

Two Types of Thrombi in the Right Atrium, In a Patient with Chronic Atrial Fibrillation, Post Correction of Tetralogy of Fallot

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Abstract: *Thrombi in the right atrium are rare and almost always associated with pulmonary embolism. Despite having high mortality, they are misdiagnosed and therefore underestimated in daily medical practice. The importance of echocardiography (TTE and TEE) in diagnosing thrombi in the right atrium and then in evaluating further treatment is to be emphasized. We present the case of a patient with two thrombi of different types in the right atrium.*

Keywords: Right atrium, thrombi, atrial fibrillation

1. Introduction

Thrombi in the right atrium are a rare finding in daily practice. In the absence of risk factors such as atrial fibrillation, structural heart abnormalities, coagulation pathology, malignant pathology, and central venous catheters, it is uncommon to encounter thrombi in the right atrium. In patients with pulmonary embolism it is not uncommon to find thrombi in the right atrium when performing echocardiography. According to The International Cooperative Pulmonary Embolism Registry (ICOPER), which registered 2,454 patients with pulmonary embolism from 52 hospitals in 7 different countries, of 2,454 patients, 1,135 were assessed by echocardiography, of whom 42 (4%) had RHTh and 1,071 did not [1]. While nearly all of the detected cases of mobile right heart thrombi are diagnosed when echocardiography is performed in patients with suspected PE or proven PE, the true incidence of mobile right heart thrombi may be difficult to ascertain [2]. We present the case of a patient with atrial fibrillation and previous tetralogy of Fallot correction with 2 thrombi of different types in the right atrium.

2. Case Presentation

A female 41-year-old patient presented to the emergency department due to dyspnea, general weakness, and edema of the lower extremities, cough and fever for several days. The patient refers for history about a month with dyspnea and general weakness, as well as fever up to 39°C in recent days. In past medical history, the patient has a surgical intervention to correct the tetralogy of Fallot at the age of 8 years (among the first interventions in Albania for this pathology), known as chronic atrial fibrillation, heart failure, regularly untreated. At the time of hospitalization the patient has the following parameters: BP 90/60 mm Hg; HR 112 / min; O₂ SAT 85% (in room air). High-frequency atrial fibrillation is detected on the ECG. Urgent tests performed shows a pronounced leukopenia WBC 1300 / mm³, without signs of anemia. Biochemical tests without alterations. A chest X-ray showed left basal pneumonia. Abdominal ultrasound shows increased liver size, dilatation of hepatic veins and ascetic fluid in significant quantities. A fluid sample was taken and transudates resulted. The patient underwent

echocardiography (TTE). Left ventricle of normal size and slightly decreased systolic function, asynchronous septum with posterior wall. Dilatation of the left atrium and right atrium. Dilated right ventricle. Moderate-advanced tricuspid regurgitation. In the right atrium there is a formation with a surface of 4.6 cm² (thrombus aspect). (Fig. 1 + 2).

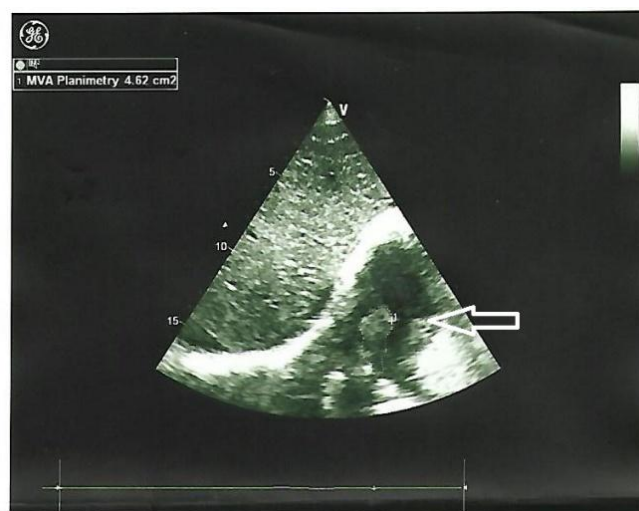


Figure 1: Thrombus in the right atrium (TTE)

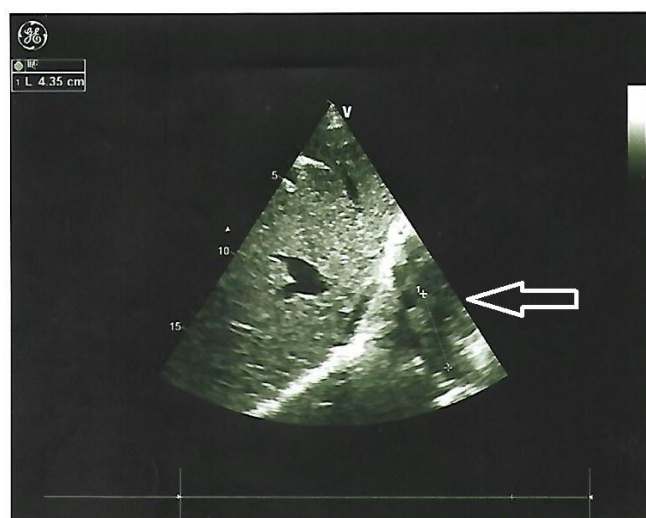


Figure 2: Thrombus in the right atrium (TTE)

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Heparin i/v treatment with electric syringe pump was started immediately. To clarify the nature of the formation in the right atrium as well as to exclude the possibility of possible vegetation due to heart surgery, a transesophageal echocardiography (TEE) was performed, which showed pronounced dilatation of the right atrium, with expressed spontaneous contrast and 2 thrombi in the right atrium. (Fig. 3)

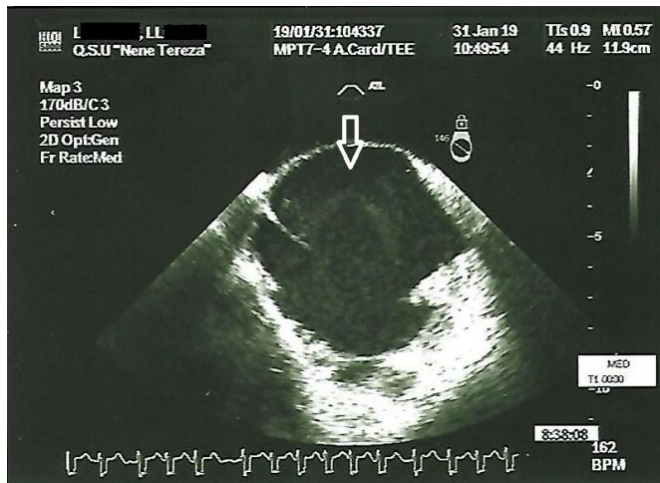


Figure 3: Thrombus in TEE

Larger mobile fresh and a smaller one, immobile, organized in the auricle wall.

The TEE also identified a thrombus in the inferior vena cava. (Fig 4) Immediately after TEE, the patient underwent a pulmonary angio CT, which resulted in right peripheral PE.

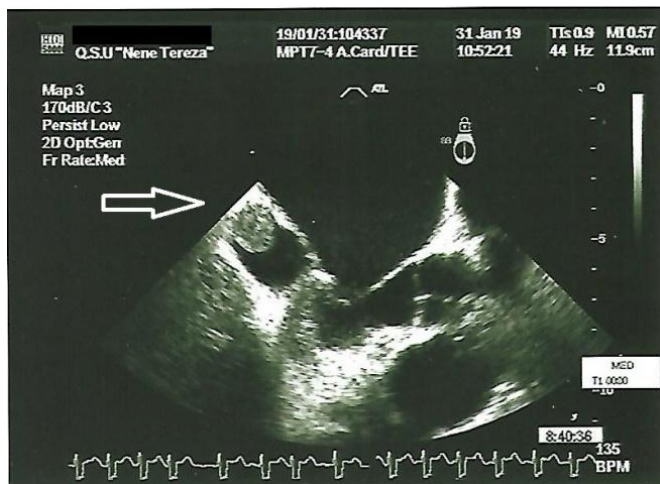


Figure 4: Thrombus in vena cava.

In joint consultation with the cardiac surgeon, angiologist and cardiologist, it was considered high risk to perform thrombolysis, or surgical intervention (thrombectomy) and it was decided to continue heparin i/v therapy. She was also placed on antibiotic therapy to treat pneumonia. Human albumin therapy, fresh plasma, and diuretics were continued. In the following days the patient underwent further examinations to rule out any malignant and/or coagulation pathology. Doppler ultrasound of the venous system of the lower extremities, normal, slightly increased tumor markers, abdominal CT without data on malignant pathology, fibro

gastroscopy normal, S Protein, C Protein normal.

After 5 days of treatment with Heparin i/v, treatment with Warfarin p.o. was started. During the two weeks of hospitalization, the patient had a significant improvement in general condition. No dyspnea in rest and efforts, no edema of the lower extremities. In last day analysis, WBC 5400 / mm³; Chest X-ray normal. BP 110/70 mm Hg, HR 87 / min, O₂ SAT 96% in room air. At follow-up after 2 weeks of treatment, the patient underwent echocardiography (TTE) where no thrombus was detected in the right atrium or IVC. There is dilatation of left atrium, right atrium and right ventricle. Other laboratory data normal. She is discharged from the hospital with outpatient treatment with diuretics, Warfarin and β -blockers.

3. Discussion

Thrombi in the right atrium are rare, but represent an extremely dangerous clinical situation with a high mortality rate. Pathogenesis of thrombus depends on three factors: endothelial damage, stasis of blood and hypercoagulable states (Virchow's triad) [3]. Classifications of right atrial thrombi based on morphology. Type A: Thrombi are morphologically serpiginous, highly mobile, may prolapse through the tricuspid valve and are associated with deep vein thrombosis and pulmonary embolism. Type B: Thrombi are less mobile, attached to the right atrial or ventricular wall and originate in association with foreign bodies or in structurally abnormal chambers. Type C: Thrombi are rare, share a similar appearance to a myxoma and are highly mobile [3].

In our case the patient presents two different types of thrombi located in the right atrium and IVC, which suggests that the thrombi were formed at different times and as a result of different risk factors (atrial fibrillation, damage to the right atrium endothelium) to the same patient.

A relatively high incidence of pulmonary embolism among patients with chronic atrial fibrillation not treated with anticoagulants or with poorly controlled anticoagulation therapy was noted by different authors. We need to establish the causal relationship between right atrial thrombus and permanent nonvalvular atrial fibrillation, despite the fact that the risk of systemic embolism in atrial fibrillation is, in itself, sufficient reason to recommend anticoagulant therapy [4]. The thrombi can be easily mistaken for other physiological or pathological structures within the right heart. It must be differentiated from congenital structures such as a chiari network, persistent eustachian or thebesian valves, atrial septal aneurysms, or acquired conditions such as intracardiac tumors and vegetations [5]. For this reason, in addition to transthoracic echocardiography (TTE), it is necessary to evaluate suspected thrombus formations with transesophageal echocardiography (TEE).

Majority of patients with right atrial thrombus are asymptomatic. Most of them get detected on routine cardiac evaluation [3].

In our case the patient presented to the hospital because of fever, no dyspnea. Unusually, a thrombus in the right atrium was first detected by cardiac ultrasound (TTE) and then PE

by pulmonary angio CT.

In a study of 38 patients diagnosed with a right atrium thrombus extending to 12 years, it was found that in-hospital mortality was 44.7%, on the other hand the prognosis was generally good after discharge [6]. The study shows no significant difference in mortality between the different therapeutic approaches [6]. From the literature consulted it is not clear whether the high mortality rate is associated with pulmonary thromboembolism or with the thrombi themselves in the right atrium.

If patients remain untreated, the death rate has been reported at 80-100% as the free-floating thrombi in the right heart embolize into an already severely compromised pulmonary circulation. Thus, it is imperative to start therapy immediately in order to improve survival [7]. This pathology can be treated in several ways: anticoagulation, thrombolysis, thrombectomy (surgery). However, the small number of cases described in the literature, has led to the lack of approved guidelines for treatment.

In a meta-analysis involving 177 cases, the overall mortality rate was 27% [2]. The mortality rate associated with no therapy, anticoagulation therapy, surgical embolectomy, and thrombolysis was 100.0%, 28.6%, 23.8%, and 11.3%, respectively [2]. This study suggests that thrombolysis is the preferred option in the absence of contraindications.

4. Conclusion

Thrombi in the right atrium and especially mobile ones (type A) are a rare finding in daily practice, but represent an extremely dangerous clinical situation, with a high mortality rate. It is possible to encounter more than one thrombus type in the right atrium in the same patient as in our case, which suggests that pathogenesis and risk factors may act independently in the same patient in thrombus formation. Right atrium thrombi are almost always associated with pulmonary embolism. It is advisable for the treating physician to consider the comorbidities, advantages, and side effects of each treatment before deciding how to treat the patient. It is also important to clearly determine the cause of thrombus formation, for further treatment and follow-up of the patient.

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