Risks Associated with Ocular Vitamin and General Multivitamin Regimens in Patients with Age-Related Macular Degeneration

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Introduction

Age-related macular degeneration (AMD) is the leading cause of vision loss in patients over 50 years of age. The National Eye Institute developed the Age-Related Eye Disease Study (AREDS) to study risk factors associated with AMD. The AREDS study examined the use of various types of vitamins and minerals that may reduce the risk of AMD in specific clinical scenarios and recommended the use of vitamins and minerals as a means to reduce AMD risk. As a result, non-prescription vitamin and mineral use is widely recommended by clinicians who demonstrate early AMD retinal findings. However, many older adults self-medicate with multivitamins even prior to use of eye vitamins and therefore may be subject to increased levels of vitamins and minerals that may increase risk for toxicity. The goal of this study was to provide recommendations for safe and appropriate vitamin and mineral supplementation regimens for patients with age-related macular degeneration (AMD) who seek to add ocular vitamins to their general multivitamin regimen.

Methods

A systematic review of the literature was performed using secondary literature databases. The reference search allowed for compilation of primary and tertiary sources. The evidence was compared to common ocular supplement and Centrum multivitamin ingredients; multivitamins and ocular vitamins were also directly compared. Upper limits of each vitamin or mineral examined was determined using total upper intake limit (TUIL) set by the Institutes of Medicine (IOM). The vitamins and minerals assessed in the ocular and multivitamin include: vitamins A, B, C, D, E, K, copper, lutein, selenium, omega-3 fatty acids, and zeaxanthin.

Results

Results from the systematic review found relevant data regarding the ingredients present in both ocular supplements and daily multivitamin formulations. Cumulative levels of vitamin A and zinc found to surpass the established TUIL.

Vitamins

Table 1. Ocular vitamin and mineral supplements analyzed in this study

Table 2. Daily multivitamin and mineral supplements analyzed in this study

Table 3. Amounts of zinc in ocular vitamins, daily multivitamins, and combined levels. Amounts of zinc were taken from the product label and are displayed as International Units (IU) of retinol. Product labeling with units of beta-carotene were converted into units of retinol. Numbers highlighted in red represent the combined amounts of zinc that are above the daily total upper intake limit (TUIL) when combined with all multivitamins analyzed were seen with the combination of I Caps Eye Vitamin with Lutein and Omega-3 formula with all multivitamins formulations.

Table 4. Amounts of vitamin A in ocular vitamins, daily multivitamins, and combined levels. Amounts of vitamin A were taken from the product label and are displayed as International Units (IU) of retinol. Numbers highlighted in red represent the combined amounts of vitamin A that are above the daily total upper intake limit (TUIL) when combined with all multivitamins analyzed.

Conclusion

In many combination regimens vitamin A and zinc levels surpassed tolerable upper intake levels. Patients with comorbidities, such as those with diabetes and complicating renal disease are susceptible to toxicity and should also take caution when adding an ocular vitamin to their daily multivitamin therapy. Select combinations regimens keep nutrients at safe levels. Eye care professionals should be knowledgeable of harmful combinatory effects when adding ocular vitamins to established daily multivitamin regimens and recommend regimens that avoid interactions.

References