



RESEARCH ARTICLE

IDIOPATHIC PULMONARY VEIN THROMBOSIS: CLOT PICKS VEIN INSTEAD OF ARTERY

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ABSTRACT

Pulmonary vein thrombosis (PVT) is an uncommon disease with a very similar clinical presentation as pulmonary artery embolism. We present a case of a 53 year old female patient who presented with chest pain and shortness of breath and was later found to have pulmonary vein thrombosis. The diagnosis was established with a CT scan of chest which showed a filling defect in a right segmental pulmonary vein. Patient was started on heparin drip and later discharged on oral apixiban. Three month later, CT scan showed resolution of thrombus. PVT presents with non-specific symptoms which can be easily mistaken for pulmonary artery embolism. While investigating a patient for cryptogenic stroke, diagnoses of PVT should always be considered. Diagnoses is made via CT pulmonary angiogram or magnetic resonance angiography. Echocardiography also aids in confirming a diagnosis. Treatment is similar to pulmonary arterial embolism with systemic anticoagulants.

INTRODUCTION

Pulmonary vein thrombosis is a rare but a potentially fatal disease. There are mostly case reports in the literature so its incidence is not clear. It stands as the most proximal cause of thromboembolism in the arterial circulation (Pulmonary Vein Thrombosis, 2017). The presentation of pulmonary vein and pulmonary arterial thrombosis may be similar but both have different investigation and prognosis. Clinical diagnosis of Pulmonary vein thrombosis is difficult and usually requires a combination of conventionally used diagnostic modalities (Williamson, 1992). Etiology of pulmonary vein thrombosis can be post lung transplantation, lobectomy, atrial fibrillation, metastatic malignancy and few cases are idiopathic (Chapman, 2009; Mumoli, 2012; Ohtaka, 2014). Common presentation is dyspnea, cough, hemoptysis and chest pain. Complications like pulmonary infarction, pulmonary edema, right ventricular failure, allograft failure, and peripheral embolism resulting in limb ischemia, stroke, and renal infarction can occur due to delay in diagnosis. Imaging modalities including computed tomography (CT) scanning, magnetic resonance imaging (MRI), transesophageal echocardiogram (TEE), or pulmonary angiography are used for diagnosis of thrombi (Akiode, 2014).

Case Presentation: A 53-year-old female with past medical history significant for right breast cancer diagnosed in 2013, status post lumpectomy/chemoradiation therapy and in remission since

2014 presented for sudden onset sub sternal chest pain associated with mild shortness of breath. Chest pain was pleuritic in nature. She did not report any associated sweating, dizziness, palpitation, long travels, recent immobilization, or leg pain. Physical examination was unremarkable. EKG on admission was suggestive of normal sinus rhythm. Above image obtained from Paragon- Electronic Medical Record System of Saint Peter's University Hospital, New Brunswick, NJ, USA. Troponin were negative x 3, chest x-ray showed no acute cardiopulmonary findings.

Chest CT-angiogram with IV contrast and multi-planar reconstructions showed no pulmonary arterial embolism. However, it detected thrombosis of a right lower lobe segmental pulmonary vein. CT was performed using one or more dose reduction techniques including automated exposure control, adjustment of the mA and/or kV according to patient size, and/or use of iterative reconstruction technique. MIP images were obtained. Above Image obtained from Paragon-Electronic Medical Record System of Saint Peter's University Hospital, New Brunswick, NJ, USA. Transthoracic echocardiography showed normal findings. Thrombophilia workup was negative. Given the patient's history of breast cancer, a NM whole body bone scan was performed suspecting metastasis; it was suggestive of normal body scan. Patient was started on Heparin drip and was discharged on short course of apixiban

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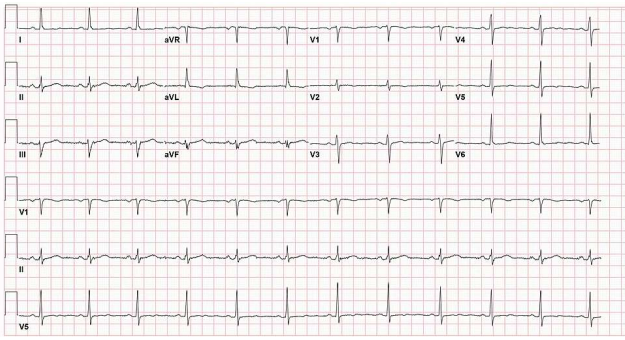


Figure 1. Normal Sinus Rhythm, Normal EKG

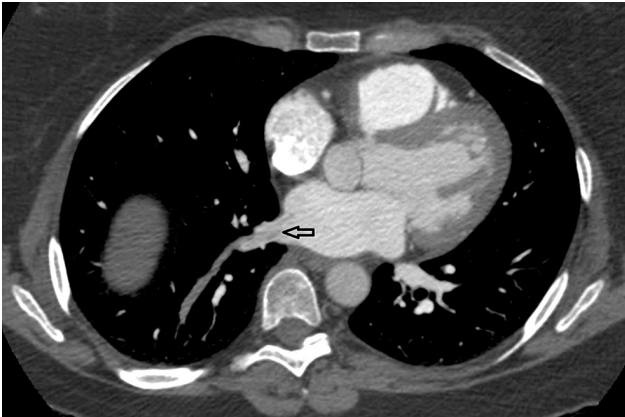


Figure 2. CT pulmonary angiogram showing thrombosis of a right lower lobe segmental pulmonary vein

DISCUSSION

Venous drainage of lung have extensive collaterals so pulmonary vein thrombosis is not common but certain medical problems can lead to obstruction of the pulmonary veins and subsequent infarction (Porres, 2013). Clinically detectable pulmonary vein thrombosis is a rare complication of lung transplantation, lobectomy, atrial fibrillation, and metastatic malignancy (Cavaco, 2009; Ohtaka, 2014). The cause in our case was unknown. The cause for thrombosis may be direct extension of tumor in the vein leading to thrombosis in larger vein or an immunologic or iatrogenic insult post lung surgery (Selvidge, 1999). Due to nonspecific signs and symptoms of cough, dyspnea, hemoptysis and chest pain, the diagnosis is difficult. CXR findings are nonspecific with findings suggestive of unilateral airspace disease without loss of volume, and pleural effusion (Gerard, 2017). Though venous thrombosis can be detected with CT pulmonary angiogram, filling defects can sometimes be missed within the left atrium due to artifacts from concentrated dense contrast medium or heart motion (9). Enhanced helical CT imaging may not help as they are designed to show arterial anatomy. A true filling defect may be overlooked due to inadequately opacified venous blood. Mixing artifacts from unopacified and opacified blood in the atrium may mimic a left atrial mass. A delayed scan might aid in reducing these artifacts and allow better visualization of the pulmonary veins and the cardiac chambers (Selvidge, 1999). MRI chest can successfully distinguish between a tumor thrombus and a bland thrombus in the pulmonary vein (Hricak, 1985). Gradient-echo sequences can differentiate intraluminal mass from an extrinsic compression (Roubidoux , 1992).

Echocardiography can help to visualize extension of the thrombus into the atrium; a trans-esophageal echocardiogram would be preferable over a transthoracic echocardiogram (Ohtaka, 2014). Some of the thrombi might not be visualized on an echocardiogram but measurement of the blood flow velocities in the pulmonary veins can indirectly suggest this diagnosis (Akiode, 2014). None of the imaging modality is the diagnostic of pulmonary vein thrombosis hence imaging should be selected based on specific clinical situation. With the increasing modalities of treatment like radiofrequency catheter ablations, lung transplants, and lobectomies being performed, the incidence of pulmonary vein thrombosis will potentially increase, hence a high index of suspicion remains crucial to the diagnostic process (Williamson, 1992).

Ideal treatment guideline for pulmonary vein thrombosis is still awaited. Treatment decision are based on the underlying cause and includes anticoagulation, antibiotic therapy, thrombectomy, and/or pulmonary resection (Cywinski, 2005). Systemic anticoagulant should be given in all the cases till the resolution of the clot is seen (Cavaco, 2009). There is no ideal duration of anticoagulation or proven difference in anticoagulation between heparin (low molecular or unfractionated) or oral vitamin K antagonists (Selvidge, 1999; Cywinski, 2005; Tamizifar, 2012). In our case, we directed the treatment according to the radiological findings, treating the thrombosis with therapeutic doses of low molecular weight heparin. If medical therapy fails then thrombectomy can be planned. Lobectomy is indicated when pulmonary vein thrombosis is complicated with pulmonary necrosis or massive hemoptysis (Beyruti, 2003). In case pulmonary vein thrombosis occurs after lobectomy, antibiotics are generally preferred because of secondary infection of the lung segment involvement (Cywinski, 2005). An untreated pulmonary vein thrombosis can lead to right ventricular failure, allograft failure, pulmonary infarction, pulmonary edema, and peripheral embolism resulting in limb ischemia, stroke and renal infarction so it is essential to diagnose pulmonary vein thrombosis early (Vishnubhotla, 2017; Anandarangam, 2001; Wu, 2012).

Conclusion

As pulmonary vein thrombosis has a nonspecific presentation, a physician should keep this diagnosis in mind while coming across patients with history of lung cancers, lung surgeries or patients with systemic emboli or cryptogenic stroke. Although unverified, trans-esophageal echocardiography is considered the best and most readily available imaging modality for early diagnosis. An early definitive diagnosis is vital in salvaging a patient and in the prevention of severe complications. The treatment options still remain challenging but it is considered reasonable to initially start anticoagulants in all cases irrespective of the etiology.

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