

# Long persistent Sinus arrest and Torsades de pointes association with Ibutilide after Atrial Fibrillation ablation:A Case Report

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## Abstract

Ibutilide is commonly used for conversion of atrial fibrillation (AF) during catheter ablation procedure. Sinus arrest or Torsades de Pointes (TdP) is mainly complication of ibutilide, however, is recovery spontaneously after a few hours. We present a patient suffering long persistent sinus arrest and Torsades de pointes following administration of ibutilide for cardioversion of persistent AF after radiofrequency ablation.

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### Declaration of interest

none declared

### Abstract

Ibutilide is commonly used for conversion of atrial fibrillation (AF) during catheter ablation procedure. Sinus arrest or Torsades de Pointes (TdP) is mainly complication of ibutilide, however, is recovery spontaneously after a few hours. We present a patient suffering long persistent sinus arrest and Torsades de pointes following administration of ibutilide for cardioversion of persistent AF after radiofrequency ablation.

## Case Presentation

A 75-year-old Asian woman, with a history of hypertension and diabetes, was inpatiented of palpitations for 2 years with persistent AF. Transthoracic echocardiography showed left atrial enlargement (diameter of 42mm) with normal left ventricular function. Computed tomography angiography and transoesophageal echocardiography exclude atrial thrombi, antiarrhythmic drugs were discontinued for more than 5 half-lives periods before radiofrequency catheter ablation performed. local sedation with fentanyl was used during the procedure.<sup>[1]</sup> Conventional circumferential pulmonary vein isolation, linear ablation of the left atrial roof and with an additional isolation of superior vena cava were performed (Figure 1) sequentially under the guidance of 3D mapping system (Carto 3, Biosense Webster Inc.). Because the sinus rhythm was not restored after the ablation, a pharmacological cardioversion was used. Sinus arrest and Torsades de pointes (TdP) were observed after infusion of 0.5mg ibutilide and the patient immediately suffered a short epileptic seizure with TdP and degenerate to ventricular fibrillation (VT), which terminated temporarily by 200 J energy cardioversion, but TdP and VF were still recurrent attack even the magnesium sulfate and potassium chloride were given. After persistent atrial pace with 70bpm, the TdP and VF was not attack. However, the TdP and VF episode were recurred once the pacing stopped. Thus, a temporary pacing wire was placed with a rate of 70 beats/min and the episode of sinus rest and TdP after temporary pacing transitorily stopped were still occurred on the following days and fully recovered until the fourth days and no malignant arrhythmias recurrence.

## Discussion

To the best of our knowledge this is the first time such an association between long persistent sinus arrest or Torsades de pointes and ibutilide after AF ablation is shown. We can speculate several possible reasons.

### Potential causes

Firstly, Coexistence of sinus node dysfunction and persistent AF are not uncommon. Previous studies revealed that about 1/3 of patients with persistent AF after electrical cardioversion showed sinus node dysfunction through an overdrive suppression test,<sup>[2]</sup> Sinus node dysfunction immediately manifested when long persistent AF is terminated. Moreover, in order to correct irreversible profound bradycardia, it even may warrant subsequent permanent pacemaker implantation. Sairaku et al reported that 7% patient with persistent AF after catheter ablation is requiring a permanent pacemaker implantation because of sinus node dysfunction after AF termination.<sup>[2]</sup> Furthermore, Aging, females, atrial remodeling, hypertension are generally potential factors of Sinus node dysfunction. Secondly, the SVC isolation may result in potential transient injury of sinus node and need for temporary pacing when sinus arrest occurred. However, very lower incidence rates of 0.003% (8/2151) had been reported in a retrospective analysis.<sup>[3]</sup> In this case, the ablation of anteroseptal wall of the junction of right atrium and the SVC appears to be much safer than the anteroseptal wall of the SVC in view of the sinus node location.<sup>[4]</sup> Finally, Given the brief temporal time interval between ibutilide administration and the short epileptic seizure provoked by sinus arrest and Tdp, Ibutilide was considered the main triggers of sinus arrest and Torsades de pointes in our case. According to RCT trials using ibutilide, the reported rates of development of sustained torsade de pointes ranged from 1.3% to 2.3%.<sup>[5-6]</sup> Moreover, Small body size, bradycardia, and a history of heart failure were 3 predictors of ibutilide induced Tdp confirmed in a meta-analysis included 19 trails<sup>[7]</sup>. Despite our patient seems predispose to ibutilide-induced Tdp, the long persistent side effects duration of 4 days has never been reported. although the half-life of ibutilide is 3 to 6 hours and its clinical effect reflected by prolonged QT duration lasted through day 4 after administration.<sup>[8]</sup>

### Clinical implications

Based on our analysis, several suggestions relate to the safe use of ibutilide for conversion of persistent AF during radiofrequency ablation. it can be considered that atrial pacing by increasing the heart rate above 70 b.p.m. may can be effective for the prevention of Tdp initiated after long pauses during procedure and up-front use of Magnesium sulfate for the prevention of Tdp before pharmaceutical cardioversion (ibutilide) was performed. Continuing studies for evaluation of the safety and efficiency of ibutilide for conversion of persistent AF during radiofrequency ablation are needed. Finally, permanent pacemaker implantation should be delayed in cases of pharmaceutical side effects were reversible. We recommend that close observation of patients with sinus arrest and Tdp association with Ibutilide after AF ablation should continue for 4 days or longer.

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## Figure Legend:

Figure 1: Isolation of superior vena cava

Figure 2: Twelve-lead ECG (25 mm/s paper speed) of post-procedural.

A, Pre-procedural: atrial fibrillation rhythm. rhythm, heart rate 119 bpm, QT 350 ms, QTc 453ms; B, First Day of post-procedural: Pacing rhythm, heart rate 80 bpm, QT 380ms, QTc 415ms; C, Second Day of post-procedural: sinus rhythm, heart rate 70 bpm, QT 462 ms, QTc 480ms; D, Third Day of post-procedural: sinus rhythm, heart rate 58 bpm, QT 502 ms, QTc 480 ms. E. Third Day of post-procedural: sinus rhythm, heart rate 59 bpm, QT 480 ms, QTc 487 ms. Bpm=beats per minute

