A 38-year-old man was referred to our hospital because of progressive dyspnea on exertion. He was diagnosed as having congestive heart failure. On physical examination, his blood pressure was 118/86 mm Hg, and his heart rate was regular at 80 beats/min. On admission, jugular venous distension was detected, a third sound was audible, and auscultation of the lungs revealed bilateral coarse crackles and diminished breath sounds. Peripheral edema was also detected. A chest x-ray film showed a marked cardiac silhouette, with right-sided pleural effusion (Figure 1A). ECG on admission showed sinus rhythm with poor R progression and ST depression in aVF and V6 leads (Figure 1B). A blood test showed elevated plasma brain natriuretic peptide (417.9 pg/mL) and d-dimer (6.7 μg/mL) levels. Transthoracic echocardiography revealed normal-sized left and right ventricles and the presence of a small amount of pericardial effusion; the left ventricular ejection fraction was severely decreased. The left and right atria were markedly enlarged (Figure 2). Transesophageal echocardiography (TEE) confirmed the presence of a large mobile thrombus (42×20 mm) in the left atrial appendage. Real-time 3-dimensional TEE provided an en face view of the left atrial appendage, and clearly showed a ball-like thrombus swinging at the orifice of the left atrial appendage (Figure 3, Movies I and II in the online-only Data Supplement). TEE also showed a mural thrombus (40×10 mm) within the dilated right atrial appendage. Using real-time 3-dimensional TEE, we could delineate the extent of the thrombus in the right atrial appendage (Figure 4, Movies III and IV in the online-only Data Supplement). No pulmonary arterial thromboembolism was detected (Figure 5). There were no signs of deep vein thrombosis in the lower extremities during his clinical course. Intravenous heparinization was administered to prevent any thromboembolic occurrence during follow-up. We finally decided to perform surgery because of the highly mobile and large thrombi. Biatrial thrombectomy, pulmonary vein isolation, left atrial appendage closure, and partial excision of the right atrial wall were performed without major complications. Myocardial biopsy showed that the findings were compatible with dilated cardiomyopathy. Microscopic examination of the intra-atrial mass revealed a fibrin-erythrocyte thrombus (Figure 6).

We report a rare case of biatrial mobile thrombus that developed in a patient with heart failure. Right atrial appendage thrombus in sinus rhythm is an uncommon finding, and is typically associated atrial fibrillation (only a few cases have been reported).

Physicians need to recognize that right atrial appendage thrombus can occur in patients without atrial fibrillation, especially in those with right ventricular dysfunction (patients with heart failure). Divitiis et al reported that right atrial spontaneous echo contrast is an independent predictor of right appendage thrombosis. Multiplane TEE (eg, midesophageal bicaval view; 90°; view, 150°) is useful for visualizing right atrial appendage thrombus. Real-time 3-dimensional TEE is also useful for visualizing right atrial structures, and allows detailed assessment of the extent of right atrial mural thrombus.

Disclosures
None.

References
Figure 1. A, Chest x-ray film showed marked cardiac silhouette, with right-sided pleural effusion. B, ECG on admission showed sinus rhythm with poor R progression and ST depression in aVF and V6 leads.

Figure 2. Transthoracic echocardiography (TTE). TTE revealed normal-sized left and right ventricles, and the LV ejection fraction was 28% (method of disks). The left and right atria were enlarged. TTE also revealed that there were no focal wall motion abnormalities, LV hypertrophy, or significant valvular disease. TTE revealed the presence of a small amount of pericardial effusion. LA indicates left atrium; LV, left ventricle; RA, right atrium; and RV, right ventricle.
Figure 3. Transesophageal echocardiography (TEE) of the left atrium. TEE confirmed the presence of a large mobile thrombus (42×20 mm) in the left atrial appendage (LAA). Three-dimensional real-time TEE provided an en face view of the LAA, which clearly showed the swinging ball-like thrombus in LAA. LA indicates left atrium; LV, left ventricle; and Th, thrombus.

Figure 4. Transesophageal echocardiography (TEE) of the right atrium. TEE also revealed a mural thrombus (40×10 mm, red arrow) within the dilated right atrial appendage. Using 3DTEE, we can easily delineate the extent of the thrombus in the right atrium. RA indicates right atrium; RAA, right atrial appendage; SVC, superior vena cava; Th, thrombus; and 3DTEE, 3-dimensional transesophageal echocardiography.
Figure 5. Cardiac computed tomography. A number of irregular masses were detected in the LAA and RAA (red arrow), and the diagnosis of biatrial thrombi was suspected. No pulmonary arterial thromboembolism was detected in this patient. LAA indicates left atrial appendage; and RAA, right atrial appendage.

Figure 6. Histopathologic examination. Intramyocardial biopsy revealed findings compatible with dilated cardiomyopathy. Microscopic examination of the intra-atrial mass revealed a fibrin-erythrocyte thrombus. HE indicates hematoxylin and eosin; and RBCs, red blood cells.
Bialtrial Appendage Thrombi in a Heart Failure Patient With Sinus Rhythm: Detailed Assessment by Real-Time 3-Dimensional Transesophageal Echocardiography
Hiroki Oe, Yuko Ohno, Toshiaki Yamanaka, Nobuhisa Watanabe and Hiroshi Ito

Circulation. 2016;133:e1-e4
doi: 10.1161/CIRCULATIONAHA.115.018522
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2015 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/133/1/e1

Data Supplement (unedited) at:
http://circ.ahajournals.org/content/suppl/2015/12/28/CIRCULATIONAHA.115.018522.DC1

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org/subscriptions/