Introduction

Hearing loss is the most common sensory disorder among adults in the United States, and can arise from noise exposure, age, genetic causes and predispositions to hearing loss, ototoxic drug exposure, or any combination of the above.

Avoiding noise exposure, wearing hearing protection devices and avoiding ototoxic drugs can help prevent hearing loss. Monitoring hearing status can help highlight ways to manage hearing loss, and the possibility of consuming antioxidants to protect against hearing loss has become more in the media.

Question

Does consumption of the antioxidant vitamin E help prevent against any type of hearing loss? More specifically, is dietary consumption of vitamin E associated with better hearing thresholds (thus, potentially play a protective role against age or noise induced hearing loss)? Can vitamin E intake during periods of exposure to ototoxic drugs play a protective role for auditory function?

Search Terms

- Vitamin E
- Hearing Loss

Inclusion / Exclusion Criteria

The following inclusion criteria was used in selecting articles to review from the literature reviewed:

- Examines impact/association of vitamin E and hearing loss
- Subjects/participants are human
- Can be easily accessed through Western University libraries

The following exclusion criteria was used in selecting articles to review from the literature search results:

- Subject/participants were not human
- Cannot easily be accessed through Western University libraries
- Duplicates from different database results
- Not available in English

Literature Search

A systematic review of the literature was conducted. Search terms were run through databases, including PubMed, Cochrane Review, Scopus, and ProQuest for the primary literature search. An additional secondary search was completed using references from several articles found in the initial search; two additional references were found. The primary and secondary searches yielded 48 articles. The number of results from each search is outlined in the flowchart below.

Results

The literature search resulted in 7 articles for data extraction. The articles were appraised for their quality using the Crow Critical Appraisal Tool (CCAT) Version 1.4 and the CCAT form. The data extraction tool was used to highlight key information and relevant findings from each article. Categories on the data extraction tool included: authors, year of study, year of publication, research question/objective, setting methods, sample size, participant demographics, description of intervention, statistical analyses, results, findings/conclusions, and CCAT score.

The 7 remaining articles were appraised and key data was extracted using the data extraction tool. The data extraction tool is illustrated in the Results section of this poster.

Conclusions

Data collected from the 7 reviewed articles suggest, overall that vitamin E and hearing level association is weak at best. Of the 5 Large-scale longitudinal and cross-sectional studies, 2 studies did not indicate any association between vitamin E intake (through diet and supplements) to be associated with hearing level sensitivity. Conversely, 3 of these large-scale studies did find weak association between vitamin E intake and better hearing level sensitivity. No firm conclusions can be made as to whether the long term consumption of vitamin E is protective of hearing sensitivity. This review also includes 2 studies which examined vitamin E (either alone or with additional nutrients) intake during ototoxic drug exposure to determine if vitamin E had a protective effect for hearing. In relation to gentamicin exposure, vitamin E was not protective for hearing sensitivity. When combined with other nutrients, it was also ineffective at preventing hearing loss due to cisplatin exposure. Overall there is not definitive evidence that hearing sensitivity is protected or that hearing loss is prevented by vitamin E intake.

A limitation of this systematic review is the exclusion or inclusion of journal titles in databases searched. It is not always easy to tell which journals are included in a database selection. By only using databases to search for articles, and by only using 4 databases for the search, other journal articles may have been missed. The secondary search was performed using the reference lists of the articles and 2 additional, relevant articles were found which had not appeared in the initial database search. This limitation could be improved by querying which journal titles (and years of publication) are included in the database, by searching through additional databases, and by doing additional searches in the journals in which the previously found articles appeared.

Future research for the topic of this systematic review could include looking at animal studies. These studies have greater control and it would be more helpful in determining under which conditions vitamin E is protective of hearing, and therefore how well these conditions were met in the human studies. Additionally, further research should examine higher doses of vitamin E during ototoxic drug exposure, and then follow those patients for hearing sensitivity for longer periods.

References

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