



Vagally-mediated atrial fibrillations

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ABSTRACT

Atrial fibrillation is the most common type of arrhythmia, affecting 40% of the population for more than 60 years. It increases the occurrence of cardioembolic stroke, heart failure, dementia, and death. Anticoagulation is the standard of care for patients at high risk of stroke. Although we made significant progress in treating persistent, permanent, and chronic atrial fibrillation, lone atrial fibrillation did not receive significant progress compared to other types of atrial fibrillation. In this article, we present a case of lone atrial fibrillation with few presentation to emergency and never received the right diagnosis or treatment and discuss pathophysiology and treatment alternatives..

Keywords: Atrial fibrillation, Lone atrial fibrillation, Vagally medicated atrial fibrillation.

INTRODUCTION

A 38-year-old man presented with a three-month history of worsening paroxysmal Atrial Fibrillation (AF). Associated symptoms included left-sided dull chest pain, palpitations, mild dyspnoea, no pre-syncope, syncope, or diaphoretic episodes. Troponins were negative and electrocardiograms revealed intermittent episodes of atrial fibrillation interspersed with sinus bradycardia (around 55 bpm).

CASE REPRESENTATION

The history of the patient's AF appeared very common and strongly consistent with vagally-mediated Atrial Fibrillation. Which was minimal during the day as the patient noticed only two-to-three episodes lasting seconds to minutes because patient is usually active during the day with enhanced adrenergic drive and less dominant parasympathetic drive. Day-time triggers included eating (particularly cold foods and drinks), burping, and long periods of relaxation (parasympathetic drive mediated). When the patient tried to sleep at night, his symptoms were more pronounced and could last up to eight hours. He noticed that riding on an exercise bicycle helped revert this atrial fibrillation to a normal sinus rhythm and abort all symptoms (by decreasing his parasympathetic drive and increasing his sympathetic drive) adrenergic drive mediated).

Twenty years before the onset of the AF, the patient was envenomated by a pit viper snake and was admitted to an intensive care unit in a developing country. The patient reported that in that event, his creatinine kinase level was around 15,000 U/L. No medical records were available from this event and there was no report of potential effects on the patient's heart. The patient had no cardiac risk factors, a normal calcium score, and a normal coronary angiogram.

The patient was seen by a cardiologist who commenced amiodarone and nebivolol, because of one episode of symptomatic paroxysmal atrial fibrillation but his symptoms worsened on nebivolol (blocking adrenergic drive and parasympathetic drive dominates over sympathetic), especially when the dosage was increased. Ceasing Amiodarone and Nebivolol had led to improvement in his symptoms and spontaneous cardioversion to sinus rhythm (sympathetic drive dominates over parasympathetic).

DISCUSSION

Although there is an explosion in research and understanding of the mechanism, pathophysiology, and intervention to treat AF, there is no research on lone Atrial Fibrillation and no unique mechanism has been proposed [1-3]. The term lone AF was introduced in 1945 by Evans and Swann for patients under the age of 60 with structurally normal hearts, and no history of hypertension [4,5]. A larger proportion of patients with paroxysmal AF is diagnosed with lone AF than with permanent AF [6]. A normal echocardiogram and left atrial volume index are required for lone AF diagnosis.

Most patients with paroxysmal AF visit Emergency Departments (ED) frequently. In a busy ED, emergency physicians often concentrate on risk stratification for cardioembolic stroke and does not have the time to inquire about the triggers of AF - whether adrenergic mediated like exercise, stressors, infections, or vagal-mediated like eating, burping, relaxation and nausea- or whether AF precipitates with exercise during the day time or relaxation during night and sleep. Thus, patients with autonomic mediated AF attend regularly to the ED and discharge without an accurate diagnosis of atrial fibrillation and they make no changes in lifestyle or triggers. Vagal-mediated AF affects younger people between the ages of 25 years and 55 years and is more common in men than in women; ECG usually shows flutter alternating with fibrillation. Adrenergic AF can occur in patients with structural heart disease in contrast with vagally mediated AF, which occurs in the normal heart. In addition, patients with vagally mediated AF usually have sinus bradycardia before culmination to AF. A few patients can have both vagally and adrenergic mediated AF in the same time or subsequently.

Vagally induced AF has been attributed to an increase in acetylcholine which causes shortening of atrial action potential and atrial refractory period. Which, in turn, increases spatial heterogeneity causing a decrease in the wavelength of the atrial excitation wave resulting in multiple re-entrant circuits in the atrial myocardium causing and maintaining AF. Schauer et al. showed that trans vascular atrial parasympathetic catheter ablation can cure vagally mediated AF in dogs, confirming the major role of high vagus tone in paroxysmal AF [6-9].

Scarce case reports describe transient ST elevation in the inferolateral leads, and this has been attributed to autonomic imbalance and increased vagal tone. The authors thought that there could be an association between the left atrium, vagal hypertonicity, and the atrial septum. Published data confirmed that atrial ganglionated plexus were found on the posterior surface of the left and right atrium, posterior medial surface of the left atrium, inferior and lateral aspect of the posterior left atrium, and interatrial septum. Manipulation of the atrial septum or left atrium causes selective activation of the right cardiac parasympathetic innervation to the inferior and or posterior myocardium which could explain the transient elevation of the S-T segment in the inferolateral leads. Despite the limited publication on the treatment of vagally mediated AF, it is obvious that beta-blockers, digoxin, and non-dihydropyridine calcium blockers are not only ineffective and harmful but also are contraindicated and can precipitate arrhythmia due increasing the atrial parasympathetic tone [10-13].

According to the scant relevant literature, diagnosis of vagally mediated AF is of paramount importance to provide an effective treatment which includes avoiding triggers mainly heavy spicy meals during the night, avoiding nausea and alcohol, in addition to considering regular exercise as it can stop abort the arrhythmia. And most important not to prescribe medications that abolish sympathetic drive and get the parasympathetic to be to dominant drive like beta blockers and non-dihydropyridine calcium channel blockers, our patient after he received the diagnosis of vagally mediated atrial fibrillation, he did not attend emergency department due to AF, seen in out patient clinic for follow, he had few episodes of AF during day time and night, he advised us that he treated his atrial fibrillation during night by putting his finger inside his mouth to induce vomiting, during the night he went for a run, both manovres helped him to relieve his symptoms immediately by blunting the parasympathetic drive, [11,12].

Class 1 antiarrhythmics, specially disopyramide, can successfully stop vagally mediated AF due to its vagolytic effect. Other promising drugs are Class 1c flecainide, which is recommended as the second best, and Botulinum toxin injection in the epicardial fat pad, rich in autonomic ganglia, as other published data showed that it can terminate arrhythmia for a short time [10-14].

CONCLUSION

Our patient presented with classic symptoms of vagally induced AF, the diagnosis was almost always missed, and he was treated with medications that augmented the parasympathetic drive and got his symptoms to worsen, detailed history taking could have helped the clinician to diagnose Atrial Fibrillation mediated by a parasympathetic drive which could help the patient to treat his symptoms and revert AF to sinus rhythm by modest exercise to abolish parasympathetic drive and avoid hospital visits and admission. Every patient with paroxysmal AF under the age of 55 should be thoroughly investigated for autonomic AF, especially vagally induced, through a detailed history taking, and telemetry overnight to achieve an accurate diagnosis and avoid multiple presentations to emergency departments.

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