A Case of Stroke due to Pulmonary Venous Thrombosis

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ABSTRACT

Pulmonary vein thrombosis (PVT) is a rare but potentially lethal disease. It most commonly occurs as a complication of malignancy, post-lung surgery or atrial fibrillation. Thrombi are typically detected using a variety of imaging modalities including transesophageal echo, CT-scan, magnetic resonance imaging (MRI) or pulmonary angiography. Treatment consists of anticoagulation. Here we report a case of a middle-aged male with systolic left ventricular dysfunction who presented with a stroke due to embolization from a pulmonary vein thrombus diagnosed on CT scan. Etiology of the thrombosis was felt to be secondary to severe systolic dysfunction. Based upon this case report, we believe that pulmonary venous embolism should be considered as a cause of cryptogenic stroke in patients with a significantly reduced cardiac systolic function.

KEYWORDS: Pulmonary venous thrombosis, stroke, atrial fibrillation

INTRODUCTION

Pulmonary venous thrombosis (PVT) is an infrequent phenomenon that usually develops secondary to pulmonary neoplasm or post pulmonary surgery.[1,2] Symptoms can manifest as dyspnea, cough or hemoptysis.[3] Diagnosis is often difficult and can be missed if there is not a high level of suspicion. Without proper identification and prompt treatment, peripheral embolization including acute stroke can occur and have catastrophic results. Here were present a case of stroke likely due to embolization from a pulmonary vein thrombus.

CASE REPORT

A 54-year-old male with a past medical history significant for paroxysmal atrial fibrillation (not on anticoagulation) and non-ischemic cardiomyopathy status post-implantable cardiac defibrillator (ICD) presented to the emergency room with new-onset weakness and aphasia. Initial physical exam revealed a normal heart and lung exam and an abnormal neurologic exam characterized by aphasia, disconjugate gaze and leftward gaze paresis. A brain CT scan did not demonstrate any acute intracranial process. The patient was evaluated by neurology and the diagnosis of acute stroke was made.

Subsequently, the patient was administered tissue plasminogen activator (tPA). Following tPA administration, the patient experienced a brief episode of hypotension so a CT scan of his chest, abdomen and pelvis were obtained to evaluate for an acute bleed. No hemorrhage was detected but the

Figure 1. Contrast-enhanced axial chest CT shows a filling defect in the left superior pulmonary vein at the junction of the left atrium (arrow).

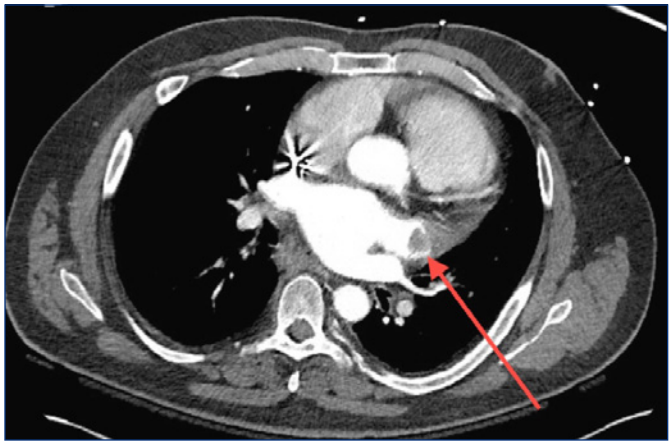
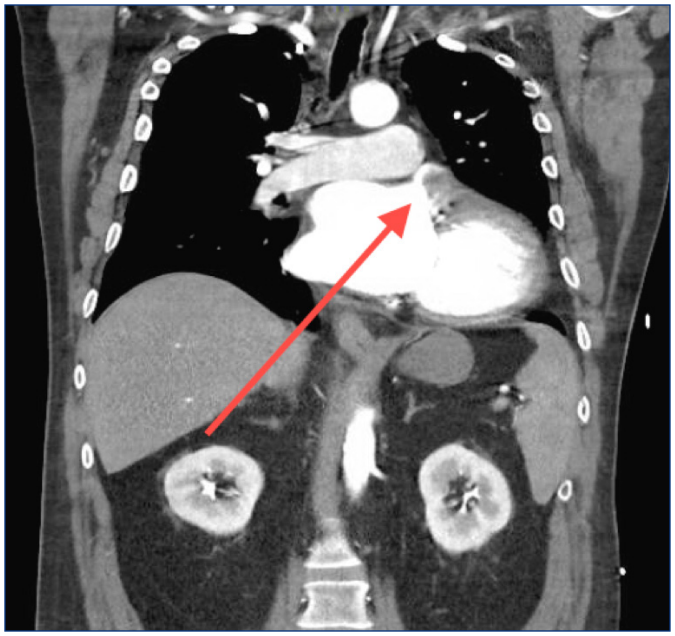


Figure 2. Contrast-enhanced coronal chest CT shows a filling defect in the left superior pulmonary vein at the junction of the left atrium (arrow).



imaging revealed a large filling defect in the superior left pulmonary vein immediately prior to its union with the left atrium suggestive of a pulmonary vein thrombosis (**Figures 1–2**). An echocardiogram was performed and showed stable cardiomyopathy with reduced ejection fraction, estimated at 15%, and no evidence of left atrial thrombus or left ventricular thrombus. The patient's pacemaker was interrogated and was notable for sinus rhythm with less than thirty seconds of atrial fibrillation over the prior months. Hematology-Oncology was consulted and hypercoaguable work-up was performed and was negative.

Through the course of the admission, the patient's neurologic exam and functional status improved to his baseline. Systemic anticoagulation with subcutaneous enoxaparin and oral warfarin was initiated and the patient was discharged.

DISCUSSION

Pulmonary vein thrombosis is a rare diagnosis. Distal embolization resulting in cerebrovascular accident (CVA) as a complication from PVT is multiplicatively more rare. A review of the literature demonstrates fairly few case reports highlighting stroke and systemic embolization from PVT. There have been no randomized control trials to date. A study by Grau et al in 2002, evaluated multiple patients with cryptogenic stroke for PVT by Magnetic Resonance Venography and did not find PVT to be significant contributor to the etiology of ischemic stroke in these patients. However, the study was significantly limited by frequent inadequate visualization of the left pulmonary veins due to limitations in MRI technique.[4] In our case, the thrombus was found in the left superior pulmonary vein. Perhaps with the improved radiologic techniques developed over the last 10-15 years, more cases of PVT could be discovered particularly in the left side of the pulmonary venous system. We propose that our patient's acute CVA was a result of embolization from a thrombosis in the left superior pulmonary vein. We hypothesize that the patient's poor systolic function contributed to a low flow state and stasis of blood which predisposed him to thrombosis. This is further supported by the fact that he had no known malignancy or recent surgery. He has a history of atrial fibrillation; however, on interrogation of the pacemaker, only several seconds of atrial fibrillation over the past months was noted and thus was unlikely to be the etiology.

This case raises two important points. First, in patients with cryptogenic stroke or systemic emboli it is reasonable for clinicians to evaluate for pulmonary vein thrombosis. The diagnosis of PVT can be made with transesophageal echocardiography, CT scan, MRI or pulmonary angiogram. Second, in patients with pulmonary vein thrombosis of unknown etiology, severe systolic dysfunction with resultant low flow cardiac state should be considered as a potential trigger. In regards to treatment, while there are no universally accepted guidelines, both short- and long-term anticoagulation have been utilized successfully in the literature.[5,6]

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Conflict of Interest

None

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Authors' addendum:

"On review of the images with an additional radiologist for clinical purposes, it was of the reviewing radiologist's opinion that the imaging findings did not in fact represent a pulmonary venous thrombosis but rather represented a left atrial thrombosis despite the report of the original radiologist. A left atrial thrombus would indicate a source of stroke in the related case and going forward this should not be considered a case report of pulmonary vein thrombosis in the future."