Fish Oil and Impulsive Aggressive Behavior

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To The Editor:

IT IS NOT SURPRISING TO SEE A NEGATIVE OUTCOME from the study by Dean et al. (2014) for several reasons. First, the 6 week length of the intervention was not long enough to see any effect, especially in a crossover design in which there would be a carry-over effect from the fish oil. Second, compliance was questionable, as the 400 mg eicosapentaenoic acid (EPA) plus 2000 mg docosahexaenoic acid (DHA) dose resulted in a significant increase of serum EPA (by approximately fivefold) but no significant increase in DHA; however, the dose of DHA was 5 fold higher than that of EPA. Third, “15 participants provided at least one blood sample during the study (13 at baseline, 8 at 6 weeks, and 2 at 12 weeks).” The authors correctly pointed out in the Limitations section that the number of participants with serum concentration data was too small to examine how the change in serum concentrations of fatty acids influenced behavior. Despite these major limitations, the authors still concluded that fish oil was not an effective treatment for aggression.

An important point raised previously by statisticians and authors Bloch and Qawasmi relates to the design of dietary supplement intervention trials in children with disruptive behavioral disorders including attention-deficit/hyperactivity disorder (ADHD) and the relevance of adequate power and sample size. Bloch and Qawasmi (2011) calculated that, in order to have sufficient power ($\beta = 80\%$, two tailed $\alpha = 0.05$) to detect a significant benefit (effect size of 0.31), clinical trials of omega-3 intervention compared with a placebo would need a sample size of ~330 children. Therefore, the actual sample size in this study ($n = 21$) demonstrated insufficient statistical power, which notably contributed to the null finding (Bloch and Qawasmi 2011).

When designing randomized controlled trials, the study design should include an intervention long enough for an effect to be seen, and to show that the change in intervention (e.g. aggressive behavior) is related to the change in the biomarker. Furthermore, there is a significant washout period for DHA levels once they have accumulated in brain tissue; therefore, a crossover design such as this with fish oil supplementation is inappropriate. Outcome measures should also be considered; this study used a questionnaire to assess aggression. Although the authors refer to Gesch et al. (2002), they do not mention that both Gesch et al. (2002) and Zaalberg et al. (2010) found substantially reduced aggressive behavior in prisoners after omega-3 plus multivitamin mineral supplementation, as assessed by the reduced number and severity of reprimands, but not as assessed with self-report questionnaires that assessed aggressive behavior.

Given these methodological issues, the authors' conclusion is flawed. It is disappointing to see studies such as this that have not sufficiently researched previous study methodologies and outcomes. Readers should refer to a recent update of the current evidence and future directions (Gow et al. 2015).

Disclosures

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