



## Case Report

# Successfully thrombolysis using tenecteplase in a case of massive pulmonary embolism with multiple free-floating thromboses in the right atrium and right ventricle

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## ABSTRACT

Massive pulmonary embolism (PE) combined with right atrial (RA) thrombus is associated with significant mortality. Hemodynamic collapses, which can manifest as hypotension, severe dyspnea; cyanosis, syncope, shock, and right ventricular heart failure are the hallmark of massive PE. Moreover, hemodynamic collapse can be the earliest clinical presentation and the most common cause of death in the first days. Although fibrinolytic therapy has contraindications; exclusion is necessary to minimize bleeding risk, but it can be lifesaving and prevent complications such as shock, right ventricular heart failure, and multi-system organ failure. Here, we report a 70-year-old woman who has an atypical presentation of sudden onset of a persistent hiccup for 8 hours diagnosed with massive pulmonary embolism with multiple free floating thromboses in the right atrial and right ventricle which has been successfully treated with systemic fibrinolytic. Furthermore, the patient was given a Tenecteplase as a last resort to save her life due to the unavailability of the catheter or surgical embolectomy besides an absolute contraindication for thrombolytic.

## 1. Introduction

Immediate identification of pulmonary embolism (PE) for the patients in the emergency department (ED) remains a challenge. Besides myocardial infarction and stroke, pulmonary embolism is the third leading cause of mortality due to cardiovascular disease [1].

Free-floating right heart thrombus is a severe form of thromboembolic disease that usually coexists with a massive pulmonary embolism and substantially increased risk of mortality compared to the presence of pulmonary thromboembolism alone [2,3]. Nonetheless, the management strategy of free-floating right heart thrombus with massive pulmonary embolism is conventional with the treatment of anti-coagulants with fibrinolytic therapy or surgery have all been involved [4,5]. Here, we reported a 70 years old female with massive pulmonary embolism and associated with multiple free floating thromboses in the right atrium and right ventricle successfully treated with systemic fibrinolytic as the latest option to save a life in the presence of absolute contraindication, and this risk has exposed due to lack of availability of catheter or surgical embolectomy in our country.

## 2. Case report

A 70-year-old woman came to the emergency department (ED) of our hospital with sudden onset of a persistent hiccup for 8 hours. Also the patient has shortness of breath, chest pain, and hemoptysis for last two days. Although she has a history closed head trauma before two month and mild parenchymal hemorrhage was detected on computer tomography, but she had no history of chronic disease, blood transfusion, and surgery. Moreover, the patient doesn't make the diagnosis of deep venous thrombosis. The Physical examination revealed that she had respiratory distress with a respiratory rate of 31 breaths per minute, tachycardia (138 beats/min), with low oxygen saturation (70%) at room temperature without supplemental oxygen, and hypotension (BP = 80/50). No jugular venous distension and hepatomegaly were noted. The laboratory investigations were unremarkable. The ECG demonstrated atrial fibrillation with 130 beats per minute (figure-1). After consulted the cardiology specialist and performed transthoracic echocardiography (TTE) in ED which revealed multiple mobile thrombi in the right atrium and right ventricle, moderate left ventricular hypertrophy (LVH), right side heart dilatation, and D-sign positive (figure-2). McConnell's sign was not detected on TTE. A high-resolution enhanced spiral CT

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### Abbreviations

N/A

pulmonary angiography was performed, to identify the degree and localization of pulmonary thrombi and confirmed massive pulmonary thrombotic occlusion of the left and right main pulmonary artery, as well as lobe and segmental arteries with filling defect in the right atrium of the heart (figure-3).

According to hemodynamic compromise of the patient resulting from the massive pulmonary embolism, the definitive treatment was pulmonary embolectomy. Due to the lack of availability for catheter or surgical embolectomy and other thrombolytic regimens, she became a candidate for emergent Tenecteplase administration as a last resort to save a life.

Before thrombolysis, we performed fluid resuscitation [1000cc] which increased the blood pressure little bit (100/60mmHg). Immediately, Tenecteplase of 10,000 U bolus single dose in 10 seconds was administered via the central venous line. After administration, the patient hemodynamically improved, and Heparin infusion was initiated with full-dose. One day later, we ordered a combination of Bisoprolol, Ramipril, and a low molecular weight heparin regimen. Furthermore, repeated echocardiography was ordered to assess the changes in the thrombi number, and the pulmonary arterial pressure (PAP). Indeed, upon visualization of the right atrium, there was no thrombus, and the size of the right heart chamber reduced, while, PAP was normal. The patient was transferred after two days from the ICU into the inpatient department, and continues her medications. After one week, her echocardiography showed normal heart diameters and no thrombus in the right atrium or appendage. Moreover, enhanced pulmonary angiography had repeated and no abnormalities were detected. The patient was discharged to home on foot with Dabigatran and Metoprolol for atrial fibrillation and the prevention of future coagulation management to be followed up into the outpatient department.

### 3. Discussion

Here, we presented a 70 years old female with massive pulmonary embolism and associated with multiple mobile thrombus in the right atrium and right ventricle successfully treated with systemic fibrinolysis as the latest option to save a life in the presence of absolute contraindication.

Massive pulmonary embolism resides associated with high morbidity and mortality rates notwithstanding currently available for different therapeutic options [6].

In patients with massive pulmonary embolism, right atrial and right ventricular thrombus typically appears on echocardiography as an incidental finding. Echocardiography has been used not only as a diagnostic tool for the detection of right heart thrombi associated with pulmonary embolism but also used as an adjunct modality to evaluate the outcome and detect the potential complications.

Well's and a Revised Geneva Scores are the Scoring systems for early risk stratification of patients having the clinical manifestation and risk factors for venous thromboembolism (VTE) [7,8]. According to Well's (5.5-points) and a Revised Geneva (8-pints) Scores, our patient had an intermediate clinical probability of PE.

A massive PE and right atrial thrombus with presentation of shock (either a systolic blood pressure of less than 90 mmHg or a pressure drop of at least 40 mmHg that lasts 15 minutes or longer), thrombolytic therapy is useful in such circumstances and is recommended as first-line therapy, in the absence of contraindications [9].

In corresponding to a previous study, the present case has an absolute contraindication to thrombolytic therapy and high early mortality risk [10].

According to hemodynamic compromise of the patient resulting from the massive pulmonary embolism, the definitive treatment was pulmonary embolectomy. Due to the lack of availability for catheter or surgical embolectomy and other thrombolytic regimens, she became a candidate for emergent Tenecteplase administration as a last resort to save a life.

In life-threatening conditions, clinicians may be faced with frequent questions on how to manage patients with massive pulmonary embolism especially, those having an absolute contraindication to thrombolytic or do not meet the indications thrombolytic or unavailability of the catheter or surgical embolectomy.

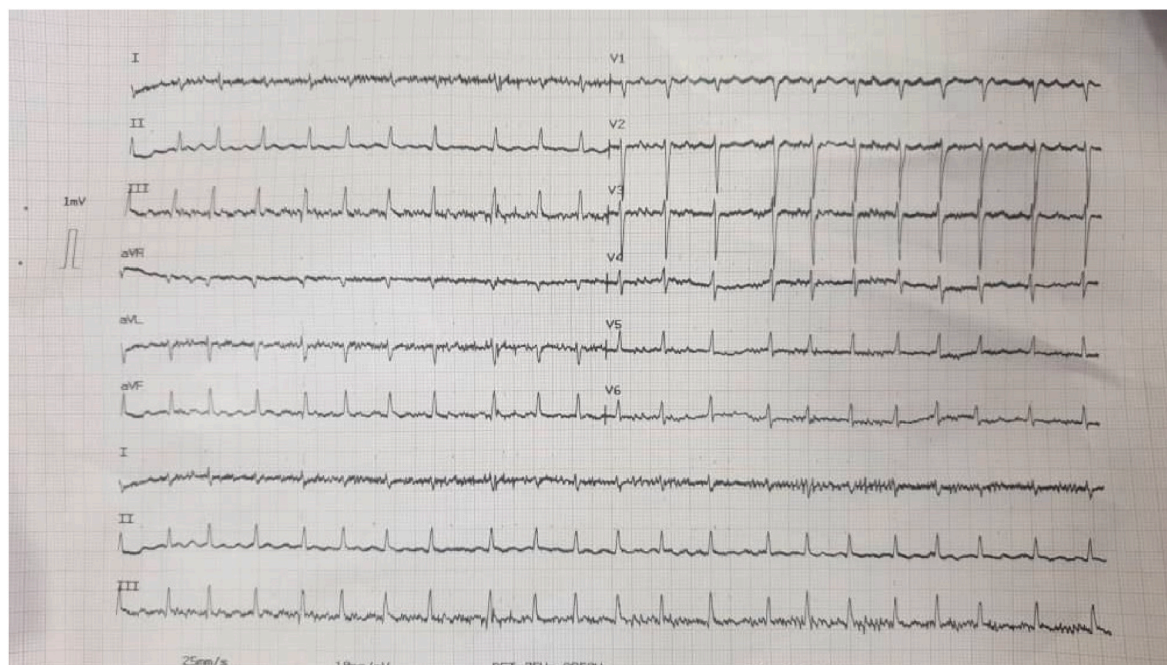


Figure-1. Electrocardiogram demonstrating with atrial fibrillation.

In conclusion, in the presence of massive pulmonary embolism, the definitive treatment was pulmonary embolectomy (either by catheter or surgical embolectomy). Due to the lack of availability for embolectomy procedures the patients become candidate to thrombolytic agents (Tenecteplase) as the last step to save her life even in the presence of absolute contraindication which was that the patient has a history of intra-parenchymal hemorrhage on brain CT scan. In such circumstances, the physicians should take action beyond the guidelines to save a life.

### Ethical approval

In institution board of review is not required ethic committee approval for the case reports.

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We declare that we have no funding source.

### Author contribution

M.F.Y.M. idea of the research, writing of the manuscript, final revision of the data, statistical tables, and radiological images; and finalization of the research manuscript. M.S.M. data collection, writing of the manuscript, and intellectual content related to pulmonology. M.O.H. Writing of the manuscript and intellectual content related to cardiology.

### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Registration of research studies

- 1 Name of the registry: **Not Applicable**
- 2 Unique Identifying number or registration ID: **Not Applicable**
- 3 Hyperlink to your specific registration (must be publicly accessible and will be checked): **Not Applicable**

### Guarantor

As Corresponding Author, I confirm that the manuscript has been read and approved by all named authors.

### Availability of data and materials

The data is available from the corresponding author and can be accessed if requested.

### Provenance and peer review

Not commissioned, externally peer-reviewed

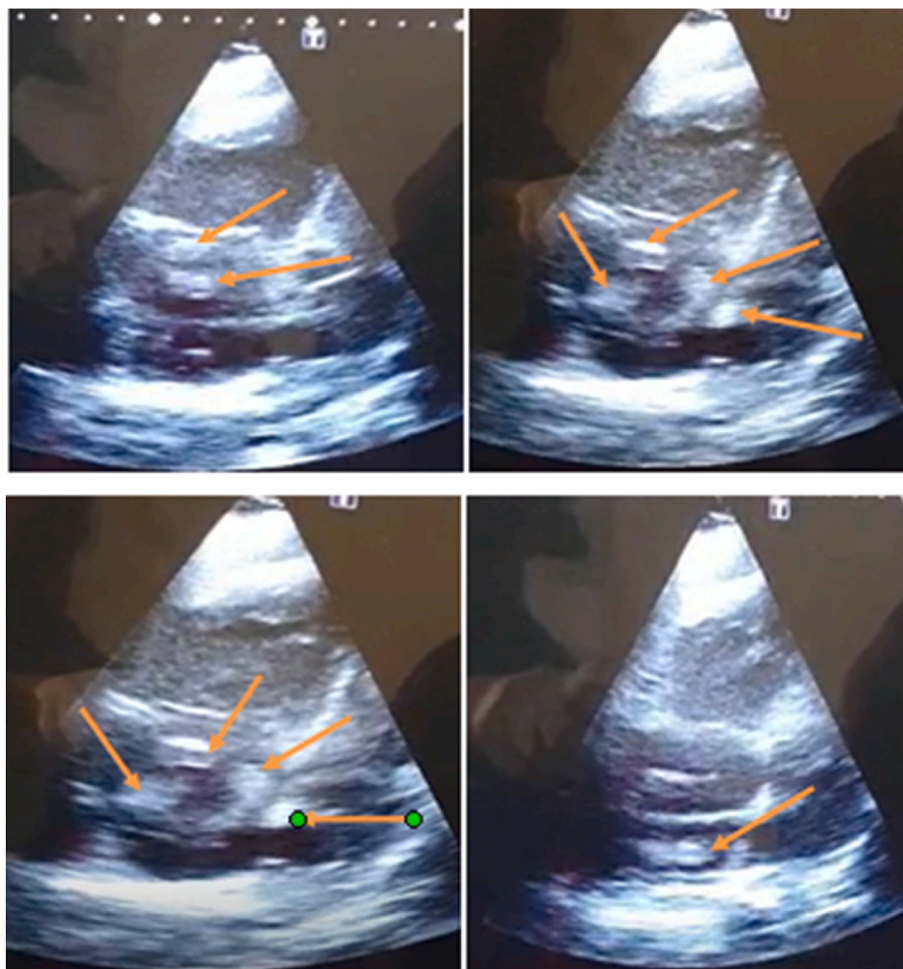
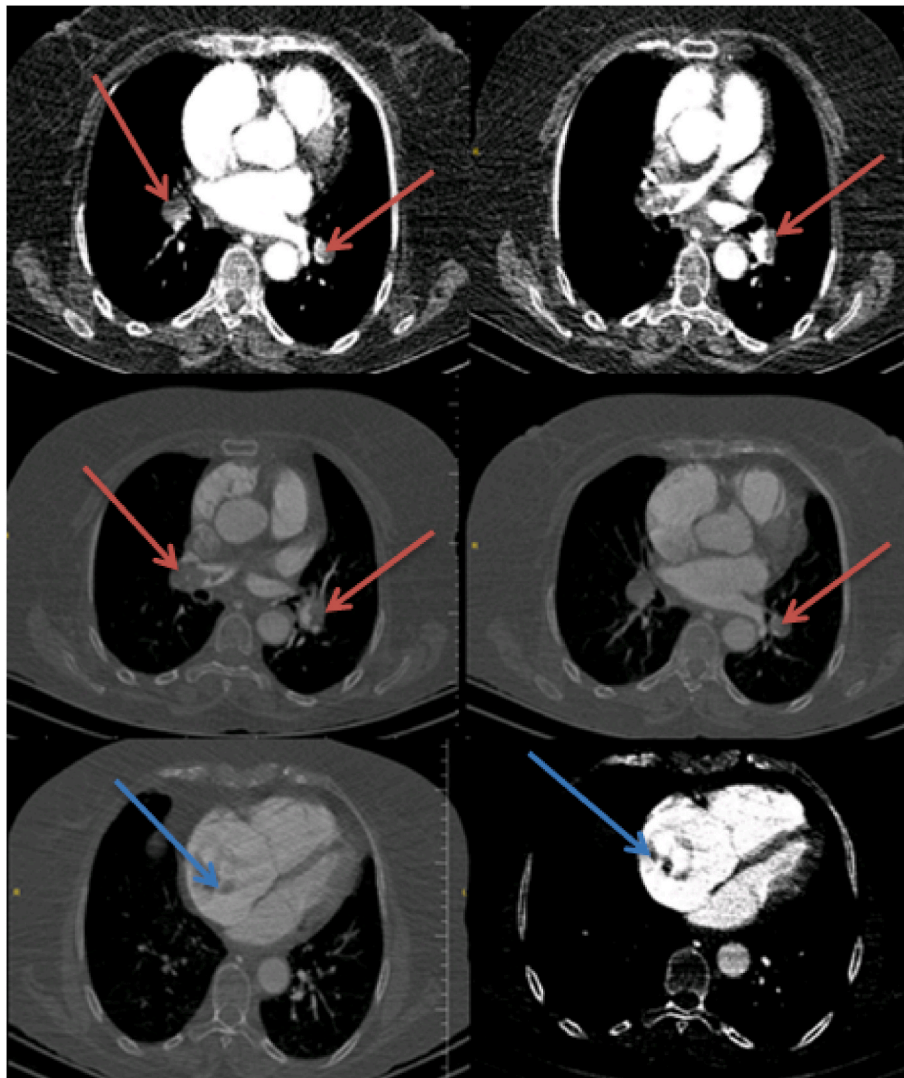


Figure-2. Transthoracic echocardiography showing a multiple mobile thrombi in the right atrium and right ventricle (orange arrows).





**Figure-3.** Enhanced pulmonary angiography revealing a massive pulmonary thrombotic occlusion of the left and right main pulmonary artery, as well as lobe and segmental arteries with filling defect in the right atrium of the heart with multiple hypodense lesions inside the heart (Most likely multiple intracardiac thrombus).

#### Declaration of competing interest

We declare that we have no conflict/competing interests.

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We thank the patient who gave her consent to be published in this case report.

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