

## Case Report: Right Atrial Thrombus with Pulmonary Embolism - Effect of Timely Medical Treatment

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### Abstract

**Background:** Right atrial thrombus (RAT) is a rare finding that is almost exclusively found complicating pulmonary embolism (PE) and carries a high mortality rate. Emergency treatment is usually required to save life. There is no algorithmic approach of the management of this condition due to the lack of evidence-based guidelines and randomized control trials. Management of RAT is still a subject of debate.

**Objective:** This study demonstrates the effectiveness of thrombolysis in resolution of right atrial thrombus.

**Case Report:** Sixty one year-old female, presented with a history of fainting, exertional dyspnea, easy fatigability, and lower limb swelling. A transthoracic echocardiography (TTE) showed a right atrial mass that was moving into right ventricle. Computed tomography pulmonary angiogram (CTPA) confirmed a diagnosis of pulmonary embolism.

The patient was thrombolysed with tenecteplase and a repeat TTE confirmed that the thrombus had resolved with and improvement in the patient's clinical symptoms.

**Discussion:** This demonstrates thrombolysis is a rapid and life-saving therapeutic measure reducing the risk of death from thromboembolism.

**Keywords:** Cardiac Thrombus; Pulmonary Thromboembolism; Thrombolysis

### Introduction

Right atrial thrombus is a rare entity frequently encountered in patients with pulmonary embolism. Right atrial thrombus is an underdiagnosed condition with a high mortality rate and the best management modality has not yet been established [1]. The concomitant presence of pulmonary embolism is an emergency. The presence of right heart thrombus in the setting of pulmonary embolism is 4%-18% and the mortality rate is increased [2].

Treatment options available are anticoagulation, embolectomy and thrombolysis. Survival rates of each approach vary, on the patient’s clinical status. Anticoagulation agent(heparin) is generally considered to be the safest treatment, but its use has been associated with many complications, including potentially life-threatening ones, such as thrombocytopenia [3].

The largest meta-analysis to date was presented by Athappan (2015), thrombolytic agent which included 328 patients of whom 70 patients received anticoagulation, 122 patients received thrombolysis, and 120 patients had surgical embolectomy. The highest mortality rates (90.9%) were reported in patients who were left untreated. The mortality associated with anticoagulation alone was significantly higher than surgical embolectomy or thrombolysis (37.1% vs 18.3% vs 13.7%, respectively) [4].

**Materials & Methods**

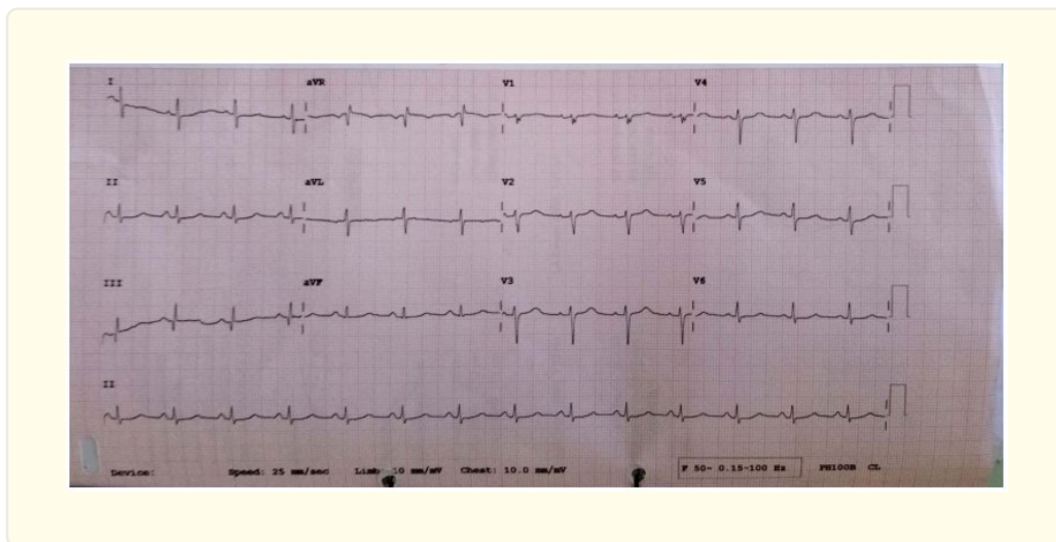
A 61-year-old female referred from a peripheral facility with a diagnosis of right heart failure. She presented with complaints of exertional dyspnea, orthopnea, bilateral lower limb swelling that resolved by morning, easy fatigability, and an episode of fainting four days prior while undergoing physiotherapy. Medications prior to referral; spironolactone 25mg once daily, aspirin 75mg once daily, carvedilol 3.125mg twice daily, Frusemide 40mg once daily, ceftriaxone 2g once daily, esomeprazole 40mg once daily.

**Examination findings**

At the time of admission obese, Sick looking patient with bilateral pitting edema with features suggestive of heart failure. Patient was in fair general condition, normal blood pressure and oxygen saturation.

The patient was admitted in high dependency unit, TTE showed a right atrial mass that was moving into the right ventricle, 12 lead electrocardiography showed deep S wave in lead I, Q wave in lead III, CTPA revealed a bilateral pulmonary embolism. Other laboratory tests were as shown in the table below.

12 lead ECG before thrombolysis showing deep S wave in lead I, Q wave in lead III.



Transthoracic echocardiography before thrombolysis showing right atrial thrombus.



She was thrombolysed with Tenecteplase 50mg given in 5 seconds, a repeat TTE after thrombolysis showed no apparent right atrial mass and the patient was discharged from high dependency unit within 24 hours with stable clinical state.

<i>Vital sign</i>	<i>Unit</i>	<i>Value</i>	<i>Reference values</i>
Blood pressure	Mm Hg	103/52	<120/80
Pulse rate	Beats per minute	79	60 - 100
Oxygen saturation	%	89	95 - 100

### Diagnosics

Investigations results before thrombolysis.

	<i>Unit</i>	<i>Value</i>	<i>Reference Value</i>
Sodium	mmol/L	133	135-150
Potassium	mmol/L	3.3 - 5.3	3.3 - 5.3
Chloride	mmol/L	104.3	99 - 110
Creatinine	nmol/L	136.6	50 - 120
Urea	mmol/L	8.9	2.6 - 7.0
Troponin	ng/L	204.5	0 - 0.06
Prothrombin time	Seconds	68.5	11 - 13.5
Alkaline phosphatase	U/L	119	35 - 306
Alanine aminotransferase	U/L	81	0.0 - 50
Aspartate aminotransferase	U/L	104	0.0 - 50

Gamma GT	U/L	81	11 - 50 81
Bilirubin (total)	mmol/L	5.65	5 - 17
Direct bilirubin	umol/L	81	11 - 50
Uric acid	mmol/L	456	142 -339 456
Random blood sugar	mmol/L	7.7	3.3 - 7.8
C-reactive protein	mg/L	211.54	< 0.3

**Investigations:** after the patient was thrombolysis.

	Unit	Value	Reference Value
Sodium	mmol/L	139.4	135 - 150
Potassium	mmol/L	4.18	3.3 - 5.3
Chloride	mmol/L	104.8	8.99 - 110
Creatinine	nmol/L	109.19	50 - 120
Urea	mmol/L	7.4	2.6 - 7.0
Hemoglobin A1C	%	5.22	4.2 - 6.2
Total white blood cell count	g/L	11.7	4 - 11
Lymphocytes	g/L	23.7	0.4 - 4.8
Hemoglobin	g/Dl	11.1	11.6 - 15
Platelet count	g/L	105	140 - 450

At the time of discharge, Fair general condition, Blood pressure - 110/60 mm Hg, Pulse rate 75 beats per minute, Oxygen saturation 95% on room air.

## Discussion

Suretkal. V et al (2018) reported lower mortality rate in patients who received thrombolytic therapy when compared to patients who underwent surgery or anticoagulation. The thrombolytic therapy accelerates thrombolysis and or enhancing pulmonary reperfusion, reduces pulmonary artery hypertension, thus improving the right and left ventricle function and reverses cardiogenic shock. Thrombolysis dissolves the clot in three major sites: intracardiac, pulmonary and venous thrombosis. Recombinant tissue Plasminogen Activator (rtpa) is preferred because it has greater affinity for plasminogen in the presence of fibrin and a shorter infusion time than streptokinase or urokinase [3, 5].

Although the existing guidelines do not offer a clear statement for the management of RAT and PE, this condition is associated with worse outcomes [6].

Algorithmic approach toward right heart thrombus is due to the lack of evidence-based guidelines and randomized control studies. Treatment options surgical v/s thrombolysis is debatable. No evidence-based guidelines for prophylaxis in indwelling catheters [4] is available.

Anticoagulation therapy alone is not recommended in very mobile and large thrombi as it may cause a systematic embolization. Thrombolysis has been proposed as a non-invasive treatment and can be a suitable alternative therapy of choice because of its ability to accelerate clot lysis and it ensures simultaneous thrombolysis cardiac and also of pulmonary arterial and femoral venous thrombi [5, 6].

Thrombolytic and anticoagulation therapy is used to treat the patient and complete resolution of the RAT was achieved. However, this treatment may not be applicable to every patient because of considerations regarding age and comorbidities. TTE is very helpful to identify patients at risk and to make early management decisions. In addition, it gives valuable information regarding response to treatment during follow-up process.

## Conclusion

The optimal treatment for right heart thrombi remains uncertain and warrants additional studies. There are no studies on management of right atrial thrombus that has been conducted in Africa and Kenya. Until there is more definitive evidence, management decisions should be made on a case-by-case basis, with careful consideration of complicating factors such as hemodynamic instability, right heart function. This case demonstrates that thrombolysis can effectively resolve RAT in PE.

## Abbreviations And Acronyms

CTPA: Computed tomography of pulmonary angiography.

ECG: Electrocardiography.

PE: Pulmonary embolism.

RAT: Right atrial thrombus.

RHTE: Right heart thromboembolism, Magnetic resonance imaging.

TEE: Transesophageal echocardiography.

TTE: Transthoracic echocardiography.

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