A large left atrium thrombus extended from the right lower pulmonary vein in a patient with malignant lymphoma

Ischemic stroke is a serious clinical problem that crucially needs to be prevented. The three major pathophysiological mechanisms leading to ischemic strokes are cardiac embolisms, atherosclerotic large-vessel disease, and intracranial small-vessel disease.

Left atrial appendage (LAA) thrombi in patients with atrial fibrillation (AF) are the well-studied cardiac thrombi known to cause ischemic stroke [1,2]. Fifteen to twenty percent of ischemic strokes were observed in patients with AF, and the annual risk of stroke in patients with non-valvular AF is as high as 5% [3].

Pulmonary vein thrombosis (PVT) is thought to be a rare complication of thoracic surgery or lung cancer; however, since 2012, several cases of PVT in elderly patients without these conditions have been reported, suggesting that PVT may be common in elderly patients. Additionally, a 2014 report found PVT in a young female [4], indicating PVT can exist in all populations.

My previous manuscript reported that 35 out of 57 (61%) elderly patients with chest pain had PVT, and 17 of 35 (48.6%) patients with PVT had a connected thrombus in the left atrium, which was assessed using a 64-slice multidetector-computed tomography (64-MDCT) [5]. However, there have been no reports of a thrombus in the left atrium connecting to a pulmonary vein thrombus using transesophageal echocardiography (TEE).

An 82-year-old Japanese male with malignant lymphoma was referred for the evaluation of edema. The patient was treated with dexamethasone (0.5 mg once daily). The patient had no cough, sputum or cerebral infarction present. The patient presented with edema of the left arm and both legs. Cardiac examination revealed no heart murmurs or arrhythmias. The patient's body-mass index (BMI) was 27.1. Lung examination was normal with no presentation of decreased breath sounds, lung crackles or wheezing. The patient had no history of warfarin treatment. The chest roentgenogram revealed a pleural effusion on the left side. The lymph nodes around the neck and the femoral artery had significant swelling. EKG indicated a normal sinus rhythm, a normal axis, no ST–T changes, and complete left bundle branch block; the patient's heart rate was 77 beats/min. In addition, the serum D-dimer level was 5.6 μg/ml (normal: <1.0 μg/ml), the activity of protein S was 55% (normal: 60–127%), and the activity of protein C was 140% (normal: 64–135%). Transthoracic echocardiography (TEE) identified a thrombus in the left atrium, which was presented as a white mass (Fig. 1 and Video 1), and a volume of 84 mL in the left atrium. A thrombus in the right lower pulmonary vein was detected in the TEE image (Fig. 2), which extended into the left atrium (LA) and formed a feather-like shape (34.9 mm × 7.1 mm) (Figs. 2 and 3, and Video 2).

My previous report using 64-MDCT scans showed a left atrial thrombus rooted in the pulmonary vein [6]; however, there was no TEE image of this type of thrombus. Here, I present the first case illustrating a left atrial thrombus extending from a right lower pulmonary vein thrombus using TEE.

In this case, the patient was diagnosed with malignant lymphoma. Although the relationship between malignant lymphoma and PVT is unknown, there is a possibility that PVT causes malignant lymphoma. Microclots are released from the PVT and occlude microvessels in all organs, including the bone marrow. Recanalization is performed to potentially rescue the occluded cerebral microvessels. Failure of the recanalization may be caused by genetic abnormalities, resulting in the occluded tissues becoming hypoxic and under-nourished, ultimately leading to a loss of normal cell function. For the cells to adapt to such conditions, they undergo epigenetic alterations. Furthermore, hypoxia is associated with cancer formation [7]. Microvessel occlusion of the bone marrow may cause malignant lymphoma. Further study is needed to elucidate the relationship between microvessel occlusions in the bone marrow and malignant lymphomas.

Cerebral microvessels are known to be occluded in patients with dementia and Alzheimer’s disease. In addition, occlusive disease of the small coronary arteries may be a form of early phase atherosclerosis, which has also been suggested to cause angina pectoris [8]; however, the origin of these occlusions has not yet been fully understood. One potential origin of these occlusions is PVT.

TEE is known to be a useful tool to visualize the interatrial septum, left atrial appendage and aortic arch. Performing a TEE is recommended for young stroke patients and older adults who may be at risk for a stroke caused by a cardiac embolism. In this case, embolicogenic arrhythmias were not detected; yet during TEE examination a thrombus in the left atrium was suspected. In this case, pulmonary veins should be checked to identify a thrombus as the possible cause of an ischemic stroke.

This is a first report to show a thrombus in the right lower pulmonary vein extending into the left atrium by TEE examination. We recommend using TEE to visualize a thrombus in the left atrium extending from the pulmonary vein.

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