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Omega-3 Fatty Acids and Risk of Atrial Fibrillation: A Case Report and Literature Review

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Abstract

Omega-3 fatty acids are one of the most used food supplements. However, atrial fibrillation has been recently presented as a rare adverse drug event following ingestion of high doses of this food supplement.

Keywords

Atrial Fibrillation, Omega-3, Food Supplements

1. Introduction

Omega-3 fatty acids are food supplements used to manage elevated serum triglycerides, amongst other FDA-approved indications. According to the American Heart Associated, 4 g per day of omega-3 fatty acids is an effective treatment for hypertriglyceridemia, either alone or adjunctive therapy with other lipid-lowering agents. However, the global market size of USD 2.1 billion in 2020 [1]. These huge expenditures reflect the worldwide popularity of these products and the belief that omega-3 fatty acids are beneficial to their health. It is important for consumers who take them to understand their potential risks. The VITAL Rhythm Study examined the risk of atrial fibrillation (AF) with the intake of omega-3 fatty acids [2]. The study showed that there might be a dose-related risk of AF with omega-3 fatty acid intake; concerns have emerged regarding the safety of this food supplement, particularly linked with cardiac arrhythmias.

2. Case Presentation

We report a case of a 42-year-old male patient with no previous medical history presenting to the emergency department with palpitations for one day with no clear history of chest pain. There were no associated symptoms. He had similar previous attacks with the latest three months ago, which was reverted by cardioversion. The patient was conscious and oriented on examination with no neurological deficit or cerebellar signs. The chest had good bilateral air entry, and the abdomen was soft and lax. The patient was hemodynamically stable. Heart rate was around 110 beats/minute, with ECG showing flutter-fibrillation. The diagnosis was atrial fibrillation. The patient was admitted to the CCU for further management. Echocardiogram was normal.

During CCU admission, therapeutic enoxaparin was administered as 80 mg STAT once-only dose and flecainide 200 mg STAT dose, bisoprolol 1.25 mg STAT. In addition, a cardiac monitor was placed. Fortunately, he reverted to sinus rhythm 8 hours later.

Following an interview with the patient, an omega-3 fish oil supplement was identified as a potential causative agent. The patient admitted ingesting around three tablets (3 gm) daily for the past 20 years. The patient denied taking any other medications. The patient was instructed to discontinue this treatment. Follow up for the next six months; the patient did not report any atrial fibrillation attack.

Using the Naranjo Algorithm [3], a score of 7 was calculated, which might indicate that omega-3 causality to atrial fibrillation, in this case, is probable.

3. Discussion

Omega-3 fatty acids generally refer to three main forms; ALA, EPA (eicosapentaenoic acid), and DHA (docosahexaenoic acid). Commercially, Omega-3 is available in two medications. One form combines EPA and DHA while the other medicinal form consists of one type only: EPA.

A scientific advisory from the American Heart Association stated that 4 grams per day of omega-3 fatty acids can help manage hypertriglyceridemia by decreasing serum triglycerides by 25% - 30% and that a dose-response relationship exists between omega-3 fatty acid intake and triglyceride-lowering effects [4]. Since then, there have been advocates for the use of omega-3 fatty acids for stroke, cardiac arrhythmias, hypertension, and rheumatoid arthritis. The 2019 science advisory from American Heart Association provided similar recommendations [5].

Our case report adds to the body of evidence linking omega-3 fish oil ingestion with increasing risk of developing cardiac dysrhythmias, namely, atrial fibrillation. Four randomized clinical trials recently provided information on the risk of atrial fibrillation with omega-3 fatty acids. Firstly, in the STRENGTH randomized controlled trial of 13,078 patients examining the effect of high dose omega-3 fatty acids (4 g/day) on major adverse cardiovascular events in patients

at high cardiovascular risk, a higher incidence of atrial fibrillation was observed in the omega-3 group (2.2% vs. 1.3%; hazard ratio, 1.69; 95% CI, 1.29 - 2.21; $p < 0.01$) [6]. The REDUCE-IT trial randomized 8179 patients to high-dose omega-3 fatty acids (4 g/d) or mineral oil. Atrial fibrillation or flutter-related hospitalizations were significantly higher in the purified EPA group than placebo (3.1% vs. 2.1%, $p = 0.004$). In addition, the rate of atrial fibrillation was significantly higher in the icosapent ethyl group than in the placebo group (5.3% vs. 3.9%) [7]. The OMEMI randomized controlled trial enrolled 1027 older patients with recent MI and was randomized to receive an intermediate dose of 1.8 g/d of omega-3 fatty acids or corn oil. After 24 months, there was an increase in AF in the polyunsaturated fatty acids (PUFA) group compared with placebo (7.2% vs. 4.0%, $p = 0.06$) [8]. Finally, in the VITAL RHYTHM study, 25,871 participants were randomized to receive a standard dose of omega-3 fatty acids of 840 mg/d (combination of EPA and DHA) or placebo. After a median of more than five years, the incidence of AF was 7.2 per 1000 person-years in those taking omega-3 fatty acids vs. 6.6 person-years in those receiving placebo (HR, 1.09; 95% CI, 0.96 - 1.24; $p = 0.19$) [2].

4. Conclusion

Patients should be aware of the risk of atrial fibrillation when taking high doses of omega-3 fatty acids. Therefore, patients should be kept on the lowest possible dose and reviewed periodically whenever prescribed. In addition, follow-up for possible development of this condition should be performed to ensure the safety of this high dose regimen.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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