

A Massive Free-floating Right Atrial Thrombus in a Patient with Permanent Atrial Fibrillation Complicated by a Pulmonary Embolism: A Case Report.

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ABSTRACT

The association between atrial fibrillation and left atrial thrombus had been widely described; on the contrary, the relation between atrial fibrillation and right atrial thrombus hasn't been demonstrated. We always thought that right atrial thrombus originated from deep venous thrombosis and named as "emboli in transit". We report the case of a 91 year-old male patient, presenting with a permanent atrial fibrillation, his echocardiography showed a huge floating right atrial thrombus complicated with a bilateral pulmonary embolism. Our aim is to demonstrate through this case the association between atrial fibrillation and right atrial thrombus, using our findings in the literature, and comparing between the prevalence of right and left atrial thrombi in association with atrial fibrillation, explaining the difference between the both, and discussing therapeutic options.

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Introduction

Atrial fibrillation induces a pro-thrombotic state [1]. However, the association between atrial fibrillation and right atrial thrombus has received little attention. Right atrial thrombus is often correlated to migrated emboli from peripheral venous system also called "emboli in transit" but not to atrial fibrillation. We report the case of a 91 year-old male patient with no previous known disease, presenting with atrial fibrillation. Transthoracic echocardiography showed a huge free-floating right atrial thrombus complicated with proximal bilateral pulmonary embolism treated with anticoagulants.

Case Report

A 91 year-old male patient with no medical history, presented with palpitations and fatigue over 2 weeks. Upon presentation, vitals were as follows: oral temperature of 37.6°C, blood pressure of 110/60 mmHg, heart rate of 95 beats/min, and respiratory rate of 20 breaths/min, with an oxygen saturation of 95 % on room air. The patient was alert and oriented. Physical examination revealed irregular heart rhythm with no sign of heart failure or peripheral deep venous thrombosis. ECG showed atrial fibrillation and bifascicular block (figure1).

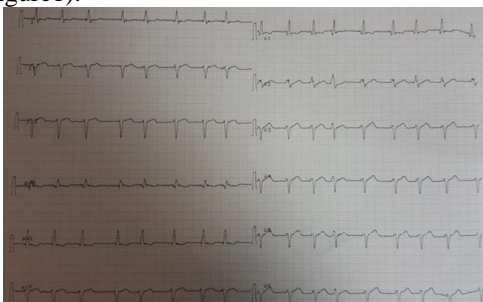


Figure 1 . ECG. atrial fibrillation with fascicular block.

Two dimensional transthoracic echocardiography (TTE) allowed the visualization of a huge floating right atrial thrombus measuring 42/22 mm, prolapsing toward the right ventricle through tricuspid valve in systole (figure 2 a et b).

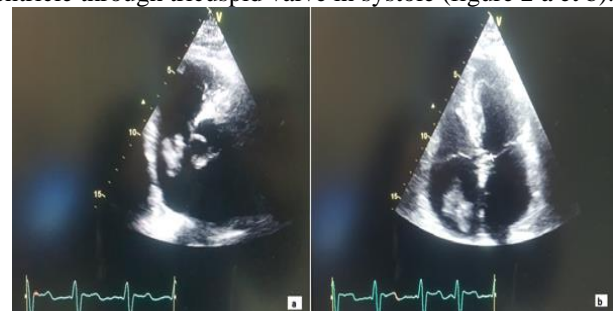


Figure 2 . Transthoracic echocardiography: floating right atrial thrombus protruding towards the Right ventricle in systole

The right ventricle's size and function were normal. And the left atrium was mildly dilated. Giving the high thrombo-embolic risk, we performed a thoracic amigo-CT that showed a proximal bilateral pulmonary embolism and a right atrial thrombus (figure 3,4). Doppler ultrasound venous of the lower limbs was normal.

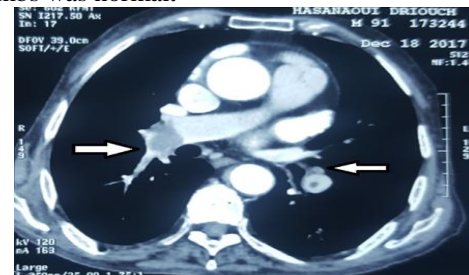


Figure 3 . CT Scan : proximal bilateral pulmonary embolism (white arrow)

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Surgical treatment was discussed, but the patient was rejected this option given his age. The patient was put on low molecular weight heparin (Tinzaparin), and then vitamin K antagonists (acenocoumarol) with favorable clinical evolution.

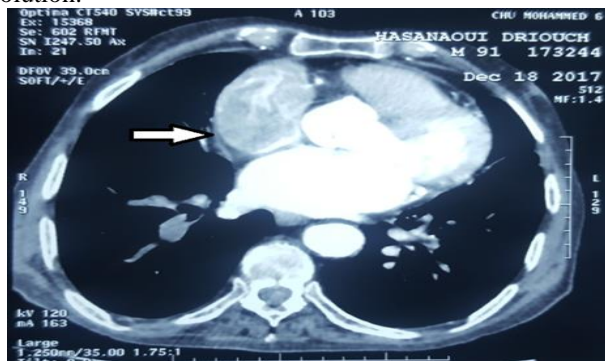


Figure 4 . CT Scan: right atrial thrombus (white arrow).

A month later, our patient had moderate dyspnea with moderate lower limb edema. TTE did not show any image of right atrial thrombus but a right ventricle dilation and severe systolic dysfunction were present (Figure 5).

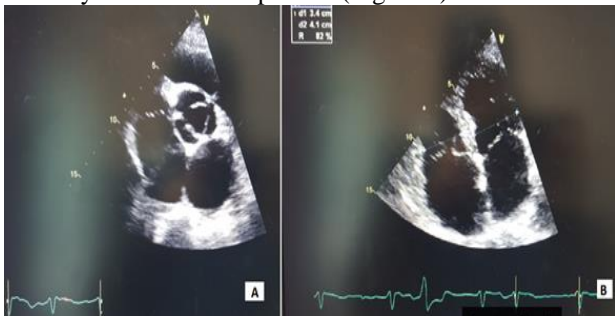


Figure 5 . transthoracic echocardiography a month later.absence of right atrial thrombus.

A second thoracic angio-CT revealed distal residuapulmonary embolism and infarction and a moderate left pleural effusion (Figure 6. B). The patient was discharged on diuretic treatment.

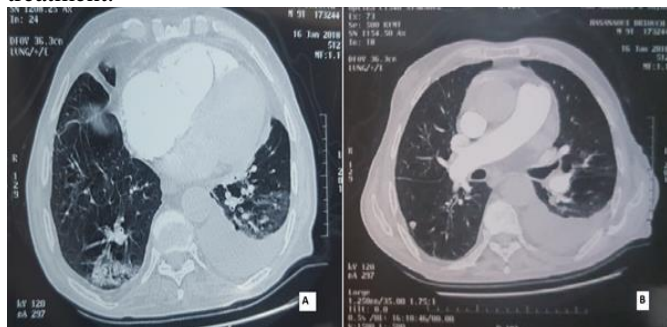


Figure 6: control thoracic angio-CT: no right atrial thrombus (A) a distal pulmonary embolism with pulmonary infarct and moderate left pleural effusion (B)

Discussion :
Atrial fibrillation induces a hypercoagulable state and activates platelet aggregation; therefore, it can cause thrombus formation not only in the left atrium but also in the right atrium and could be a cause of pulmonary embolism. However, the relation between atrial fibrillation and right atrial thrombus remains controversial.

Aberg studied the incidence of embolism and atrial thrombosis in a necropsy material of 693 patients with atrial fibrillation and noted that the incidence of pulmonary embolus without deep venous thrombosis was significant; which suggested that the thrombus originated probably from the heart [2]. Flegel also noted that in 40% of pulmonary

embolism cases, a cause cannot be found raising the possibility that emboli might have originated from the right atrium [3]. Several case reports supported this hypothesis, and the majority of authors concluded on the importance of establishing a relation of causality between permanent non valvular atrial fibrillation and right atrial thrombus in order to improve therapeutic management [4,5,6]. However, many others think that atrial fibrillation can be responsible of left but not right atrial thrombus formation justifying that left atrial platelet reactivity is increased compared to the right atria and peripheral circulation [9].

Yasuoka et al noted, on transoesophageal echocardiography, the presence of right atrial spontaneous echo contrast in patients who have atrial fibrillation, 37 patients had right atrial thrombus and 35 of these patients had spontaneous echo contrast. The incidence of perfusion defects in pulmonary scintigraphy was significantly higher in the group with right atrial spontaneous echo contrast indicating that the latter may be a high risk factor for pulmonary embolism [7]. There are other potential factors that could lead to formation of right atrial thrombus in patients with AF. Divitiis studied the incidence of right atrial chamber and appendage thrombosis in patients with atrial fibrillation in relation to right atrial appendage morphology and function on transthoracic and Multiplane transoesophageal echocardiography. Compared to patients in sinus rhythm, patients with atrial fibrillation had lower tricuspid annular excursion, larger right atrial chamber area, right appendage areas were larger and right atrial ejection fraction and peak emptying velocities were also lower. Spontaneous echo contrast was found in 57% and 66% in the right atrium and in the left atrium respectively, detected in all patients with thrombi and was the only independent predictor of right and left atrial appendage thrombosis [8]. These studies suggest that atrial fibrillation can be responsible of spontaneous echo contrast in the right atrium leading to thrombus formation.

The optimal management of right atrial thrombus remains unclear given the absence of randomized controlled trial [10]. There are several options when managing a right heart thrombus. These include thrombolytic therapy, surgical or percutaneous embolectomy, and anticoagulant therapy with heparin. Floating right atrial thrombus dictates emergent surgical embolectomy with careful exploration of the right atrium, the right ventricle and pulmonary arteries, and is the classical treatment and appears to be the most efficient treatment in case of large thrombosis [11]. On the other side, some favor thrombolysis as some cases had good outcome with lower mortality rates compared to surgical removal or anticoagulation therapy [10]. Several cases reported successful results after thrombolysis [12, 13], however this option may have a reverse effect by fragmenting the thrombus leading to an unpredictable systemic embolization or death [12,14]. Anticoagulant therapy should be administered using heparin or oral anticoagulants as novel oral anticoagulants (NOACs) has proved to be efficient [15,16]. In case of associated pulmonary embolism, prognosis is poor, as Kukla reported a lethality of 50% in patients with both atrial fibrillation and right heart thrombus presenting acute pulmonary embolism [17].

Conclusion

Our case supports the existence of a relation between atrial fibrillation and right atrial thrombus. Treatment options are surgical or percutaneous embolectomy, thrombolysis and heparin therapy. Only large prospective randomized

controlled trials could offer an evidence-based and efficient guidelines in managing such cases.

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