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Letter to the Editor

A swinging left atrial thrombus connecting to a right lower pulmonary vein thrombus

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Stroke, usually distressing and often fatal, is the leading cause of persistent disability and is the third-leading cause of death. Atrial fibrillation (AF) is one of the causes of stroke, and approximately 15% of strokes may be preceded by AF [1]. The primary cause of stroke is the embolization of thrombi forming in the left atrium (10%) or left atrial appendage (LAA) (90%) in AF patients, which was usually diagnosed using transesophageal echocardiography (TEE).

Pulmonary vein thrombosis (PVT) is a potentially life-threatening condition, but it is believed to be rare. PVT has been described in cases of primary and secondary neoplasia of the lung [2], a case of a left atrial thrombus expanding into the right upper pulmonary vein, as a rare early complication after lung lobectomy, bilobectomy or lung transplantation and as a radiofrequency ablation for AF [3].

Sixty-four-slice multidetector CT (64-MDCT) becomes an option to evaluate coronary artery stenosis. A 64-MDCT scan can more easily and completely estimate LAA thrombi and pulmonary vein thrombi. Since 2012, I have reported many cases of pulmonary vein thrombi [4–6]; in 2014, I reported that 35 in 57 elderly patients (61%) with chest pain had pulmonary vein thromboses [6], which suggests that pulmonary vein thrombi are not rare. In 2013, I reported a thrombus in the left lower pulmonary vein expanding to the left atrium using a 64-MDCT scan in the patient without lung cancer, lobectomy or catheter ablation, which could be identified by transthoracic echocardiography (TTE) [5]. Such a thrombus report is still rare.

In this manuscript, I demonstrated another case of a thrombus in the right lower pulmonary vein extending to the left atrium, which was situated on the atrial septum and could be observed as a pendulum in the images of TTE.

A 72-year-old female was referred to assess coronary artery stenosis because of recent chest pain. She had no symptoms of tachypnea, fever, cough, sputum or cerebral infarction. The respiratory exam did not show decreased breath sounds, lung crackles or wheezing. The cardiac exam did not demonstrate a heart murmur or arrhythmia. The chest roentgenogram exhibited no lung cancer and no cardiomegaly. No previous treatment with warfarin had been performed. The serum D-dimer levels were <0.5 μg/ml (normal; <1.0 μg/ml), activity of protein S was 99% (normal; 60–150%), and the activity of protein C was 154% (normal; 64–146%). Also, 64-MDCT demonstrated 50% stenosis in the left anterior descendant (#6). The patient had no thrombus in the LAA, and the volume of the left atrium was 50.9 ml. The thrombus in the right lower pulmonary vein was detected in axial (Fig. 1), coronial (Fig. 2) and sagittal (Fig. 3) images as a defect of enhancements by 64-MDCT scan. The thrombus in the right atrium was illustrated in axial (Fig. 4) and sagittal (Fig. 5) images. In Fig. 4, axial images exhibited a thrombus in the left atrium (arrow), which was located between the left atrium and the right atrium. In Fig. 6, TTE images showed that the thrombus attached to the atrial septal and wall of the left atrium. The video images

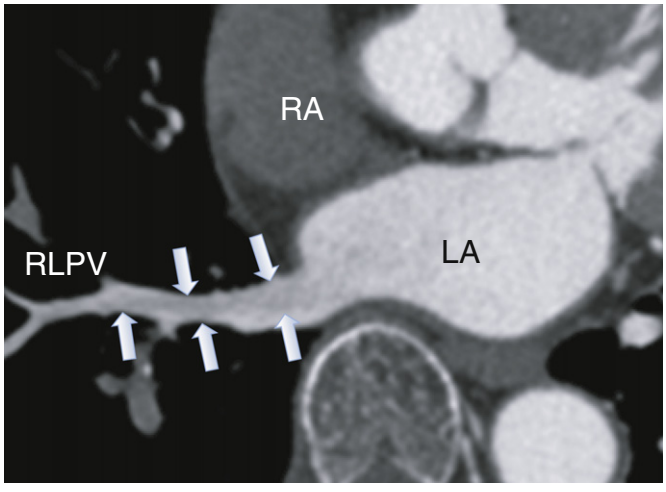

Fig. 1. Axial images showing a thrombus in the right lower pulmonary vein (arrows). LA; left atrium, RA; right atrium, RLPV; right lower pulmonary vein.

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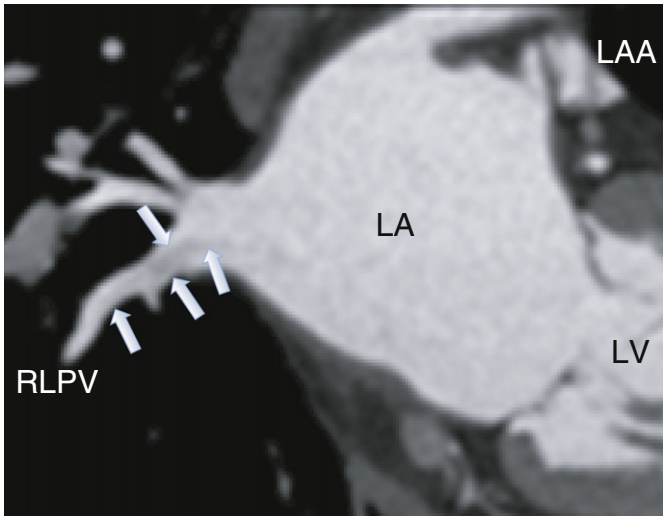

Fig. 2. Sagittal images showing a thrombus in the right lower pulmonary vein (arrows). LA; left atrium, LAA; left atrial appendage, LV; left ventricle, RLPV; right lower pulmonary vein.

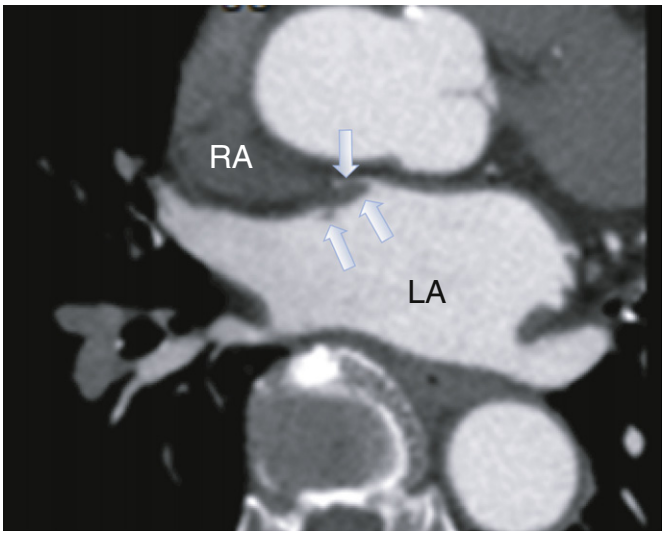

Fig. 4. Axial images showing a thrombus (arrows), which is located in the left atrium (LA) near the right atrium (RA).

demonstrated that a thrombus was situated on the atrial septum and could be observed as a pendulum in the TTE images.

This study showed a left atrial thrombus and a pulmonary vein thrombus in an elderly patient with chest pain using TTE and 64-MDCT. Only a small number of studies have reported a pulmonary vein thrombus associated with a thrombus in the left atrium for patients without lung cancer, thoracic surgery or catheter ablation for patients with AF. In my previous case report, I described a left lower pulmonary vein thrombus expanding to the left atrium, which could be observed by TTE [5].

In this case, TTE illustrated the thrombus was swinging as pendulum, which could be observed as artifacts. The images of the thrombus had bright echodensities, which indicated the thrombus was fibrous. When we observe something similar to artifacts by TTE examination, then we can examine a 64-MDCT scan to characterize and identify them further.

PVT is an important clinical problem for two major reasons. One reason is the increased risk of systemic embolism, such as (acute) ischemic stroke by large clots and (chronic) embolism of many organs by microclots; the other reason is hypoxia and under-nourishment of the pulmonary vein, which injure normal cell functions and may be associated with dementia and Alzheimer's disease via activating some genetic factors, such as transcription factors.

Cerebral microvascular occlusion is commonly known to precede and accompany age-related cognitive dysfunction and neurodegeneration [7,8]. The source of microclots is not well-understood. Microvascular occlusion by microclots in PVT may cause dementia. Emboli extravasation is reported in mice [9]. In my previous cases, emboli extravasation may be performed in cerebral microvascular occlusion, but in this case, emboli extravasation could not be easily performed, thereby increasing the risk of dementia. More studies are needed to clarify the effects of PVT.

We can non-invasively identify pulmonary vein thrombi and left atrial thrombi using TTE and 64-MDCT.

TTE can identify only a part of large thrombi in the left atrium extending into the pulmonary vein, which suggests that TTE may be the initial diagnostic study of choice for PVT. If we suspect a thrombus in the left atrium using TTE, then we could perform further investigations by a 64-MDCT scan. At that time, it is recommended to search for thrombi in the pulmonary vein.

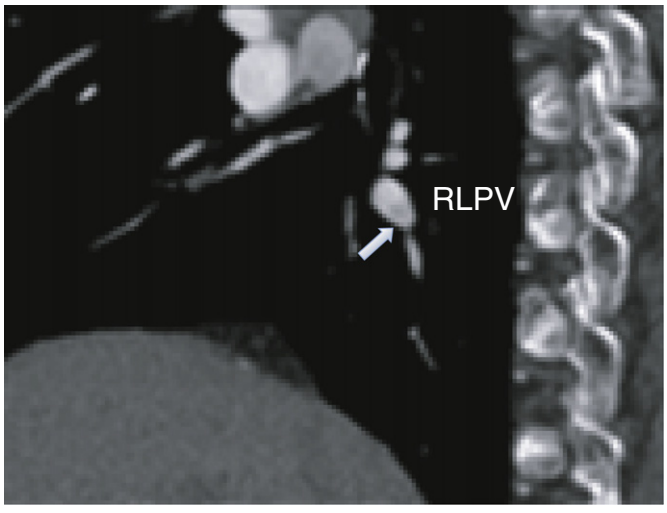

Fig. 3. Sagittal images showing a thrombus in the inferior right lower pulmonary vein (arrow). RLPV; right lower pulmonary vein.

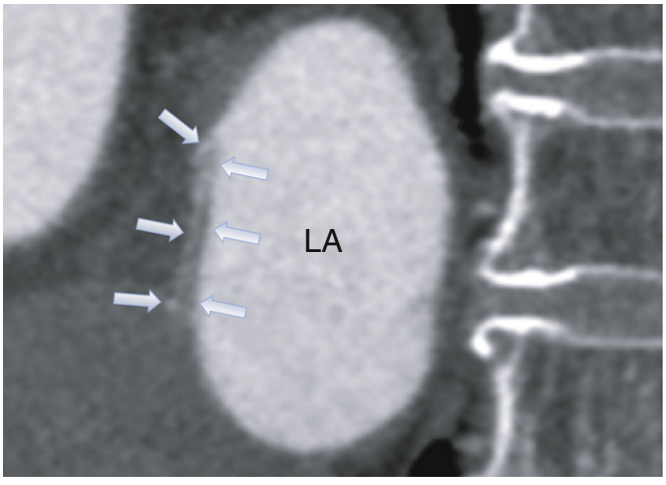

Fig. 5. Sagittal images showing a large thrombus in the left atrium (arrows). LA; left atrium.

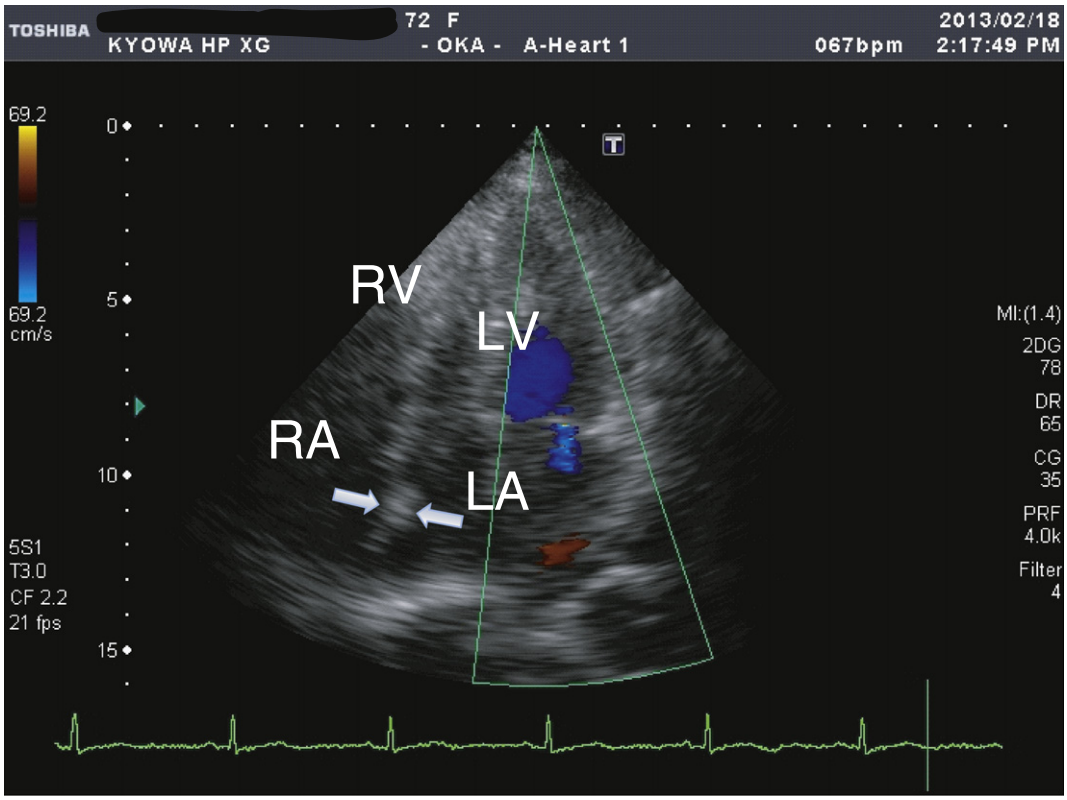

Fig. 6. TTE images showing the thrombus attached to the septum in the left atrium (LA) (arrows). LA; left atrium, LV; left ventricle, RA; right atrium, RV; right ventricle.

Conflict of interest

I have no relationships that could be construed as a conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.ijcha.2015.04.010.

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