

Pulmonary Artery Thrombus Visible on Transthoracic Echocardiography in a Patient with Saddle Pulmonary Embolism

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Abstract

Case Report

Saddle pulmonary embolism (SPE) is an uncommon type of acute pulmonary embolism. It involves the presence of a thrombus where the main pulmonary artery divides into the left and right pulmonary arteries. We present the case of a 53-year-old male who had symptoms of chest pain and dyspnea for a few days prior to visiting the emergency department. Computed tomography pulmonary angiogram (CTPA) revealed SPE, so the patient underwent catheter-directed thrombectomy. A transthoracic echocardiogram completed after the procedure showed a thrombus in the main pulmonary artery and right pulmonary artery. A repeat CTPA demonstrated multiple pulmonary emboli and an embolus in the left pulmonary artery. While in the hospital, he received heparin. On discharge, he was given oral apixaban. Three months later, imaging revealed that the embolism had resolved. This case is unique since a pulmonary embolism was visible on transthoracic echocardiogram, a rare occurrence.

Keywords: Saddle pulmonary embolism, pulmonary embolism, chest pain, echocardiography, anticoagulation.

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INTRODUCTION

Pulmonary embolism (PE) is a commonly seen in clinical practice, with an incidence of 39-115/100,000 individuals/year [1]. Both genetic and acquired risk factors can lead to the formation of PE [1]. Some genetic factors include mutations of Factor V Leiden or prothrombin genes and deficiencies of proteins C or S [1]. Some acquired factors include prolonged immobilization, obesity, joint replacement, lower limb fractures, infections, cancer, history of prior thromboembolism, and cigarette smoking [1]. The incidence of PE is higher in male individuals than in female individuals [1]. In the United States, there are more than 100,000 deaths each year due to PE [1].

Saddle pulmonary embolism (SPE), an uncommon type of PE, is seen in approximately 2.6–5.4% of cases involving acute PE [2]. SPE occurs when there is a thrombus located where the main pulmonary artery bifurcates into the left and right pulmonary arteries [2]. The mean age at diagnosis is 50 ± 20.1 years and the most common presenting symptoms are often chest pain and dyspnea [3]. Patients with SPE are more likely to

experience tachycardia, tachypnea, ICU level care, decompensation, and cardiac arrest [4].

Visualization of PE using transthoracic echocardiography is considered rare [1]. Our case is interesting since a pulmonary embolism was visible on transthoracic echocardiogram.

CASE PRESENTATION

A 53-year-old male with history of chronic obstructive pulmonary disease, hyperlipidemia, hypertension, and obesity presented to a referring emergency department due to chest pain and dyspnea. Four days prior to presentation, he was ambulating within his home, when he suddenly experienced dizziness, shortness of breath, and chest pressure. The symptoms somewhat improved after several hours of resting in bed while using his continuous positive airway pressure (CPAP) machine. Since then, he was noted to have worsening exercise tolerance, continuous dyspnea at baseline, significant exertional dyspnea, and persistent tachycardia. He also reported left-sided posterior calf pain, tenderness, and swelling. He denied history of deep vein thrombosis (DVT) or PE. However, he did report a

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nine hour road trip approximately two and a half weeks prior to presentation.

In the emergency department, his temperature was 98.8 °F, blood pressure was 169/109 mmHg, heart rate was 121 beats per minute, respiratory rate was 24 breaths per minute, and oxygen saturation was 93% on room air. Physical examination was notable for left posterior calf tenderness with some mild erythema but no

warmth or palpable cord. A duplex venous ultrasound of the left leg revealed acute thrombosis of the distal femoral vein, popliteal vein, posterior tibial vein, and peroneal vein. Computed tomography pulmonary angiogram (CTPA) revealed multiple bilateral acute pulmonary emboli with a large saddle embolus (Figure 1). The patient was subsequently transferred to our facility, requiring 3L oxygen supplementation via nasal cannula, for higher level of care.

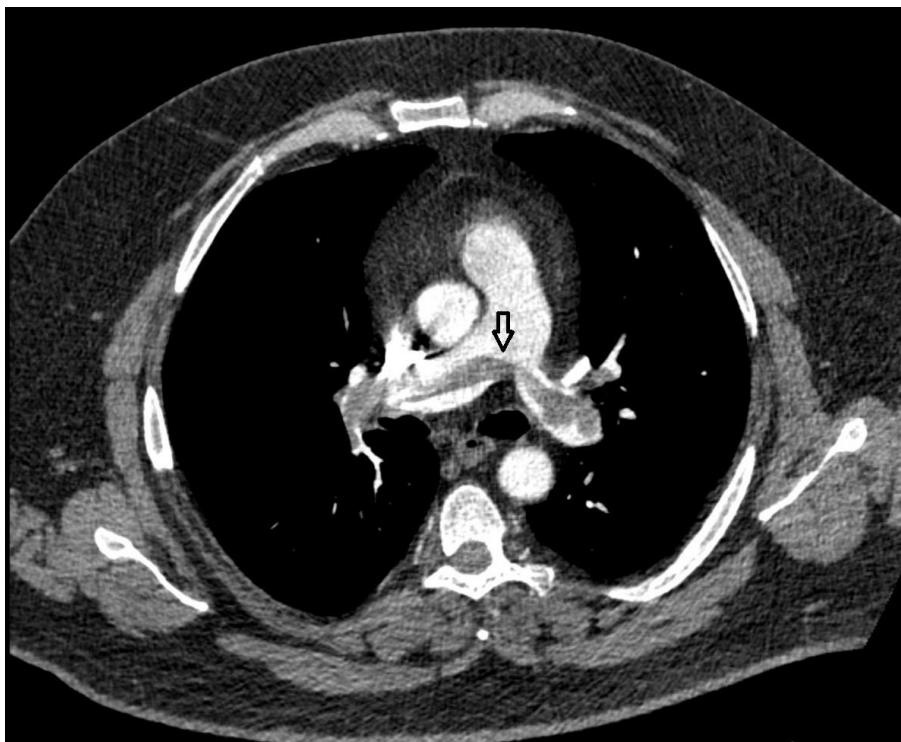


Figure 1: Computed Tomography Pulmonary Angiogram

The arrow indicates the saddle pulmonary embolism

Once in our facility, the patient underwent emergent thrombectomy, with large amount of clot removed from the right pulmonary artery and a small amount removed from the left pulmonary artery. Following the procedure, the patient was transferred to the intensive care unit (ICU), where he was started on a continuous heparin infusion. In addition, he required 3L of oxygen. The following day, he underwent a transthoracic echocardiogram, which revealed thrombus in the main pulmonary trunk and right pulmonary artery (Figure 2). The next day, he underwent a repeat transthoracic echocardiogram, which did not show a thrombus in the main pulmonary artery. A repeat CTPA continued to show multiple pulmonary emboli along

with an embolus in the left pulmonary artery. There was no thrombus in the main pulmonary artery, confirming the echocardiography findings. Cardiothoracic surgery was consulted and recommended anticoagulation rather than surgical intervention. The following day, the patient was transitioned from heparin to oral apixaban. The following day, four days after initial presentation, the patient was discharged. The patient was advised to take two 5mg tablets of apixaban twice daily for seven days. After seven days, he was advised to take one 5mg tablet of apixaban twice daily. He was also advised to follow-up with his physician as an outpatient. A CT angiogram of the chest completed three months later demonstrated resolution of the pulmonary artery thromboembolus. The patient continues to take 5mg of apixaban twice daily.

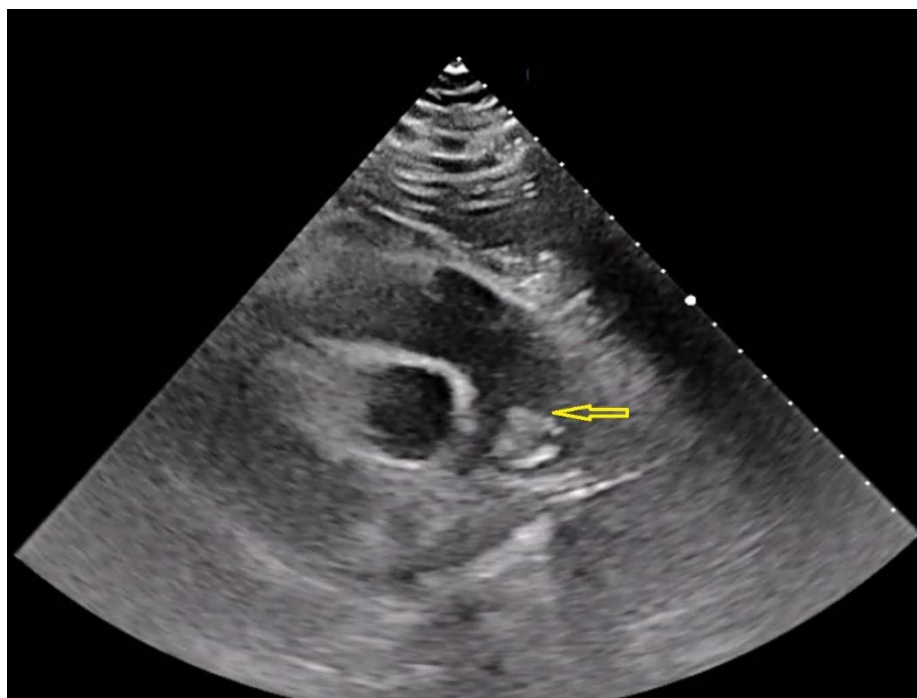


Figure 2: Echocardiogram

The arrow indicates the pulmonary embolism

DISCUSSION

On physical examination, patients with PE can have tachycardia or tachypnea [1]. There may also be erythema, tenderness or swelling of a calf [1]. Pulmonary signs may include rales or a decrease in breath sounds [1]. The imaging method most commonly used to diagnose PE is CTPA, which has sensitivity of 83% and specificity of 96% [5]. Visualization of PE using transthoracic echocardiography is considered rare [1]. Since PE can arise from a lower extremity DVT, compression ultrasonography may be conducted as well; one study demonstrated that 70% of PE cases involved DVT [1].

There are a few treatment options available for SPE. According to one study, anticoagulation is often the initial treatment of choice, with approximately 70% of patients receiving unfractionated heparin [2]. Other therapies, used in fewer cases, include enoxaparin and dalteparin [2]. Greater than half of patients received an additional therapy along with anticoagulation [2]. This included thrombolytic therapy, thrombectomy (mechanical or local catheter-directed therapy, or placement of an inferior vena cava filter (IVCF) [2]. According to one review article, surgical or catheter-directed thrombectomy, thrombolytic therapy, or anticoagulation administration can decrease the odds of death [3].

Thrombolytic therapy is associated with a decrease in mortality and relapse of PE; however, this is not statistically significant in patients who are stable hemodynamically [3]. Patients tend to have the most

benefit when the therapy is administered within 48 hours of the symptoms beginning [3]. Surgical thrombectomy appears to have similar survival outcomes as thrombolytic therapy; it may be undertaken in patients who are critically ill [3]. Catheter-directed thrombectomy is viewed as a safe and quick option in patients with massive PE, especially those who are not candidates for thrombolytic therapy [3]. It is also associated with decreased mortality in those with acute PE [3]. IVCF can be used in individuals where anticoagulation is contraindicated or in those where the PE relapsed in spite of appropriate anticoagulation [3]. Patients can be discharged from the hospital on anticoagulation therapy including warfarin, direct oral anticoagulants, enoxaparin, fondaparinux, or unfractionated heparin [2].

CONCLUSION

Patients with SPE often present with dyspnea and chest pain, and CTPA is the preferred imaging modality to make a diagnosis. Many cases of PE involve DVT, so compression ultrasonography can be useful. Visualization of a pulmonary embolus on transthoracic echocardiogram is considered to be rare. Treatment options for SPE include anticoagulation, thrombolytic therapy, thrombectomy, or IVCF. Patients can be discharged from the hospital using oral anticoagulation.

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