Association of fish oil supplement use with preservation of brain volume and cognitive function

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The objective of this study was to investigate whether the use of fish oil supplements (**FOS**) is associated with concomitant reduction in cognitive decline and brain atrophy in older adults. It was a retrospective cohort study using 229 cognitively normal individuals (**NC**), 397 patients with mild cognitive impairment (**MCI**), and 193 patients with Alzheimer's disease (**AD**), followed for up to 4 years (a total of 819 subjects, aged 55-90 years). All were assessed with neuropsychological tests and brain magnetic resonance imaging every 6 months.

Primary outcomes included global cognitive status and cerebral cortex gray matter and hippocampus and ventricular volumes.

KEY POINTS FROM THIS STUDY:

1) "Effective and safe interventions to prevent or delay the onset and treat AD are urgently needed."

2) Fish oil is a rich source of the omega-3 fatty acids eicosapentaenoic acid (**EPA**), and docosahexaenoic acid (**DHA**).

3) "Long-term effects of methyl mercury may motivate the use of fish oil supplements (FOS) to replace or augment dietary consumption of marine sources of n-3 PUFAs."

4) This retrospective cohort study is the first to examine the association of ongoing FOS use with conservation of brain volume (**BV**) and cognition across the spectrum of normal aging and neurodegeneration.

5) In this study, for those who were already consuming FOS at baseline:

- NC subjects had been using FOS for 6.0 years
- MCI subjects had been using FOS for 4.7 years
- AD subjects had been using FOS for 2.5 years

6) "FOS use during follow-up was associated with significantly lower mean cognitive subscale on the Alzheimer's Disease Assessment Scale."

7) FOS use during the study was also associated with less brain atrophy.

8) "Significant associations between FOS use and both cognitive outcome measures were observed at follow-up (6–48 months)."

9) Use of FOS at any given time during the study was associated with increased hippocampal volume and increased cerebral cortex gray matter volume.

10) "Brain imaging analyses within the MCI and AD groups revealed a significant positive association between FOS use during the study and mean cerebral cortex gray matter volumes."

11) After adjusting for potential confounders, use of FOS during the study was associated with less cerebral cortex gray matter and hippocampal atrophy and better performance on the cognitive tests compared with nonusers; "these results were observed in the entire [study] cohort, for those without a dementia diagnosis at baseline, and in the APOE ε4 group."

12) FOS use may have its greatest effects for neuroprotection when used early, in the prodromal phase of cognitive decline.

13) "By the time that AD is clinically evident, years of cumulative neuropathology has already occurred, so it is not surprising that n-3 PUFA supplements do not benefit cognition in established dementia."
[This means that FOS is best used for the prevention of AD, and not for the treatment of AD. However prior evidence suggests that FOS may retard or prevent the progression of MCI to AD].

14) "Middle age may be a particularly significant period for the potential role of n-3 PUFA in cognitive aging."

15) "This study is the first to report an association between FOS use and brain structural changes in all three cognitive diagnostic groups; these findings may suggest a potential role for FOS by reducing neurodegeneration over time."

COMMENTS FROM DAN MURPHY

A shortcoming of this study is that the type (ratio of EPA/DHA) and quantity of fish oil supplementation used is not available.