

Short Report

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Impact of atrial fibrillation ablation on right ventricular failure and manifestation of heart failure with preserved ejection fraction symptoms: A case report

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Abstract

Catheter ablation is an important treatment modality for management of Atrial Fibrillation (AF). AF is a responsible factor in the pathophysiology of Heart Failure with Preserved Ejection Fraction (HFpEF). However, the relationship between AF and Right Ventricular (RV) dysfunction has not been completely distinguished.

In this case report, we present a 67 years old woman who developed HFpEF complicated after AF ablation by RV dysfunction. AF catheter ablation and peri-procedural fluid infusion associated with reversible impairment of RV dysfunction, high Pulmonary Artery Pressure (PAP) and manifestation of HFpEF.

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Introduction

Heart Failure With Preserved Ejection Fraction (HFpEF) account for almost half of all heart failure cases and its clinical outcomes remain poor due its heterogeneity [1,2]. And also Right Ventricular (RV) dysfunction is an important factor for severity of HFpEF [3,4]. Atrial Fibrillation (AF) is a responsible factor in the pathophysiology of HFpEF and rhythm control catheter ablation is an important treatment modality for management of AF and rhythm control strategy long standing persistent AF and hypertension, could relate to diastolic dysfunction and heart failure [7,8].

Case presentation

A 67 years old over-weighted woman with history of hypertension, presented 6 months previously with palpitation and was found to be uncontrolled AF with rates of approximately 110 beats per minute. Despite to amiodarone and Flecainide, AF was not converted to persistent sinus rhythm and due to symptoms the decision was made for AF catheter ablation.

The patient underwent Trans Esophageal Echocardiography (TEE) before AF ablation procedure and TEE showed normal Left Ventricular (LV) size and preserved LV systolic function (LVEF: 50-55%), normal RV size and preserved systolic function, Mild tricuspid regurgitation with RV Systolic Pressure (RVSP) 20 mm hg.

Successful AF cardioversion and RUPV, LUPV, LLPV and RLPV isolation with NAVX system was performed. 12 hours after AF ablation the patient was drowsy and had speech disorder and diplopia. Brain MRI was performed and showed Ischemic stroke at hypothalamus, so unfractionated heparin was given intravenously and 2 liters of normal saline was administered in few hours to patient. The day after ablation and stroke attack although the neurologic symptoms was improved but the patient was experienced acute and severe dysnea, despite persistent sinus rhythm and heart rate 70 beats per minute. Transthoracic Echocardiography (TTE) was performed and showed dilated RV with moderately impaired systolic function, Moderate tricuspid regurgitation with RVSP 50 mm hg and Moderate LV diastolic

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dys function and high LV filling pressures. The BNP level was checked and was 689 pg/ml.

She underwent pulmonary CT angiography with suspicious of acute pulmonary embolism and there was no visible thrombus in main pulmonary artery and branches but bilateral pleural effusion and mild pericardial effusion was reported. So because of acute dysnea, bilateral pleural effusion, elevated BNP and new echocardiographic findings, the diagnosis of HFpEF and acute RV failure was accepted by the medical team and she went on therapeutic intravenous furosemide and the day after she was symptom free.

The follow up TTE after 3 days showed improved RV systolic function, decreased LV filling pressure and serial BNP level (128 pg/ml).

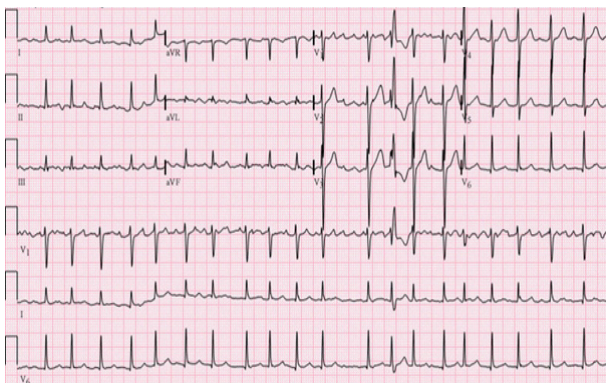


Figure 1: ECG AF at admission before ablation.

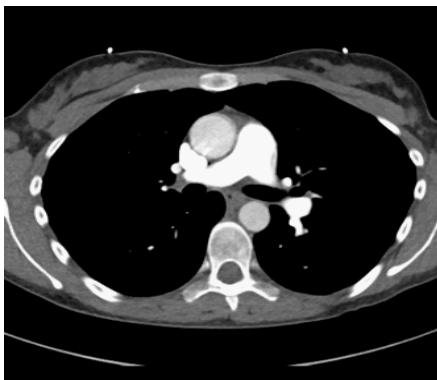


Figure 2: Pulmonary CT angiography showed no pulmonary embolism in pulmonary arteries.



Figure 3: TTE showed RV & RA enlargement with RV dysfunction.

Discussion

The present case highlights the importance of RV function after AF ablation and fluid overload. Despite adequate LV systolic function and without significant LV diastolic dysfunction and normal RV function at baseline echocardiography, acute RV decompensation after ablation in this patient resulted in dysnea FC III/IV. Although diuretic therapy was successful in decongestion of the patient, but fluid loading during and after procedure likely led to demonstration RV failure and decompensation of HFPEF. Also transient Left Atrium (LA) dysfunction and stunning of it after AF ablation ultimate in RV dysfunction, high PA pressure, presented with acute dysnea and acute decompensation of HFPEF.

In HFPEF patients with LV diastolic dysfunction pattern, AF ablation reduces diastolic filling pressures and hemodynamics. Therefore patients with HFPEF may obtain greater benefit from rhythm control [9].

Conclusion

In cases of long-standing AF rhythm such as in the present case, fluid loading and AF ablation can result in transient RV decompensation, and high PAP.

Thus, fluid resuscitation in these patients should done with more caution.

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