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Case Report

Pulmonary vein thrombosis in patients with medical risk factors

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ABSTRACT

Pulmonary vein thrombosis in patients with medical illnesses has been rarely reported, and it is also rarely reported in those with no risk factors. We report 2 patients with pulmonary vein thrombosis, 1 with metastatic renal cell carcinoma and 1 with presumed pulmonary aspergillosis. Thrombi or tumors in a pulmonary vein are clinically important because they may cause systemic embolism or hemoptysis.

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Introduction

Pulmonary vein thrombosis has been reported in 15% of patients in the early postoperative period after lung transplantation [1]. It is also reported in a stump of a pulmonary vein following lobectomy [2–5]. Radiofrequency ablation for drug-refractory atrial fibrillation is another risk factor [6]. Pulmonary vein thrombosis has rarely been reported in patients with medical illnesses as risk factors [7]. Primary lung neoplasm is the most frequent risk factor [7–11] and metastatic

carcinoma is also a risk factor [9,12,13]. Polycythemia vera [14], blunt chest trauma [15], autonomic nervous system dysfunction [16], and treatment of asthma with omalizumab [17] also have been reported in combination with pulmonary vein thrombosis. Pulmonary vein thrombosis also may be idiopathic [18–21] especially in the elderly [22–24]. We report 2 patients with pulmonary vein thrombosis, 1 with renal cell carcinoma and metastasis to the lung and 1 with presumed pulmonary aspergillosis. The association of pulmonary vein thrombosis with pulmonary aspergillosis is previously unreported.

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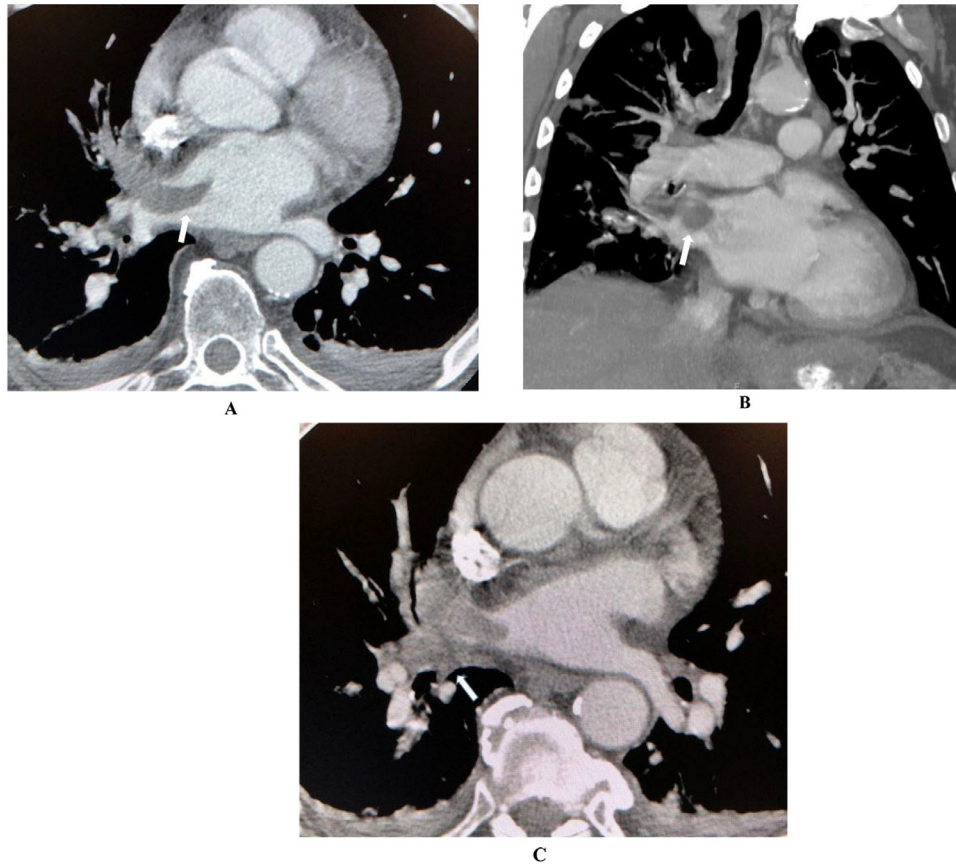


Fig. 1 – A 73-year-old man with renal cell carcinoma, multiple pulmonary metastases.

A. Contrast-enhanced CT pulmonary angiogram, axial view, shows enlarged right superior pulmonary vein with intraluminal filling defect with configuration of thrombus extending into lumen of left atrium (arrow). Bilateral pleural effusions were shown. Multiple masses of varying sizes were scattered throughout both lung fields shown on other images utilizing lung window technique. Multiple mediastinal metastases were also shown on other images. There was no evidence of pulmonary embolism.

B. Coronal image corresponding to axial image shown in A. The filling defect (arrow) extends well into the lumen of the left atrium.

C. Right inferior pulmonary vein with intraluminal filling defect (arrow) that had configuration of a thrombus as well as right superior pulmonary vein intraluminal filling defect extending into lumen of left atrium.

Case reports

Case 1. The patient was a 73-year-old man with renal cell carcinoma, shown on biopsy, and pulmonary and hepatic metastases. He was hospitalized because of acute chest pain and persistent hemoptysis. Contrast-enhanced computed tomography (CT) of the pulmonary arteries was obtained to evaluate for pulmonary embolism. Imaging showed intraluminal filling defects in the pulmonary veins with the configuration of thrombi extending into the lumen of the left atrium (Fig. 1A–C). There was no evidence of pulmonary embolism.

Case 2. Patient was thought to have pulmonary aspergillosis. The patient had a bone marrow transplantation, following which the chest radiograph became abnormal. A contrast-enhanced CT pulmonary angiogram was obtained to further evaluate the chest abnormalities. It showed multiple pulmonary parenchymal lesions and a well-circumscribed filling

defect with the configuration of a thrombus within the left inferior pulmonary vein (Fig. 2). It was presumed that the patient had an aspergillus infection, because that is the most common fungus infection following bone marrow transplantation.

Discussion

We showed 2 patients with intraluminal filling defects in the pulmonary veins that had the configuration of thrombi. Direct extension of tumor into a pulmonary vein may be associated with stasis and thrombosis that mimics primary pulmonary vein thrombosis [13]. An apparent thrombus in a pulmonary vein may be entirely tumor invasion [25,26]. Aspergillus may invade a pulmonary vein directly leading to thrombosis [27,28], or it can be disseminated hematogenously from invasion of a branch to a named pulmonary vein [28].

Table 1 – Nonsurgical risk factors for pulmonary vein thrombosis.

| Risk factor | Method of diagnosis | Complication | Reference First author |
|--|--|---|------------------------|
| Adenocarcinoma of the lung | Transesophageal echocardiography | – | Kim [8] |
| Non-small cell lung neoplasm | Contrast-enhanced CT | – | Porres [9] |
| Small cell carcinoma of lung | Two-dimensional echocardiography, Transesophageal echocardiography | – | Lestuzzi [10] |
| Small cell carcinoma of lung | PET/Contrast-enhanced CT | – | Chan [11] |
| Liposarcoma with metastasis to lung | Contrast-enhanced CT | Occasional hemoptysis | Tamizifar [12] |
| Osteogenic sarcoma with metastasis to lung | Contrast-enhanced CT, MRI | Transient ischemic attack; Pulmonary infarction | Nelson [13] |
| Renal cell carcinoma with metastasis to lung | Contrast-enhanced CT | Persistent hemoptysis | Present report |
| Polycythemia vera | Contrast-enhanced CT | – | Bhardwaj [14] |
| Pulmonary aspergillosis | Contrast-enhanced CT | – | Present report |
| Blunt chest trauma | Transesophageal echocardiography | – | Girod [15] |
| Autonomic nervous system dysfunction | Contrast-enhanced CT | – | Takeuchi [16] |
| Omalizumab for asthma | Contrast-enhanced CT | – | Narukonda [17] |
| Idiopathic | Surgery | Pulmonary infarction, Massive hemoptysis | Alexander [18] |
| Idiopathic | Contrast-enhanced CT, MRI | Splenic emboli/infarction | Selvidge [19] |
| Idiopathic | Contrast-enhanced CT | – | Mumoli [20] |
| Idiopathic | Transesophageal echocardiography | Stroke | Kinsella [21] |
| Idiopathic/aging | Contrast-enhanced CT | Transient ischemic stroke | Takeuchi [22] |
| Idiopathic/aging | Transesophageal echocardiography | – | Takeuchi [23] |
| Idiopathic/aging | Contrast-enhanced CT | – | Takeuchi [24] |

CT = computed tomography; MRI = magnetic resonance imaging; PET = Positron emission tomography.

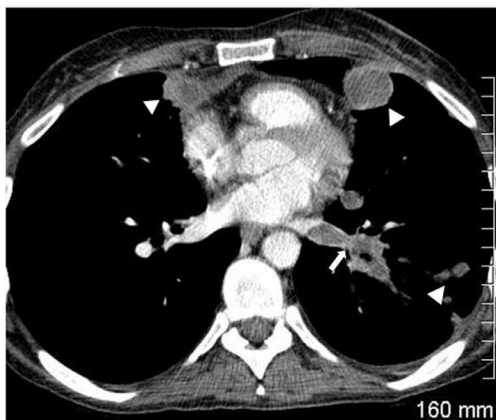


Fig. 2 – Contrast-enhanced CT pulmonary angiogram, axial view of patient with presumed pulmonary aspergillosis. Pulmonary parenchymal lesions (arrowheads) and well-circumscribed filling defect within left inferior pulmonary vein (arrow) with configuration of pulmonary vein thrombus are shown.

Review showed few patients with thrombi in a pulmonary vein and medical illnesses as risk factors or no apparent risk factor (Table 1). We searched from 2018-1993 and searched ref-

erences in published articles back to 1970. The search term was pulmonary vein thrombosis. The most frequent medical risk factor was either primary or metastatic cancer involving the lung.

Thrombi or tumors in a pulmonary vein are clinically important because they may cause systemic embolism resulting in transient ischemic attacks [13,22], stroke [21], or infarction of a vital organ [19] or they may cause hemoptysis [12,18], as we observed in our patient with presumed pulmonary aspergillosis.

In conclusion, pulmonary vein thrombosis is rarely reported in patients with medical risk factors or no risk factors. We report a patient with pulmonary vein thrombosis associated with renal cell carcinoma and metastasis to the lung, and a patient with pulmonary vein thrombosis presumably due to pulmonary aspergillosis.

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