

## Do all patients with atrial fibrillation need long-term anticoagulation?

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### Abstract

Atrial fibrillation (AF) is the most common cardiac arrhythmia worldwide with an estimated number of 2.7-6.1 million cases in the United States (US) alone. The incidence of AF is expected to increase 2.5 fold over the next 50 years in the US. The management of AF is complex and includes mainly three aspects; restoration of sinus rhythm, control of ventricular rate and prevention of systemic thromboembolism. AF as a cause of systemic embolization has been well known for many years, and majority of patients are on oral anticoagulants (OACs) to prevent this. Many times, a patient may not be in AF chronically, nor is the AF burden (the amount of time patient is in AF out of the total monitored time) calculated. We present three cases of new onset transient AF triggered by temporary stressors. We were able to restore normal sinus rhythm (NSR) with chemical cardioversion. As per 2014 American College of Cardiology (ACC)/American Heart Association (AHA) recommendations, we started all three patients on OACs based on CHA<sub>2</sub>DS<sub>2</sub>VASc score  $\geq 2$ . However, the patients refused long term OACs after restoration of NSR and correction of the temporary enticing stressors. In any case, the decision to start OACs would have had its own risks. Here we describe how antiarrhythmic drugs were used to maintain NSR, all while they were continuously monitored to determine the need to continue OACs.

### Introduction

Atrial fibrillation (AF) is the most common cardiac dysrhythmia worldwide whose prevalence is steadily increasing and projected to increase 2.5 fold by 2050 in the United States (US) alone.<sup>1,2</sup> The management of AF is complex and includes mainly three aspects; restoration of sinus rhythm, control of ventricular rate and prevention of systemic thromboembolism.<sup>3</sup> In the US, AF

accounts for more than 35% of all admissions for cardiac arrhythmias.<sup>4</sup> AF can occur primarily in the absence of identifiable structural heart disease, as a secondary arrhythmia due to disease affecting the atria or due to various predisposing systemic abnormalities. It can be secondary to acute conditions such as hypoxia, sepsis, volume depletion, severe anemia, hyperthyroidism amongst other causes, which should be actively sought and corrected.<sup>4,5</sup> AF itself poses a five to seven fold-increased risk of stroke,<sup>6</sup> and the importance of long term oral anticoagulants (OACs) has been well established based on the CHA<sub>2</sub>DS<sub>2</sub>VASc risk profile.<sup>1</sup> Currently, AF is usually diagnosed based on intermittent electrocardiogram (ECG) or external event monitors. The drawback with this approach is two fold; the first problem is one may miss the diagnosis of paroxysmal AF in an outpatient until complications such as systemic embolization arise; on the contrary, patients may be over treated with OACs, when in fact it may not be warranted, based on the AF burden and significant bleeding risk as defined by HAS-BLED score  $\geq 3$ . The advent of various cardiovascular implantable electronic devices (CIEDs) such as implantable loop recorders (ILRs), implantable cardioverter-defibrillators (ICDs) and permanent pacemakers (PPMs) helps us in calculating the AF burden and determine the need for OACs based on this. An AF burden of  $\geq 1$  hour daily is believed to carry higher risk of embolization, but in those with a history of AF who maintain normal sinus rhythm (NSR) or low AF burden, long term OACs may be more harmful than beneficial. This is true mainly in elderly population with high risk of bleeding. Thus, the use of long term OACs must be tailored to the need and preference of an individual.<sup>7</sup> Therefore it is important to identify the clinical context and weigh the risks and benefits of all approaches when making treatment decisions. We present three cases, where AF was situational and secondary, correcting with the management of the underlyingly cause.

### Case Reports

#### Case #1

An 80-year-old female with history of hypertension was admitted for Hartmann's procedure reversal. On admission, ECG showed NSR. Accordingly, the patient underwent the procedure with no complications. On post-op day three, telemetry showed new onset AF with rapid ventricular rate. At this time, the heart rate was 117, respiratory rate

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of 18, and blood pressure of 100/70. It was also noted that her hemoglobin dropped from 12.7 to 8 and subsequently, patient was transfused 2 units of packed red blood cells along with IV fluids immediately. Simultaneously, she was started on amiodarone 400 mg every six hours. The patient converted to NSR within 12 hours of pharmacotherapy with amiodarone and was discharged on post-op day five with instructions to take amiodarone 200 mg daily. Based on her CHA<sub>2</sub>DS<sub>2</sub>VASc score of 4 which equals an annual stroke risk of 4.8%, she was advised long term OACs; however, patient refused. Hence, she was brought back for placement of ILR for AF burden. She continues taking Amiodarone and has remained in NSR without any complication for 30 months.

#### Case #2

A 90-year-old female with a history of hypertension presented to the hospital with complaints of diarrhea, abdominal pain and decreased oral intake for two days. On physical exam patient's abdomen was diffusely tender to palpation and CT Abdomen showed generalized wall thickening consistent with colitis. On admission, ECG revealed NSR. Overnight, patient became hypotensive as well as tachycardic; heart rate of 135bpm and blood pressure (BP) of 74/40 mmHg. A 12 lead ECG showed AF with rapid ventricular response. Hemoglobin was 10.2 gm/dL; a significant drop from 12.3 gm/dL, within 24 hours. Immediate management of this patient included intravenous (IV) fluid resuscitation and two doses of IV digoxin and IV Ibutilide which converted patient's rhythm back to NSR within 4 hours. On day eleven of this hospitalization, patient deteriorated

and underwent emergent exploratory laparotomy with resection of the transverse colon, splenic flexure, and proximal descending colon. The remainder of the patient's hospital stay was uneventful and she was discharged on day 18. In view of her CHA<sub>2</sub>DS<sub>2</sub>VASc score of 4, patient was recommended OAC based on standard guidelines, which she refused. For rhythm control, patient was instructed to take oral amiodarone 200mg daily. Six weeks later, she was seen in the cardiologist's office with a complaint of fatigue. Patient was noted to be bradycardic with a HR of 45 bpm and BP of 120/70 mmHg off anti-hypertensive medication. Due to the persistent bradycardia coupled with the need for amiodarone to maintain NSR, patient was placed on dual chamber PPM. She remained in AV paced rhythm without any atrial fibrillation for 30 months on 100mg of oral amiodarone daily.

### Case #3

A 71-year-old female with history of hypertension and aortic valve replacement presented to the hospital complaining of profuse diarrhea of 3-day duration. Vitals showed a heart rate of 99 bpm and BP of 93/59mmHG. ECG on admission showed AF with rapid ventricular rate. Stool culture was positive for *Clostridium difficile*. In addition to electrolyte repletion and IV hydration, patient received IV ibutilide with conversion to NSR within 20 min. Patient was also started on OACs since the duration of AF was unknown, but had to be discontinued due to gastrointestinal (GI) bleeding within 24 hours. Patient maintained NSR on oral amiodarone, and received ILR one month later to evaluate for AF burden. Patient has remained in NSR without any complication for greater than 30 months.

### Discussion

AF is characterized by propagation of rapid, disorganized electrical signals in the atrium due to structural changes in the electrical conduction system and myocardium induced by ischemia, hypertension, obstructive sleep apnea, diabetes mellitus, hyperthyroidism.<sup>8</sup> Treatment consists of rhythm control in order to restore and maintain NSR, rate control of the ventricles and anticoagulation, based on the current risk stratification scoring, such as the CHA<sub>2</sub>DS<sub>2</sub>VASc score. Clinical trials have failed to show the superiority of either rate or rhythm control.<sup>9</sup> However, AF is a condition of diverse etiologies, thus the optimum method of management is case dependent.

The adverse effects of paroxysmal AF have been correlated to the duration of the episodes and to the AF burden. The clinical context of the individual patient must be taken into account when making treatment decisions for AF. After addressing the hemodynamic status, one must start by identifying the primary abnormality that led to the AF.

According to the 2014 AHA/ACC/HRS guidelines, all patients with non-valvular AF, with a CHA<sub>2</sub>DS<sub>2</sub>VASc  $\geq 2$ , OACs are recommended<sup>1</sup> for secondary prevention of stroke. But, based on the age criteria alone, many patients will have a score of 2 or greater. With these guidelines, majority of patients may be universally anti-coagulated putting them at risk for bleeding, particularly the elderly with a HAS-BLED score  $\geq 3$  and those with history of percutaneous coronary intervention (PCI) and on dual antiplatelet therapy.<sup>10</sup> Currently, there is absence of definite guidelines on safe discontinuation of OACs in presence of high risk of bleeding and such decisions are recommended to be taken by a multidisciplinary team after balancing the estimated risk of recurrent stroke and bleeding.<sup>11</sup>

In all of our three cases, temporary stressors such as hypotension, hypovolemia, hypoxia or sepsis triggered the AF. With reversal of these temporary stressors and AADs, all three patients maintained NSR throughout the follow up duration. These patients all had CHA<sub>2</sub>DS<sub>2</sub>VASc score of  $\geq 2$ , thus requiring long-term OACs, according to the standard guidelines. Given their HAS-BLED score of  $\geq 4$ , using anticoagulation was deemed high risk for these patients, besides their own refusal to take OACs. Instead, a continuous rhythm control strategy with use of CIEDs was implemented to assess the AF burden, and further guide the anticoagulation strategy. Adjustments in AADs were also feasible for the cardiologist in the long run, due to the insertion of various CIEDs.

The term CIEDs apply to ILRs, modern PPMs and ICDs. ILRs are subcutaneous, single lead devices that can last up to three years. These devices allow patients to transmit data regarding their device function, diagnostics, delivered therapy and intra-cardiac hemodynamics to a wireless monitor available to the physician at any time. Modern PPMs and ICDs also have similar capabilities. The number of CIEDs implanted worldwide has increased dramatically in recent years, mainly because of its reliability in continuous monitoring.<sup>12</sup> Moreover, decreased time burden on medical personnel and patients coupled with earlier recognition and intervention of malignant arrhythmias have helped increase their pop-

ularity.<sup>13</sup> Clinical trials have shown ILRs to be a promising tool to calculate the AF burden accurately.<sup>14</sup>

### Conclusions

In patients presenting with new onset AF that is situational in nature, addressing the primary abnormality can restore NSR. Maintenance of NSR or very low AF burden with the help of AADs, long term OACs can be avoided. These patients can be monitored continuously by means of CIEDs for any further changes in rhythm, allowing subsequent adjustments in AAD dosage. This strategy can be valuable in patients prone to bleeding as defined by high HAS-BLED score.

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