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Interrupting the Natural History of Atrial Fibrillation : Image from the Future

Dimitris Tsiachris[1], Sotiria Stabola[1], Athanasios Kordalis[1], Christodoulos Stefanadis[1]
[1]Athens Heart Center, Athens Medical Center, Athens, Greece.

Abstract

An injectable loop recorder was implanted in a 76-year old patient due to recurrent unexplained syncope.In the first week after implantation, asymptomatic short-term atrial fibrillation was recorded and oral anticoaguation was prescribed. Two weeks later the patient suffered a presyncope and a 5.8 seconds pause was recorded at the time of conversion of atrial fibrillation to sinus rhythm. A Micra Transcatheter Pacing System was implanted based on the minimum pacing needs.

Atrial fibrillation episodes became frequent and severe symptomatic without syncope relapse. Antiarrhythmic treatment was initiated and failed and the patient underwent pulmonary vein isolation 6 months later. Antiarrhythmics were discontinued right after atrial fibrillation ablation.The patient remains free of atrial fibrillation episodes based on the injectable loop recorder 1 year follow up.

Introduction

Atrial fibrillation (AF) is the most common cardiac arrhythmia, and it is associated with a reduced quality of life and an increased number of adverse outcomes such as stroke, heart failure, increased number of hospitalizations, and mortality[1]. Rarely, syncope could be the first presentation of AF[2]. We present a case of a 76-year old patient with recurrent unexplained syncope, initially diagnosed with silent AF based on injectable loop recorder findings. Anticoagulation was initiated and a MicraTranscatheter Pacing System was implanted after a presyncopal episode of pause. AF ablation reversed the natural history of the disease questioning the need for anticoagulation and pacing.

Case Report

A 76-year old female patient experienced a first episode of syncope one year ago. She had a history of hypertension treated with irbesartan and diabetes under oral antidiabetic medication. She was also treated with bisoprolol and clopidogrel after a percutaneous coronary intervention in left anterior descending artery 2 years ago. Electrocardiogram, holter monitoring, resting and stress echocardiography as well as carotid sinus massage were unremarkable. Syncope recurred twice in the following year. There wasno report of angina or palpitation prior to the episodes and the patient was referred for electrophysiological evaluation.

Electrophysiology study showed normal baseline conduction with an HV interval of 50ms, a normal corrected sinus node recovery time of 130 ms and a normal atrioventricular block cycle length of 350 ms.Multiple short-lasting episodes of AFwere inducedby programmed atrialstimulation without evidence of pause at the time of conversion to sinus rhythm. A miniaturized injectable loop recorder (Reveal LINQ™ Insertable Cardiac Monitor, Medtronic, Inc.) was implanted. An episode of AFlasting 15 minutes was transmitted by remote telemonitoring in the first week after implantation and oral anticoagulation was initiated (CHA_2DS_2VASc score =5). Two weeks laterthe patient experienced presyncope and a pause of 5.8 seconds at the time of conversion of AF (lasting 87 minutes) to sinus rhythmwas recorded ([Figure 1], lower pannel).

A miniaturized single-chamber pacemaker (Micra Transcatheter Pacing System, Medtronic Inc, Mounds View, MN, USA) was implanted based on expected minimum pacing needs ([Figure 1], upper panel) . A threshold of 0.38 V at 0.24 ms was achieved, and two tines were engaged in the myocardium. Injectable loop recorder remained at place aiming to follow up the performance of Micra Transcatheter Pacing System.

Shortly after the leadless pacameker implantation, atrial AF episodes became frequent, long-lasting and severe symptomatic (EHRA stage III) without syncope relapse. The patient reported no angina during AF episodes despite the increased ventricular response of each episode in accordance with the absence of ischemia in stress echocardiography. Off-label pill in the pocket administration of propafenone was used initially in order to minimize hospitalization for pharmacologic cardioversion. Subsequently, chronic antiarrhythmic treatment was initiated but both sotalol and dronedarone failed. Pulmonary vein isolation by means of cryoballoon ablation was finally performed 8 months after injectable loop recorder implantation. Antiarrhythmics were discontinued right after AF ablation. The patient remains absolutely free of AF episodes based on the injectable loop recorder 1 year follow up.

Key Words

Cryoablation, Injectable Loop Recorder, Leadless Pacemaker, Syncope.

Corresponding Author
DimitrisTsiachris, Athens Heart Center Athens Medical Center Distomou 5-7 street, Athens, Greece

Discussion

A third of patients with AF may have no symptoms. The commonest symptoms are palpitations. Other commonly reported symptoms of AF are shortness of breath, tiredness, chest pain, fatigue, dizziness and rarely loss of consciousness (syncope)[1]. In older individuals, syncope when associated with paroxysmal atrial fibrillation should suggest the presence of underlying sinus node dysfunction. Tachycardia-bradycardia syndrome is the most common presentation of sick sinus syndrome. Syncope occurs as tachycardia terminates with protracted sinus pauses. Subsidiary pacemaker failure is enhanced by medications such as beta-blockers. Electrophysiology test has minor diagnostic value for the identification of tachycardia-bradycardia syndrome in the absence of sinus bradycardia[4]. Injectable loop recorder, even more in its miniaturized form, is the gold standard aproach for syncope management in these cases[5]. Permanent pacing is recommended in patients with recurrent syncope in the setting of tachycardia-bradycardia syndrome to prevent symptoms[6]. Micra Transcatheter Pacing System was offered based on the minimum pacing needs and patient's preference[7]. Injectable loop recorder remained at place aiming not only to follow up the performance of Micra Transcatheter Pacing System, but also to estimate the burden of AF by exploiting the presence of AF diagnostic algorithms.

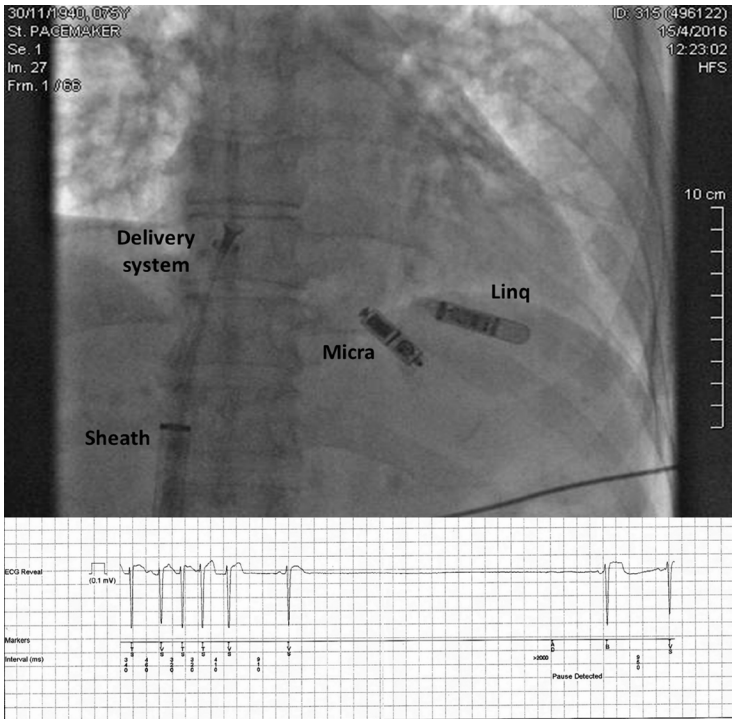

Figure 1: **SA pause of 5.8 seconds at the time of conversion of atrial fibrillation (lasting 87 minutes) to sinus rhythm was recorded in the miniaturized injectable loop recorder (lower panel). A miniaturized single-chamber pacemaker (Micra Transcatheter Pacing System, Medtronic Inc, Mounds View, MN, USA) was implanted based on expected minimum pacing needs (upper panel).**

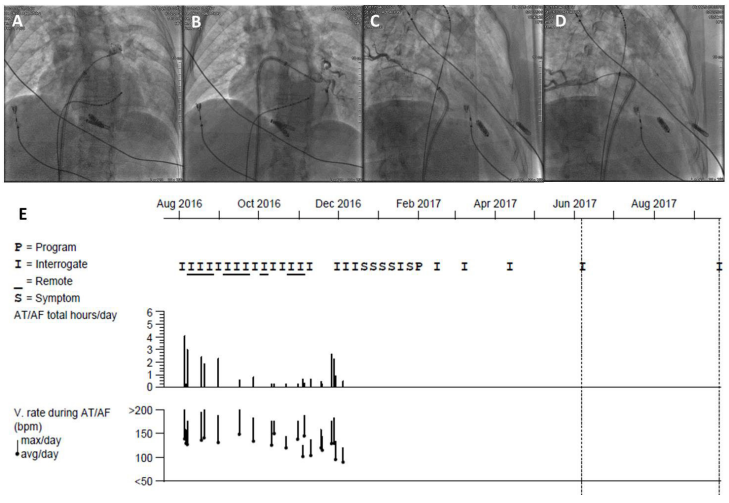

Figure 2: **Succesive antral occlusion of left superior (A), left inferior (B), right superior (C) and right inferior (D) pulmonary veins during Pulmonary Vein Isolation procedure using Cryoballoon technology. Implantable Loop Recorder interrogation showing the burden of atrial fibrillation before ablation, and the complete elimination of the disease since then at 1 year follow up (E).**

Although injectable loop recorder was impanted due to recurrent unexplained syncope, it first revealed the occurence of short-lasting asymptomatic AF episodes. AF is a prothrombotic state and tends to increase the risk of cardioembolic stroke in susceptible individuals, based on CHA_2DS_2VASc score[1]. Although the minimum duration ofAF episode necessating the administration of oral anticoagulants is not established, (15 minutes in our case)oral anticoagulation was initiated based on the increased stroke risk in our patient(CHA_2DS_2VASc score of 5 – age > 75 years, female, diabetes and hypertension while coronary artery disease was notobstructive).

In accordance with the natural history of the disease, AF episodes became gradually more frequent and lasted more[8]. Main AF symptoms were shortness of breath and tiredness, while syncope did not recur. Off-label pill in the pocket administration of propafenone was used for pharmacologic cardioversion taking into account the absence of ischemia in our revascularized patient. Subsequently, antiarrhythmic treatment rather than AF ablation was preferred despite the IIa indication[1]. Type IIIantiarrhythmic drugs were the sole choice, but both sotalol and dronedarone soon failed. Pulmonary vein isolation, by means of cryoballoon ablation, was finally performed 8 months after injectable loop recorder implantation as a Class I indication, instead of amiodarone administration. Antiarrhythmics were discontinued right after AF ablation. The patient remains absolutely free of AF episodes based on the injectable loop recorder 1 year follow up.

The alternative of first line AF ablation after documentation of tachycardia-bradycardia syndrome was discussed before proceeding to pacemaker implantation. Current guidelines support AF ablation rather than pacing in symptomatic patients based on retrospective or observational studies[9],[10]. It is speculated that the AF ablation strategy is a more etiologic treatment option, since sinus node remodeling caused by atrial tachyarrhythmia, including AF, can lead to reversible sinus node dysfunction. Our decision to follow a pacing strategy was based on the initial absence of palpitation (beyond syncopal episodes), on the age of our patient (76 years old, while the mean age of the cohorts examining ablation vs pacing was well below 70 years)and the need for anticoagulation, taking into account the plausible detrimental consequences of a traumatic syncope in an anticoagulated elderly patient.

In conclusion, pulmonary vein isolation in this older patient with

AF, succesfully interrupted the natural history of the disease, as it is documented in implantable loop recorder follow up, questioning the need not only for pacing but also for anticoagulation.

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