



NEW ONSET ATRIAL FIBRILLATION DUE TO AMPHETAMINE USE IN A YOUNG PATIENT

*¹Muammer KARAKAYALI, *¹Timor OMAR

¹Department of Cardiology, Kars Harakani State Hospital, Kars, Turkey

Case Report

Received: 13/01/2021; Accepted: 24/02/2021

*Corresponding author: muammer-28@hotmail.com

Abstract

The Food and Drug Administration (FDA) label for amphetamine gives warning of serious cardiovascular events and risk of sudden death in patients with structural heart disease or other serious cardiac conditions. Literature review was unrevealing for linkage of amphetamine stimulants to atrial fibrillation specifically. Additionally, recreational use of amphetamines can cause electrical instability of the myocardium potentially leading to arrhythmias, although this is more typical in the setting of an underlying structural heart defect. We must rely on the diligence of the practitioner to evaluate all possible causes for a new onset arrhythmia, and possibly specifically ask about the off-label use of these medications. There is clear documentation in the literature regarding myocardial infarction, stroke, and sudden death in adults using CNS stimulants. However, there is little data regarding specific arrhythmias, including atrial fibrillation, using these medications. Further studies need to be developed to assess the relationship between stimulant medications and atrial fibrillation, as well as guidelines for prescribing these medications to patients who may already be at risk for developing atrial fibrillation based on personal or family history.

Key Words: Amphetamine, Atrial fibrillation, Stimulant.

Özet

Gıda ve İlaç Dairesi (FDA) Amfetamin kullanımını; yapısal kalp hastalığı veya diğer ciddi kalp rahatsızlıkları olan hastalarda ciddi kardiyovasküler olaylar ve ani ölüm riskine sebep olabilmesi nedeniyle uyarılmaktadır. Literatürde amfetamin vb. uyarıcıların özellikle atriyal fibrilasyonu tetiklemesi net açıklığa kavuşmamıştır. Ek olarak; amfetaminlerin eğlence amaçlı kullanımı miyokardiyumun elektriksel instabilitesine neden olabilir ve potansiyel olarak aritmilere yol açabilir, ancak bu altta yatan yapısal bir kalp hastalığı durumunda daha tipiktir. Yeni başlayan bir aritminin tüm olası nedenlerini değerlendirmek ve özellikle bu ilaçların endikasyon dışı kullanımını sorgulamak için hekimin gayretine güvenmeliyiz.

Literatürde Merkezi Sinir Sistemi (MSS) uyarıcıları kullanan erişkinlerde miyokard infarktüsü, inme ve ani ölümle ilgili net bulgular vardır. Ancak, bu ilaçların kullanımına bağlı atriyal fibrilasyon dahil spesifik aritmilerin gelişimiyle ilgili çok az veri vardır. Uyarıcı (stimülan) ilaçlar ile atriyal fibrilasyon arasındaki ilişkiyi değerlendirmek için daha ileri çalışmaların yanı sıra, kişisel veya ailevi geçmişe dayalı olarak atriyal fibrilasyon gelişme riski olan hastalara bu ilaçları reçete etmek için kılavuzlar geliştirilmesi gerekmektedir.

Anahtar Kelimeler: Atriyal fibrilasyon, Amfetamin, Uyarıcı

1. Introduction

Atrial fibrillation is a very common rhythm in the general population, with a prevalence of approximately 2%, with the majority of the patients being of older age (Wilke et al., 2013). Well established risk factors for atrial fibrillation include congestive heart failure, hypertension, diabetes mellitus, hyperthyroidism, structural heart defects and heavy alcohol use (Potpara & Lip, 2011). It is important to further identify risk factors and precipitants of atrial fibrillation given its association with significant morbidity and mortality.

2. Case Report

A 26 years old male presented to the emergency department after an electrocardiogram (ECG) in his primary care providers office revealed atrial fibrillation with rapid ventricular

response. The patient whose blood pressure was 120/70 had no angina, palpitations, syncope or shortness of breath. The patient who did not have any history of chronic disease, arrhythmia or familial heart disease also had no known alcohol or drug use. The score of CHA2S2Vasc was 0. ECG in the emergency department confirmed atrial fibrillation with rapid ventricular response, with a heart rate of 140 beats per minute (see Figure 1).

Further laboratory testing demonstrated potassium level 3.62 mEq/L (normal range 3.5-5.1 mEq/L), magnesium level 2.3 mg/dl (normal range 1.6-2.6 mg/dl), thyroid stimulating hormone 1.680 μ IU/ml (normal range 0.45-4.50 μ IU/ml), free thyroxine 1.34 ng/dl (normal range 0.82-1.77 ng/dl), troponin 3 ng/L (normal range 0.00-14 ng/L) and hemoglobin 15.4 g/dl (normal range 11-16 g/dl). Chest X-ray was without acute findings. Echocardiogram, while in atrial fibrillation, ejection fraction of 55%, the left atrium was 28 mm in the parasternal long axis and there was no structural heart disease. Amphetamine was detected in the drug screening test performed on the urine sample taken from the patient. Transesophageal echocardiogram (TEE) was performed, was unrevealing for thrombus. Medical cardioversion was decided, but the patient returned to sinus rhythm before starting medical treatment.

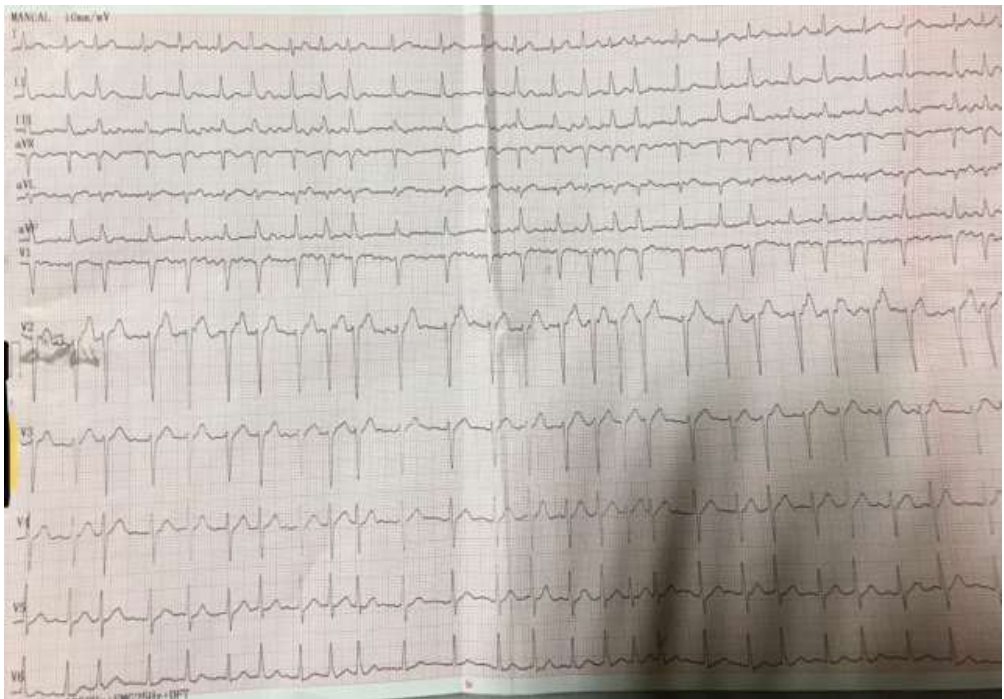


Figure1: ECG in the emergency department confirmed atrial fibrillation with rapid ventricular response, with a heart rate of 140 beats per minute

3. Discussion

Amphetamine-dextroamphetamine is a non-catecholamine sympathomimetic central nervous system (CNS) stimulant, and a class II-controlled substance. The Food and Drug Administration (FDA) label for amphetamine gives warning of serious cardiovascular events and risk of sudden death in patients with structural heart disease or other serious cardiac conditions. Literature review was unrevealing for linkage of amphetamine stimulants to atrial fibrillation specifically. However, there are reports associating amphetamines to atrial flutter (Mugmon, 2012). Additionally, recreational use of amphetamines can cause electrical instability of the myocardium potentially leading to arrhythmias, although this is more typical in the setting of an underlying structural heart defect (Ghuran & Nolan, 2000). We must rely on the diligence of the practitioner to evaluate all possible causes for a new onset arrhythmia, and possibly specifically ask about the off-label use of these medications.

4. Conclusion

There is clear documentation in the literature regarding myocardial infarction, stroke, and sudden death in adults using CNS stimulants. However, there is little data regarding specific arrhythmias, including atrial fibrillation, using these medications. Further studies need to be developed to assess the relationship between stimulant medications and atrial fibrillation, as well as guidelines for prescribing these medications to patients who may already be at risk for developing atrial fibrillation based on personal or family history.

Acknowledgement

None.

Conflicts of interest

The authors declare that there are no potential conflicts of interest relevant to this article.

References

- Ghuran, A., Nolan, J. (2000). The Cardiac Complications of Recreational Drug Use. *West J Med*, 173(6): 412-15. <https://doi.org/10.1136/ewjm.173.6.412>
- Mugmon, M. (2012). Atrial Flutter with Aberrant Conduction in a Patient Taking Amphetamine Salts and Caffeine. *J Community Hosp Intern Med Perspect*, 1(4), 10.3402/jchimp.v1i4.10663. <https://doi.org/10.3402/jchimp.v1i4.10663>
- Potpara, T.S., Lip, G.Y.H. (2011). Lone Atrial Fibrillation: What is Known and What is to Come. *Int J Clin Pract*, 65(4): 446-57. <http://dx.doi.org/10.1111/j.1742-1241.2010.02618.x>
- Wilke, T., Groth, A., Mueller, S., Pfannkuche, M., Verheyen, F., Linder, R., Maywald, U., Bauersachs, R., Breithardt, G. (2013). Incidence and Prevalence of Atrial Fibrillation: An Analysis Based on 8.3 Million Patients. *Eurospace*, 15(4), 486-93. <https://doi.org/10.1093/europace/eus333>