

CASE REPORT

INTENSIVE CARE

Recurrent atrial fibrillation episodes related to monosodium glutamate (MSG) - a case report

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ABSTRACT

Cardiac disease is largely believed to be a gift of modern sedentary life style and junk foods. Yet often the clinicians fail to find the etiologic factors in many of the patients. This case report is about recurrent episodes of atrial fibrillation in a physician. Careful history revealed the relationship of having ingested Chinese food before every episode of the atrial fibrillation. Aspartame and flavor enhancer monosodium glutamate have been considered as the food ingredients that may cause such arrhythmias. The patient had to be treated aggressively with drugs and even cardiac cryoablation of four pulmonary veins and radiofrequency ablation of right atrium.

Key words: Monosodium glutamate (MSG); Excitotoxins; Cardiac arrhythmias; Atrial fibrillation

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1. INTRODUCTION

There is ample evidence in the form of multiple reports in the literature about cardiac rhythm abnormalities caused by various food ingredients and chemicals used for food processing. Two of the most concern have been a sweetener - aspartame and a flavor enhancer - monosodium glutamate (MSG). The use of both of these is prevalent in modern food items and both have been implicated as an epidemiological cause of atrial fibrillation. Physiologically, this is supposed to be resulting from glutamate and aspartame receptors that have been documented in cardiac muscle tissue. We present a report of a physician, a teetotaler, with no previous history of food intolerances, no history of other arrhythmias, ischemic heart disease, or heart failure. He had eight recurrent episodes of atrial fibrillation over a

course of few months, out of which six occurred within two hours of confirmed consumption of catered Chinese food. After conservative management failed, these episodes required ablation procedures. The presence of MSG and aspartame in modern foods, may need to be monitored, and warning signs posted, for those who are susceptible to these cardiac rhythm abnormalities.

2. CASE REPORT

A 63-year old physician with no previous history of food allergies, cardiac rhythm abnormalities, hypertension, or heart failure presented with an initial episode of atrial fibrillation after a jogging activity in early morning in September 2021. It was accompanied by dizziness but resolved spontaneously within two hours. The episode was initially caught by an Apple watch and then

confirmed by a 12-lead ECG in an outpatient setting. There were no other clinical abnormalities on a thorough examination and testing at that time. Following that, he had almost twelve recurrent episodes, each occurring at a shorter interval than the previous one. While the earlier ones occurred after an interval of more than a month, the following episodes happened two times a week. Only clinical positive diagnostic test with these episodes was the ECG, which confirmed atrial fibrillation on EKG. The patient does not consume alcohol because of his religious beliefs. Only common denominator for 6 of the 8 episodes was the documented consumption of Chinese food bought at different restaurants consumed within a 2-hour window of the episodes. A recent episode did not resolve spontaneously in a few hours and metoprolol 50 mg 2 times a day orally was started for rate control and apixaban 5 mg 2 times a day to reduce the risk of stroke and systemic embolism. With subsequent episodes, he also required an oral anti-arrhythmic in the form of a loading dose of 300 mg flecainide that converted the rhythm to sinus rhythm within few hours each time.

A chest x-ray was normal, and an echocardiogram revealed maintained normal ejection fraction, normal size and thickness of left ventricle with normal global and segmental wall motion. A stress electrocardiogram was negative for evidence of myocardial ischemia with excellent exercise tolerance for age/gender matched controls.

Because of increased frequency and resulting disability, he underwent cardiac cryoablation of 4 pulmonary veins and successful radiofrequency ablation of RA for atrial tachycardia, that resulted in immediate and lasting relief. More than a year out now, the patient has avoided Chinese food in any form or other substances that may contain monosodium glutamate and has remained symptom-free.

3. DISCUSSION

Extensive use of MSG has been postulated as a possible threat to public health. It acts on the glutamate receptors and releases neurotransmitters which, play a vital role in normal physiological as well as pathological processes.¹ In addition, combined with high lipid diet, it provokes metabolic alterations and systemic anomalies. MSG and high lipid diet exert deleterious effects by modulating different signaling cascades to cause dyslipidemia via altered LDL/HDL and leptin/adiponectin ratio, oxidative stress via generation of reactive oxygen species with altered redox-homeostasis, inflammatory response via altering the balance of pro-inflammatory/anti-inflammatory factors, apoptosis via stimulating apoptotic mediator and thereby systemic damages.²

There is evidence of these NMDA glutamate receptors in human keratinocytes and rat cardiocytes.³ Human heart glutamate receptors have been implicated in toxicology and food safety.⁴ 'Lone' atrial fibrillation precipitated by monosodium glutamate and aspartame has been reported that were brought about by MSG challenge and resolved by avoidance. That report describes the rapid rise of free glutamate resulting in their higher levels in body, and thus the cardiac toxicity.⁵

The present report describes documented recurrent episodes of atrial fibrillation, linked temporally to consumption of MSG in Chinese food, in a patient with no significant past medical history. An extensive workup confirmed episodic atrial fibrillation without any underlying morphological abnormality and ruled out other arrhythmias including atrial flutter and tachycardia, reentry and supraventricular tachycardia and Wolff-Parkinson-White syndrome. The management included oral beta blockers, anticoagulants and anti-arrhythmic medications. Because of the increasing frequency of episodes disrupting activities of daily living, the patient underwent cryoablation of four pulmonary veins and radiofrequency ablation of right atrial tachycardia. The patient continues to avoid any new exposure to MSG. He has experienced long-term relief with no requirement for additional medications or interventions.

4. CONCLUSION

Atrial fibrillation is a serious medical condition that can lead to stroke, heart failure and other cardiac complications. Given the prevalence of food additives like monosodium glutamate in modern food and evidence in the literature of possibly serious cardiac, and other systemic toxicity, we recommend people sensitive to it to avoid foods containing this ingredient. Additional research, greater public awareness and, possibly warning label system is recommended.

5. Conflict of interests

None declared by the authors.

6. Consent of the patient

Written consent of the patient was obtained to publish this case report for academic and clinical purposes.

7. Authors' contribution

AP: Concept, conduction of the study work, literature study, and manuscript editing

CMV, OJM, GDE: Supervision. review of the manuscript

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