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Case Report

An Unusual Presentation of a Cardiac Thrombus

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ABSTRACT

We describe the case of a patient with an evolving left atrial cardiac mass associated with pulmonary vein thrombosis. The patient presented no symptoms. Imaging follow-up revealed increase in size despite rivaroxaban therapy. Operative resection was performed, and pathological examination was compatible with pulmonary vein thrombus. This case illustrates an unusual presentation of cardiac thrombus.

RÉSUMÉ

Nous décrivons le cas d'un patient présentant une masse cardiaque évolutive à l'oreillette gauche associée à une thrombose de veine pulmonaire. Le patient était asymptomatique. Le suivi par imagerie a révélé une augmentation de la taille de la masse malgré un traitement par le rivaroxaban. Une résection a été effectuée et les résultats de l'examen pathologique concordaient avec la présence d'un thrombus dans une veine pulmonaire. Ce cas illustre un tableau clinique inhabituel pour un thrombus cardiaque.

Case

An asymptomatic 68-year-old man had a routine chest radiograph showing consolidation of the right upper lobe. He had no previous medical history, except for diabetes and paroxysmal atrial fibrillation on a structurally normal heart. Cardiac medication included flecainide, diltiazem, and rivaroxaban, 20 mg daily.

A computed tomography (CT) scan with contrast material showed extensive opacities of the right upper and middle lobes, with a small right pleural effusion (DICOM 1 in the Supplementary Material). An eccentrically calcified hypodense structure was also noted within the left atrium near the ostium of the right upper pulmonary vein. After tuberculosis was ruled out, the patient was started on antibiotics for possible pneumonia. A follow-up chest CT scan showed improved pulmonary opacities. However, a follow-up contrast-enhanced chest CT scan obtained 6 weeks after the initial one, showed significant enlargement of the cardiac mass from 20 x 19 mm to 29 x 25 mm. There was mild diffuse enhancement of the mass with a serpiginous internal enhancement isodense to the blood pool (Fig. 1 and DICOM 2 in the Supplementary Material). Cardiac magnetic resonance imaging (CMRI) confirmed quasitotal occlusion of the right upper pulmonary vein (Fig. 2, Supplemental Fig. S1 and DICOM 3 in the Supplementary Material). This immobile mass was hyperintense on T2 and showed diffuse heterogeneous enhancement on perfusion and viability sequences. A neoplastic mass was suspected, and a positron emission tomography (PET) scan was performed, but no hypermetabolic activity was noted. A transesophageal echocardiogram (TEE) confirmed the intracardiac position of the mass, with regular borders and heterogenous consistence. There was no enhancement with the use of contrast material. A ventilation/perfusion scan showed absence of perfusion in the right upper and middle lobes.

Owing to the unknown nature of the mass, continued enlargement despite anticoagulation, and infarction of pulmonary lobes, surgery was recommended. Complete resection of the left atrial mass, originating from the superior right

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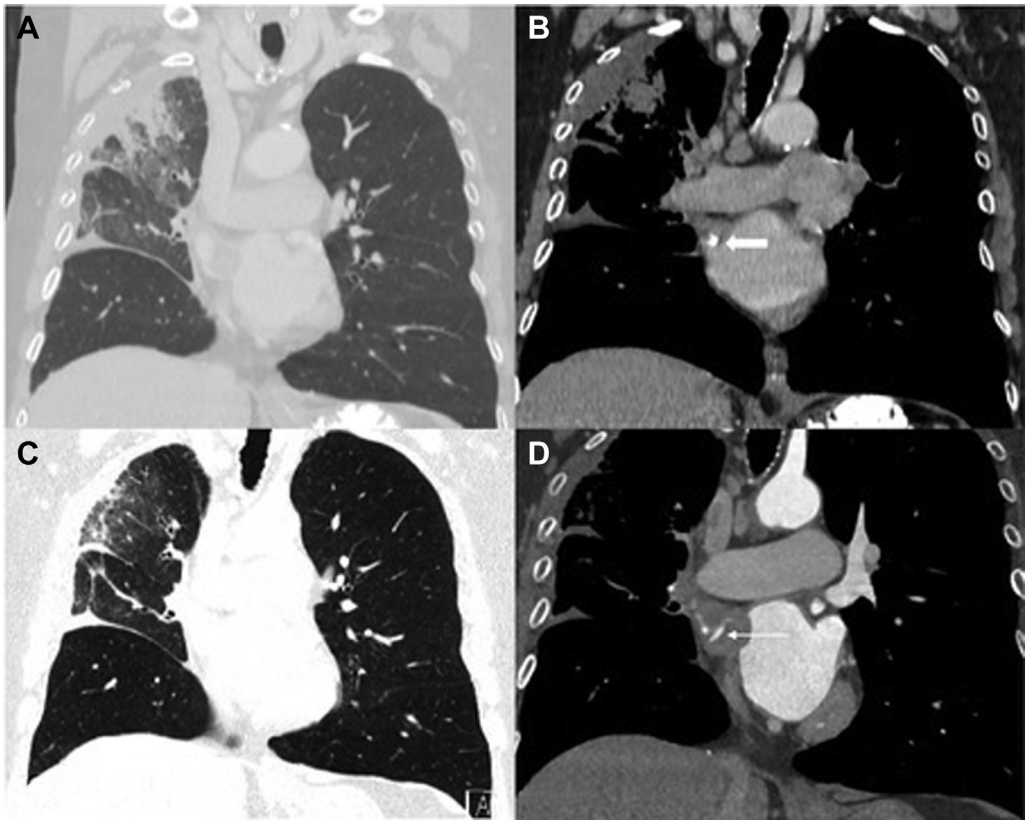

Figure 1. Coronal enhanced chest CT with images **A** and **B** performed 6 weeks prior to **C** and **D**. **A** and **B** demonstrate pulmonary venous infarct in the right upper lobe related to a right superior pulmonary vein thrombus with a peripheral calcification (**thick arrow**). Six weeks later, the pulmonary infarct has improved **(C)** with enhancing serpiginous structure within the thrombus **(D)**, likely a recanalized thrombus (**thin arrow**).

pulmonary vein, was performed along with a right upper and middle lobectomy. Histopathologic assessment revealed acute on chronic thrombosis of the superior right pulmonary vein (Supplemental Fig. S2). Postoperatively, the patient was placed on dabigatran 150 mg twice daily, and antiarrhythmic drugs were discontinued. At 1-year follow-up, there was no recurrence of atrial fibrillation and no new thrombi. Investigation for hematologic abnormality was negative but incomplete, as the patient's condition was deemed to be too high risk to stop anticoagulants.

Discussion

Differential diagnosis of cardiac masses is wide and complex. Multimodal imaging is helpful to distinguish benign and malignant entities; main features are described in Supplemental Table S1.

Pulmonary vein thrombosis (PVT) is a rare but potentially life-threatening condition, with an unclear incidence. The most frequent etiologies of PVT are malignancy, lung transplantation, and lobectomy. It has also been described as a complication of pulmonary vein isolation. Idiopathic PVT is uncommon.[1] The clinical diagnosis of PVT remains a challenge because most patients are asymptomatic or have nonspecific symptoms such as cough, hemoptysis, chest pain, and dyspnea from pulmonary edema or infarction.[2,3] The pathophysiology of this condition is dictated by an increase in pulmonary venous pressure, leading to compensatory vasoconstriction of the pulmonary arterial vasculature. PVT is normally detected using multimodality imaging techniques such as TEE, CT, and MRI. Treatment is determined by the level of obstruction and includes antibiotics, anticoagulants, thrombectomy, and/or pulmonary resection.[3]

We present this case, as it offers many interesting challenges. This patient was completely asymptomatic except for well-controlled paroxysmal atrial fibrillation. The etiology of the PVT was considered idiopathic, as it was impossible to conclude whether atrial fibrillation or PVT presented first. To our knowledge, only 7 other cases of spontaneous idiopathic PVT have been reported.[4] Three other features of this case need to be highlighted. First, the thrombus continued to expand despite compliance with rivaroxaban. Second, lobar pulmonary consolidation due to venous thrombosis and pulmonary infarct is rare. In this case, the clues that support the diagnosis of pulmonary infarct are the involvement of both the right upper and right middle lobes that possess a common path of drainage by the right upper pulmonary vein, the peripheral distribution of the opacities, the absence of air bronchogram, and the alveolar opacities surrounded by ground glass opacities that is known as the halo sign (DICOM 1 in the Supplementary Material). Finally, this thrombus showed atypical characteristics on imaging. Thrombus

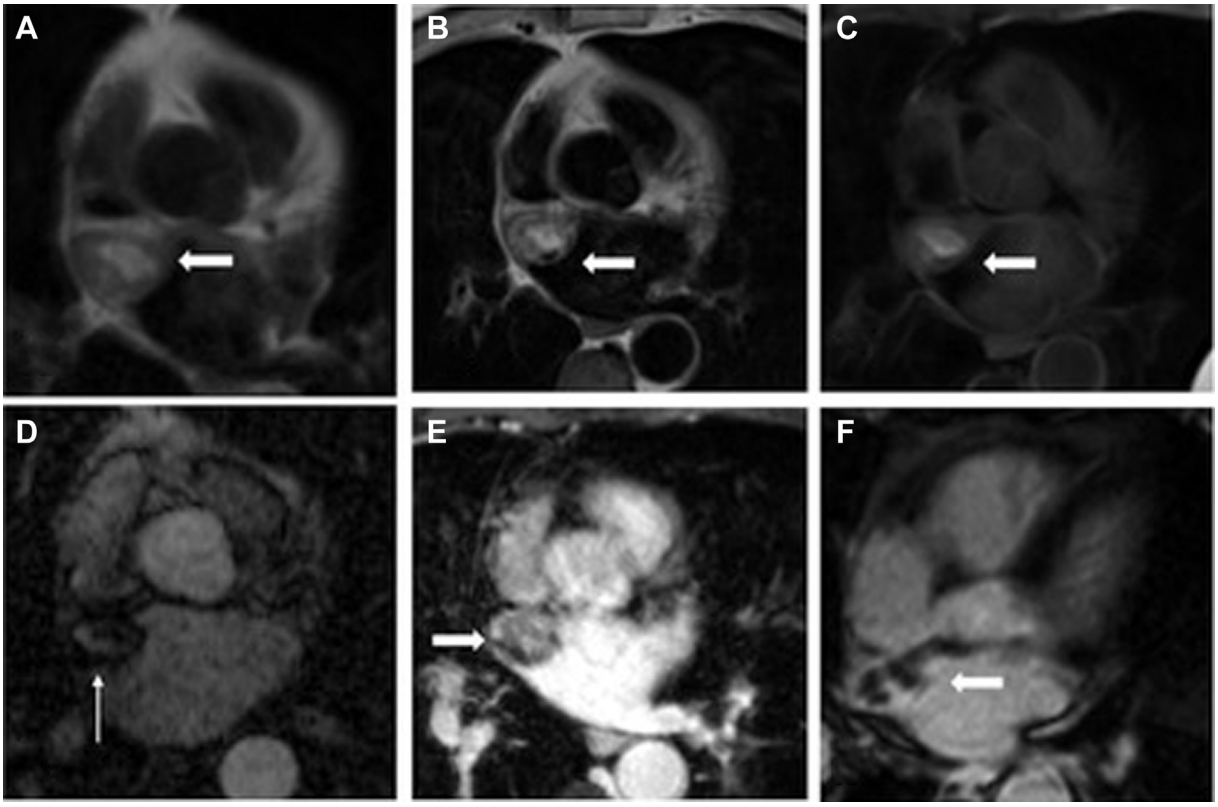

Figure 2. Cardiac MRI showing a thrombus (**wide arrows**) in the right superior pulmonary vein. On T1-weighted (**A**) and T2-weighted (**B**) axial sequences, the lesion shows heterogeneous signal with no fatty component on T1-weighted fat saturated sequence (**C**). On perfusion sequence (**D**), the center of the lesion (**thin arrow**) remains isointense to blood pool, related to a recanalization of the thrombus. Heterogenous enhancement of the thrombus is shown on 3D post contrast gradient echo (**E**) with persistent, mild peripheral enhancement on 4-chamber viability sequence (**F**).

enhancement on MRI has rarely been reported in the literature.[5] In our case, it was presumed that neovascularization and a partial recanalization of the thrombus might have contributed to the observed pattern of enhancement.

We believe that this case serves as an unusual presentation of idiopathic PVT and highlights the importance of multimodality imaging and multidisciplinary team approach.

Disclosures

The authors have no conflicts of interest to disclose.

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Supplementary Material

To access the supplementary material accompanying this article, visit the online version of the *Canadian Journal of Cardiology* at www.online cjc.ca and at https://doi.org/10.1016/j.cjca.2019.05.034.