

Free-floating thrombus in the inferior caval vein and the right atrium

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Abstract

The diagnosis of free-floating thrombus in the right atrium is still met very rarely and there are no unambiguous recommendations for the way of management with such patients. We present the case of a 65-year-old patient with suspicion of thrombus in the inferior caval vein and the right atrium, who was admitted to the Department of Cardiac Surgery with the symptoms of palpitation, atypical chest pain and easy fatigue. We also discuss the most suitable management with this condition.

Key words: free-floating thrombus, cardiac surgery, right atrium, inferior vein.

Introduction

Free-floating thrombus (FFT) in the right atrium is diagnosed very rarely and there is still little knowledge concerning what management should be implemented in such situations. Right atrial FFT can appear as a result of atrial septal defect, other heart abnormalities, atrial fibrillation, and traumas [1-4]. There are still few studies presenting intracardiac thrombi in the course of extracardiac neoplasms, pulmonary thrombosis, following percutaneous coronary interventions (PCI) and open-heart surgery [5-7]. In the available literature there are no multicentre, randomized and prospective trials to provide a basis for guidelines of diagnostic and therapeutic management in patients with free-floating thrombus in the right atrium.

Case report

A 65-year-old patient with the suspicion of thrombus in the inferior caval vein and the right atrium was admitted to the Department of Cardiac Surgery, 1st Chair of Cardiology and Cardiac Surgery of Medical University of Lodz, Poland. For about a year the patient had complained of palpitations, atypical chest pain and easy fatigue. All the above ailments intensified in the last month before admission. Physical examination revealed hypertension according to ESH/ESC 2007 guidelines (mean blood pressure was 150/105 mmHg) and lower limb varices with the coexistence of skin trophic changes. The auscultatory examination did not reveal any abnormalities.

Laboratory tests showed elevated concentration of plasma D-dimers (>1000 ng/ml) as well as raised erythrocyte sedimentation rate (ESR)

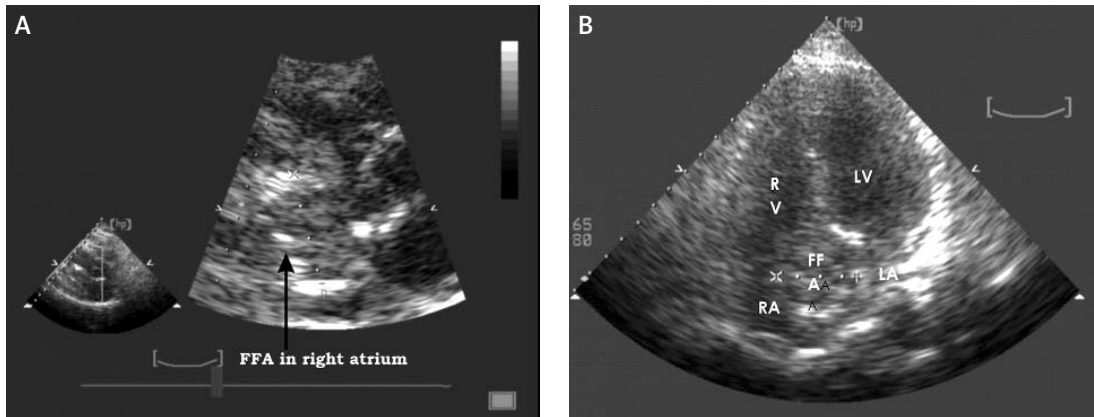


Figure 1A, B. Free-floating thrombus in transthoracic echocardiography

*RA – right atrium, RV – right ventricle, LA – left atrium, LV – left ventricle, FFA – free-floating thrombus

(32 mm after 1 hour). The chest X-ray discovered enlargement of the heart with effusion of the left pleural cavity. In transthoracic echocardiography enlargement of the right ventricle was observed with the coexistence of pulmonary hypertension (SPAP, *systolic pulmonary artery pressure*, was 75 mmHg, which could suggest embolism), insufficiency of the tricuspid valve of 2nd degree as well as similar mitral valve insufficiency. In the right atrium we observed a floating pedunculated outgrowth (suspected thrombus), which appeared to be connected with the ostium of the inferior caval vein (Figure 1A and 1B). Transoesophageal echocardiography (TEE) confirmed the presence of a floating cast thrombus from the lower limb veins that moved to the inferior caval vein and right atrium (the outgrowth length in the right atrium was about 5.0 cm and in the inferior caval vein about 6.0 cm, the width about 1.0 cm), reaching the tricuspid valve in diastole.

Due to the organization of the outgrowth and the high risk of pulmonary embolism, the patient was qualified for urgent surgical embolectomy, rather than streptokinase therapy. The surgery was performed in general intratracheal anaesthesia, with access by median longitudinal sternotomy. Next, arterial cannulation to the ascending aorta and venous cannulation through the right atrium to the superior caval vein and carefully to the inferior caval vein were performed. The extracorporeal circulation was attached using heart-lung apparatus Jostra HL 20 with the oxygenator Quadrox and arterial filter Quart, with blood flow 4.48 l/min. The action of the heart was stopped using electric fibrillation, then the aorta with the pulmonary trunk was cross-clamped and 1000 ml of crystalloid cardioplegia was administered to the aortic bulb. Bands were tightened over the cannulated caval veins. Extracorporeal circulation was performed at a temperature of 33-34°C. Part of the embolic material protruding from the inferior caval vein appeared after opening of the right atrium cavity. It was evacuated all-in-one using pulsative loosening of the band tightened over the

inferior caval vein. There was no embolic material in the right ventricle cavity or in the pulmonary trunk. Next we sutured the right atrium, deaerated the heart cavities and aorta, released the aorta and pulmonary trunk clamp, and performed direct defibrillation. The aorta cross-clamping time was 11 min, perfusion time 29 min and reperfusion time 14 min. After decannulation we administered protamine and controlled the homeostasis. After that we drained the pericardial sac and anterior mediastinum, removed the epicardial electrode, and finally sutured the pericardial sac and thorax.

The thrombus was sent for histopathological examination, which confirmed the initial diagnosis.

During the postoperative period no complications were observed. After surgery the patient was given enoxaparine (2×40 mg) and after a few days enoxaparine was replaced with tablets of acenocumarol. Transoesophageal echocardiography was performed 7 days after surgery and confirmed the good outcome of the surgery (lack of embolic material). During the postoperative period the patient did not suffer from dyspnoea or palpitations. On the 10th day after surgery the patient was discharged from hospital.

Discussion

The diagnosis of free-floating thrombus in the right atrium is a very rare phenomenon and requires special diagnostic and therapeutic management. It is associated with high mortality (over 40%) in this group of patients, as a result of the transfer of thrombotic material to the pulmonary arteries [8-11]. On the basis of available literature transthoracic echocardiography (TTE) is the gold standard in case of suspected pulmonary embolism [8-11]. TTE aims to differentiate thrombus from right atrial myxoma, vegetations in the course of infective endocarditis, and foreign objects (electrode, cannula) or embryonal Chiari's network [10, 12]. It may lead to syncope, which can be a manifestation of pulmonary embolism.

Occlusion of a pulmonary artery with cardiac output drop, sometimes resulting in cardiac arrest, is the main underlying mechanism. What is interesting, the embryonal Chiari's network could have acted as an anatomical barrier preventing massive pulmonary embolism and cardiac arrest [10].

In case of diagnostic doubts it is recommended to perform transoesophageal echocardiography, which usually finally confirms the presence of a thrombus and enables to reveal the thrombus in the pulmonary trunk [13, 14]. Further diagnostics including computer tomography, lung scintigraphy and angiography of the pulmonary vessels may delay the implementation of suitable management and worsen the prognosis in the event of diagnosis of a floating thrombus in the right atrium [11, 15-17]. In the presented case we performed TTE and TEE examinations, which confirmed the diagnosis and enabled us to choose a suitable way of treatment.

In recent years there has been a discussion regarding the best methods of management in case of diagnosis of intracardiac thrombus. There are a few available studies where thrombolytic and anticoagulant treatment were successfully used [18-20]. However, other studies suggest that such a method of management gives uncertain outcomes, is time-consuming and may lead to pulmonary embolism [2, 9, 21]. Therefore currently most authors suggest surgery as the treatment of choice in this group of patients [8-12, 22]. In the presented case report surgery was performed in the urgent mode, and we obtained optimal therapeutic effect. During the further hospitalization we used appropriate antithrombotic and anticoagulant treatment according to the current recommendations [23, 24].

In conclusions, the diagnosis of free-floating thrombus in the right atrium is met very rarely and there are still many doubts regarding the way of management with such patients. Accordingly, as there are no recommendations so far, we suggest performing urgent surgical embolectomy in each case of a risk of pulmonary embolism.

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