Case Reports

A Case of Right Atrial Mobile Thrombus Complicating Multiple Pulmonary Emboli

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SUMMARY
Right atrial thrombi are usually immobile. However, a mobile type mimicking a cardiac tumor, especially myxoma, has been described on rare occasions. We report here a case of atrial thrombus which was mobile in the cardiac chambers. A 29-year-old male was admitted because of exertional dyspnea. On admission, his echocardiogram showed an abnormal mass in the right atrium with a stalk attached to the interatrial septum. It decreased in size on the next day. On the fourth day of admission, it moved to the right ventricle. Multiple pulmonary emboli were revealed by the lung perfusion scintigram. Two days after the administration of intravenous urokinase, the abnormal mass in the cardiac chambers was no longer seen on the echocardiogram. This was a rare case of mobile atrial thrombus associated with multiple pulmonary emboli. Thrombolytic therapy appeared to be effective in this case.

Key Words: Myxoma Deep venous thrombosis Thrombolytic therapy

RIGHT atrial thrombi are usually fixed to the chamber wall but a mobile type is rarely seen. The latter should be differentiated from cardiac tumors, especially myxoma. There have been few reports of mobile atrial thrombus in Japan compared to the higher incidence seen in western countries. In this report, we describe a young man in whom a right atrial thrombus moved to the right ventricle and disappeared after several days of thrombolytic therapy.

CASE REPORT

A 29-year-old man visited our hospital complaining of dyspnea and pal-
pitation. He had a history of left calf muscle strain at 21 years of age and left deep venous thrombosis at 22 years. Three days prior to his admission, he had suddenly felt shortness of breath and palpitations while walking up a hill. His symptoms continued despite resting at home. He was admitted with exacerbating symptoms and abnormal echocardiographic findings.

Physical examination revealed a blood pressure of 124/86 mmHg and a regular pulse of 92 beats/min. The lungs were clear on auscultation with an accentuated pulmonary component of the second heart sound. No cardiac murmurs were noted. No leg edema was seen. The veins in his left leg were distended in the supine position. The blood sample showed a slightly elevated LDH. An analysis of arterial blood gas levels on room air revealed a significant hypoxemia with a $PO_2$ of 63.1 mmHg, $PCO_2$ of 38.1 mmHg, and pH of 7.41.

The cardiothoracic ratio was 47% with clear lung fields on the chest roentgenogram (Fig. 1). The electrocardiogram (Fig. 2) showed sinus rhythm, right axis deviation of $+120^\circ$ and negative T waves in the chest leads from $V_1$ to $V_4$.
Fig. 3. The time course of echocardiograms. (A) On admission: The arrow indicates an oval mass in the right atrium. It appears to be attached to the interatrial septum by a stalk. (B) The next day: The mass (arrow) decreased in size. (C) The fourth day: The mass (arrow) moved to the right ventricle. RA = right atrium; RV = right ventricle; LA = left atrium; LV = left ventricle.

Fig. 4. Lung perfusion scintigram. Left panel shows the anterior view and right panel the posterior view. There are widespread perfusion defects at all segments except S8 in the left lung and multiple defects at S3,5,6 in the right lung (arrows).

The echocardiogram recorded on admission (Fig. 3A) demonstrated an oval mass in the right atrium 25 mm x 15 mm in size which appeared to be attached to the interatrial septum by a stalk. The mass was heterogeneous in echo density with an irregular surface.

The lung perfusion scintigram (Fig. 4) showed widespread perfusion defects at all segments except S8 in the left lung and multiple defects at S3,5,6 in the right lung, corresponding to multiple pulmonary emboli.

We considered surgical excision of the myxoma-like mobile mass that was suspected to be the source of these multiple pulmonary emboli. However, the atrial mass decreased in size to 10 mm in diameter and increased in mobility on the echocardiogram recorded the next day (Fig. 3B). On the fourth day, the mass moved to the right ventricle with further reduction in size without changes in symptoms (Fig. 3C). Repeat lung perfusion scintigraphy done on the same day disclosed no additional perfusion defects.
Thrombolytic therapy was started. After urokinase was administered at a dose of 960,000 units/day for 5 days followed by 480,000 units/day for a subsequent 4 days, a subsequent echocardiogram no longer showed any abnormal mass in either the right ventricle or right atrium. Lung perfusion scintigraphy demonstrated reestablishment of perfusion in $S_{1+2,3,6}$ in the left lung and $S_{3,5,6}$ in the right lung. He was treated with warfarin thereafter. The pulmonary artery angiogram (Fig. 5) revealed total occlusion of left A$_6$ and multiple occlusions of the peripheral arteries in the left lung. The venous angiogram of the leg showed total occlusion of the left femoral vein.

**DISCUSSION**

This case showed a myxoma-like mobile mass on the echocardiogram. Based on the patient’s past history of deep venous thrombosis and the effect of thrombolytic therapy on lung perfusion scintigraphy, we suspected right atrial thrombus rather than myxoma. Right atrial thrombi can be classified into immobile and mobile thrombi.\(^1\) The former are usually associated with conditions causing dilatation of the right atrium, decreased cardiac output, relative stasis of blood such as in cardiomyopathies, atrial fibrillation or following repair of atrial septal defects, and intracardiac catheters. In contrast, mobile thrombi usually originate from the leg veins or inferior vena cava and are entrapped in the right atrium during their transition to the lung.

Right atrial myxomas may be confused with mobile right atrial thrombi.
However, myxomas have a mottled, ovoid, and sharply demarcated appearance and commonly attach to the interatrial septum and occasionally prolapse across the tricuspid valve during diastole.

In this case, the mass had an ovoid shape and appeared to be attached to the interatrial septum by a stalk. These findings mimicked myxoma, but the heterogeneous echo density with an irregular surface suggested thrombus rather than myxoma.

In reviewing the literature we found 57 cases with right atrial mobile thrombus reported during the past 9 years,2)–16) including 4 cases from Japan.14)–16) In these 4 cases, 2 patients died suddenly. The thrombus disappeared in the remaining 2 cases after the administration of warfarin or heparin. Thus, right atrial mobile thrombus has been rarely seen in Japan, and its pathogenesis, natural course, and management are not well known.

In this case, because the mass moved from the right atrium to the right ventricle during the first few days after the patient’s admission, recurrence of pulmonary emboli was highly possible. Medical treatment for pulmonary emboli is generally thrombolytic therapy combined with the use of anticoagulant drugs. However there has been no standard for the use of thrombolytic agents. A national cooperative study from the United States recommends an intravenous infusion of urokinase, given as a loading dose of 4,400 units/kg followed by 4,400 units/kg/hr for the subsequent 12 hrs.17) In Japan the doses of urokinase generally administered for pulmonary emboli are 240,000–720,000 units for a mean of 4.8 days.18) Watanabe et al.19) reported a case of multiple pulmonary emboli successfully treated with large doses of urokinase (total dose of 7,080,000 units over 10 days). Our patient received a total dose

### Table 1. Reported Cases of Right Atrial Mobile Thrombus2)–16)

<table>
<thead>
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<th>after therapy</th>
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<tr>
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A = anticoagulant therapy; T = thrombolytic therapy; O = operation.
of 6,720,000 units of urokinase over 9 days with significant improvement in both clinical and laboratory findings.

Table I summarizes the 52 cases, from the 57 cases described in the literature, in whom the thrombus disappeared from the right atrium over time. Thrombolytic therapy was given in 19.2% of the 52 cases, with or without anticoagulant therapy and was effective in 70% of them, resulting in disappearance of thrombus without death. Accordingly, thrombolytic therapy seems to be effective for right atrial mobile thrombus as well as for pulmonary emboli.

REFERENCES