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Massive Pulmonary Embolism with Right Atrial Thrombus: A Case Report

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ABSTRACT

We present the case of a 53-year-old woman who arrived at the emergency department with acute dyspnea persisting for 24 hours. The purpose of this report is to highlight an unusual presentation of massive pulmonary embolism (PE) combined with right atrial thrombi and to underscore the diagnostic and therapeutic considerations in such complex cases. Despite initial hemodynamic stability, a comprehensive diagnostic evaluation revealed a massive PE affecting both pulmonary arteries, along with multiple thrombi in the right atrium (RA) – a rare and high-risk combination in PE management. Elevated D-dimer levels, computed tomography pulmonary angiography (CTPA), and transthoracic echocardiography (TTE) confirmed the diagnosis. The patient responded well to anticoagulation therapy, achieving significant clinical improvement. This case is notable due to the concurrent presence of right atrial thrombi and massive PE in a patient with no identifiable risk factors, such as atrial fibrillation, cancer, or recent surgery, suggesting an idiopathic cause. This report provides an example within the field of PE management where individualized treatment and comprehensive diagnostic workup are essential, particularly in atypical presentations without clear predisposing factors.

Keywords: *Pulmonary Embolism, Right Atrial Thrombus, Anticoagulation*

Introduction

Pulmonary embolism (PE) is a common and potentially life-threatening condition caused by the obstruction of the pulmonary arteries, usually due to thrombi originating from the deep veins of the lower extremities (Cao *et al*., 2021). The clinical presentation of PE can vary widely, ranging from asymptomatic cases to severe, life-threatening events such as massive PE, which is associated with significant morbidity and mortality (Almeneessier *et al*., 2020). In rare cases, emboli may originate from thrombi located in the

right atrium (RA), complicating the clinical picture and posing additional therapeutic challenges (Susilo *et al*., 2021).

This case report discusses the diagnosis and management of a patient with a massive pulmonary embolism complicated by the presence of multiple right atrial thrombi, underscoring the importance of early recognition and multidisciplinary management in such cases. It highlights the importance of considering RA thrombi in the differential diagnosis of PE, especially in patients without traditional risk factors like atrial fibrillation, malignancy, or recent surgery (Degiovanni *et al*., 2022).

Case Presentation

A 53-year-old woman presented to the emergency department with a sudden onset of dyspnea that had persisted for approximately 24 hours. She reported no chest pain, hemoptysis, or palpitations. The patient described feeling anxious due to the worsening of her symptoms but denied any recent history of trauma, surgery, or prolonged immobilization. She had no significant medical history of thromboembolic events, chronic illnesses, or hormone replacement therapy use. On physical examination, the patient appeared anxious but hemodynamically stable. Her vital signs revealed a blood pressure of 125/80 mmHg, a heart rate of 88 beats per minute, a respiratory rate of 22 breaths per minute, and an oxygen saturation of 94% on room air. She was afebrile, with a temperature of 98.6°F (37°C). Cardiovascular examination showed a regular heart rhythm with no signs of heart failure. Respiratory examination revealed mild wheezing and decreased breath sounds at the bases, but no crackles or pleural rubs. The rest of her systemic examination was unremarkable.

Given her acute dyspnea and clinical findings, a preliminary diagnosis of PE was considered. Laboratory investigations showed an elevated D-dimer level of 1973 ng/mL (normal range < 500 ng/mL), raising suspicion of a thromboembolic event. A chest X-ray showed no acute infiltrates or pleural effusion. A CT pulmonary angiogram (CTPA) was performed, revealing a massive pulmonary embolism involving both the right and left pulmonary arteries. Additionally, transthoracic echocardiography (TTE) identified multiple thrombi within the right atrium, including a large thrombus in the right atrial appendage (Fig. 1).

Upon confirmation of a massive PE with concomitant right atrial thrombi, the patient was stabilized with supplemental oxygen. Anticoagulation therapy was initiated with intravenous heparin to prevent further thrombus formation and reduce the risk of embolization. The presence of multiple right atrial thrombi posed a significant risk of further embolization to the pulmonary circulation. A multidisciplinary team of

cardiologists, pulmonologists, and hematologists was consulted to devise an appropriate management plan.

Figure 1: TTE showing multiple thrombi in right atrium.

Given the patient's stable hemodynamic status and the risk of bleeding associated with thrombolytic therapy, the decision was made to forgo thrombolysis and proceed with anticoagulation therapy alone. The patient was closely monitored, and her condition showed steady improvement with anticoagulation. Her dyspnea decreased, and her oxygen saturation improved to 98% on room air. Repeat echocardiography performed 48 hours later showed a reduction in the size of the right atrial thrombi and decreased right ventricular strain. A follow-up CTPA confirmed partial resolution of the pulmonary embolism.

The patient was transitioned to oral anticoagulation with warfarin, with a target INR of 2-3, and was monitored for bleeding or other complications. She was advised to continue anticoagulation therapy for at least six months. The patient was discharged with follow-up plans, including regular echocardiographic evaluations and INR monitoring.

Discussion

This case emphasizes the importance of early diagnosis and management of massive pulmonary embolism, particularly when complicated by the presence of right atrial thrombi. PE is frequently difficult to diagnose because of its nonspecific symptoms and variability in presentation, and in some cases, it may

be considered idiopathic, meaning the cause is unidentified despite thorough investigation (Qi *et al*., 2023). Elevated D-dimer levels can be helpful in screening for thromboembolic events (Himeno *et al*., 2023), and imaging studies such as CTPA and echocardiography are crucial for confirming the diagnosis and assessing the extent of thromboembolic disease (Oh and Park, 2023).

The presence of right atrial thrombi in the context of PE is rare but increases the risk of further embolization and adverse outcomes. Right atrial thrombi may develop in situ, especially in patients with conditions like atrial fibrillation or heart failure, although our patient had none of these risk factors. Anticoagulation therapy is typically the mainstay of treatment for PE with right atrial thrombi, and in this case, it was sufficient to manage the thrombus burden without the need for thrombolysis.

The decision to forgo thrombolytic therapy in favor of anticoagulation was based on the patient's stable condition and the associated risks of bleeding with thrombolysis (Zuo *et al*., 2021). This case supports the use of anticoagulation alone in selected patients with massive PE and right atrial thrombi, particularly when thrombolysis may pose additional risks.

Conclusion

Massive pulmonary embolism with right atrial thrombus is a rare but potentially life-threatening condition that requires prompt diagnosis and management.

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Consent: The patient's consent has been obtained for the writing and publication of this case report.

Conflicts of Interest: The author declares no conflicts of interest.

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