

## Special Article – Clinical Case Reports

## Surgical Treatment for Floating Right Heart Thrombus in High Risk Patients: A Case Report

Redondo A\*, Miguelena J, Martín M, Varela L, Fajardo E, López J, Muñoz R and Rodríguez-Roda J

Hospital Ramón y Cajal, Madrid, Spain

\*Corresponding author: Redondo Ana, Department of Adult Cardiovascular Surgery, Hospital Ramón y Cajal, Madrid, Spain

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## Abstract

**Background:** Right heart floating thrombus or “embolus in transit” can be a very dangerous condition, usually associated to pulmonary thromboembolism. Even though many treatment options have been considered, nowadays, the recommended approach remains unclear. Surgical embolectomy has been used as an option, usually less preferred than thrombolysis or percutaneous approach, but it can be a safe and effective procedure in patients with high risk of embolization.

**Methods:** We present the case of a 70-year-old man with a diagnosed thrombus in transit, with high mobility and considerable embolization risk.

**Results:** Surgical embolectomy was performed, through median sternotomy and under cardiopulmonary bypass, removing a 20-cm long thrombus from the right atrium, in an uneventful procedure.

**Conclusion:** Surgical embolectomy, through median sternotomy and with extracorporeal circulation, is a safe approach for patients with high risk floating right atrium thrombus, and must be considered as an option for these patients. Further randomized studies must be carried out in order to determine which one is the best treatment for this entity.

**Keywords:** Right Heart Thrombus; Surgical Embolectomy

## Introduction

Right heart thrombus is a potentially threatening condition, with a described mortality up to 40% when it's related to massive pulmonary embolism [1]. In some cases, these thrombi are “floating” inside the right atrium, with a significant increase of the embolization risk and, therefore, require an emergent therapeutic decision. So far, this question has been discussed in many occasions, considering both options, thrombolysis and surgical embolectomy, equally valid for these patients considering their clinical context, but the evidence available concerning this matter is still weak [2].

## Case Presentation

We present the case of a 70-year-old man, without any cardiovascular risk factor, with a recent history of a long period of immobility due to a cranial trauma.

He presented with an episode of pain and swelling of the right lower limb, being diagnosed of an iliofemoral venous thrombosis by echocardiography. Therefore, he was treated with low-molecular-weight heparin. After 24 hours, he presented with sudden shortness of breath, chest pain and loss of consciousness. A computed tomographic pulmonary angiography revealed a massive bilateral acute pulmonary thromboembolism (Figure 1).

In order to determine the right heart involvement, a transthoracic echocardiogram was performed, showing a floating mass inside the right atrium, trespassing the tricuspid valve and entering the right ventricle, compatible with a recently formed thrombus (Figure 2).

After discussing all the possible therapeutic options, surgical treatment was considered due to the high risk of embolization. Therefore, right atrium embolectomy was performed through median sternotomy and with cardiopulmonary bypass. Right atrium and both pulmonary veins were opened and reviewed, obtaining a 20cm long thrombus from the right heart chambers and the right pulmonary vein, with the shape of the iliofemoral venous axis (Figure 3). The procedure was uneventful and the patient had a non-complicated postoperative course. An inferior vena cava filter was placed right after the procedure, being removed 3 days later, once the anticoagulant treatment was settled. He was discharged 7 days later with long-term treatment with LMWH during 6 months.

## Discussion

Although it has been widely reviewed in scientific literature, the treatment for the floating right thrombus or “embolus in transit” is

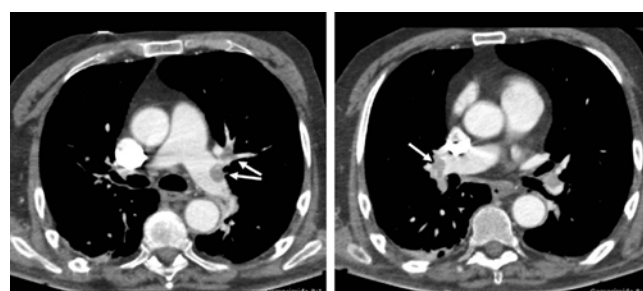
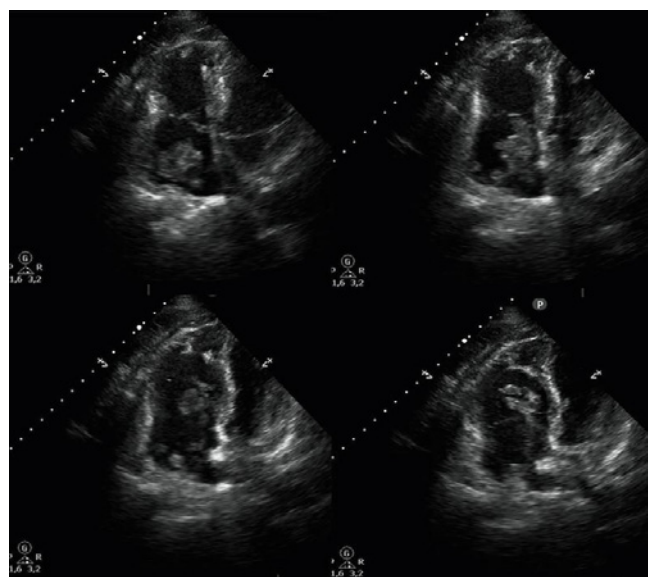


Figure 1: Capture image of a computed tomographic pulmonary angiography showing the bilateral pulmonary embolism (pointed with arrows).



**Figure 2:** Transthoracic echocardiogram images revealing the presence of a large mobile thrombus in the right atrium.

still a matter for discussion.

Most published evidence consists on isolated case reports or small case series. Rose P et al. analyzed in 2002 all reported cases in English of right heart thromboembolism, getting a 177 patient series. They determined the effects of the different treatment options and the patients baseline characteristics on the mortality rate, determining that thrombolysis was the best option with the lowest mortality. Nevertheless, a prospective randomized trial needs to be done in order to establish clear recommendations [3].

In this case we presented, surgical embolectomy was considered as the best option, since the patient was already under treatment with heparin, and the echocardiographical findings pointed towards a high risk of embolization, and therefore, a high mortality risk. In the last published guidelines, surgery remains as the last option for pulmonary embolism treatment, only recommended for patients with hemodynamic instability, any contraindications for thrombolysis or catheter removal of the thrombus or, like in this case, evidence of the thrombus inside the right heart chambers.

Echocardiographical diagnosis is unavoidable due to the need for ruling out any septal abnormalities, such as patent foramen ovale, that would lead to paradoxical embolism and a wider range of complications. Surgical approach to this entity also allows atrial septal defect repair [4]. In the case we have described TTE also defined the high mobility of the thrombus inside the right atrium, which forced to take the decision of getting the patient under surgical embolectomy.



**Figure 3:** Intraoperative picture of the removed thrombus, measuring 20 cm long.

## Conclusion

Right heart floating thrombus or “embolus in transit” is a rare but life-threatening condition, with high mortality when emergency treatment is not administered. Surgical approach, with cardiopulmonary bypass and right atrium embolectomy can be a safe and effective procedure, with a low complication rate.

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