of the National Institutes of Health, leads the federal government's research on the visual system and eye diseases. NEI supports basic and clinical science programs that result in the development of sight-saving treatments. For more information, visit http://www.nei.nih.gov.

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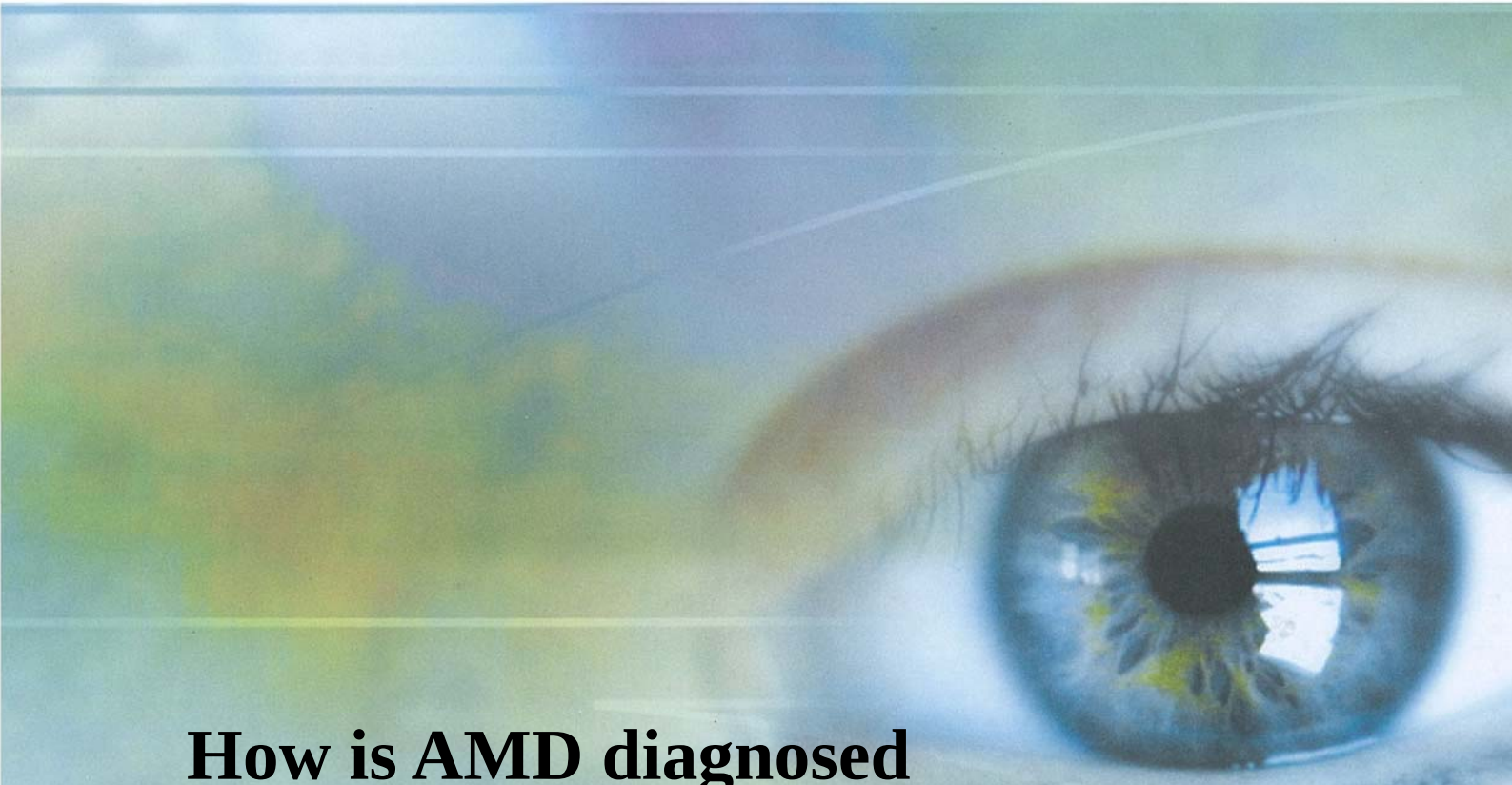

How is AMD diagnosed and what are its stages?

AMD diagnosis and staging depend largely on changes within the eye that can only be seen during an eye exam. These may include pigmentary changes in the retina and the presence of drusen, which are yellow deposits under the retina that contain cholesterol and cellular debris.

Most people develop some very small drusen as a normal part of aging. Researchers and clinicians generally recognize three stages of AMD.

1. Early AMD is characterized by the development of medium-sized drusen about 63-125 microns across, close to the width of an average human hair. Early AMD does not cause vision loss.
2. Intermediate AMD is characterized by large drusen (bigger than 125 microns) along with pigmentary changes in the retina. Intermediate AMD usually causes little or no vision loss.
3. In addition to drusen, advanced AMD is characterized by either:
   * A gradual breakdown of the central retinal area, called dry AMD or geographic atrophy
   * Abnormal and fragile blood vessels under the retina that can leak blood and damage the retina, called wet or neovascular AMD.

There are treatments to slow vision loss from neovascular AMD, including drugs that inhibit a protein called vascular endothelial growth factor (VEGF). When injected into the eye, these drugs can reduce the growth of abnormal blood vessels.

As reported in 2001, the AREDS formulation does not benefit people who have early AMD, or no AMD. It can slow the progression of intermediate AMD to advanced AMD.

What are lutein and zeaxanthin?
Lutein and zeaxanthin, along with beta-carotene, belong to a family of organic pigments known as carotenoids. Carotenoids are especially enriched in green leafy vegetables. They can be stored in animal tissues and are found at relatively low levels in animal food products. Beta-carotene is an orange pigment. In the body, it is used to make Vitamin A, which is required by the retina to detect light and convert it into electrical signals. Lutein and zeaxanthin are yellow pigments which are also found in the human retina and lens, where they may act as natural antioxidants and help absorb damaging, high-energy blue and ultraviolet light.

What are omega-3 fatty acids?
Omega-3 fatty acids are made by marine algae and are enriched in fish oils; they are believed to be responsible for the health benefits associated with regularly eating fish, including lower rates of cardiovascular disease. The AREDS2 study focused on the omega-3 fatty acids DHA and its precursor EPA. DHA is needed for the integrity of retinal cells, and has been shown to promote retinal development and repair in prior studies.