



The invaluable observation of a hazardous patient with a floating and Gecko-like-shaped right atrial thrombus diagnosed by echocardiography and computed tomography imaging

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A 70-year-old male patient developed syncope and then admitted. Bilateral pulmonary artery emboli were revealed by contrast-enhanced computed tomography (CT) (Fig. 1a). The residual deep vein thrombosis (DVT) was seen in CT and ultrasound findings of the left femoral vein. In the sampled blood, the D-dimer level extremely increased. Transthoracic echocardiography (TTE) revealed the right heart dilation, right ventricular dysfunction, and right atrial thrombus (Fig. 1b, c). The peak velocity of tricuspid regurgitation was 3.3 m/s. The inferior vena cava was dilated, and systolic pulmonary artery pressure was estimated at 51 mmHg. A secondary pulmonary hypertension due to pulmonary embolism (PE) was suspected. The right atrial thrombus was huge and moved to and fro between the right atrium and right ventricle. Therefore, right atrial thrombectomy was conducted to rescue this emergent situation. During the operation, the location of the thrombus was constantly monitored by transesophageal echocardiography (Fig. 1d, e; Movies 1, 2). The thrombus looked like a Gecko-swimming. The excised thrombus was approximately 14.5 cm in length (Fig. 1f).

An acute PE has been known as high mortality rate illness [1]. However, the right atrium thrombus is rare, and it is

often related to poor prognosis [2]. The right atrial thrombus was detected only in approximately 4% of patients with acute PE [2]. According to the report of Kronik et al. clinical data of 119 patients with right heart thrombi which were collected and categorized into two types; (1) the long, mobile thrombi which resembled a worm, and (2) the immobile and non-specific clots [3]. The optimal treatment of pulmonary embolism with free-floating right heart thrombus seems to be controversial. However, the treatment has been conducted taking the thrombus size, bleeding risk and hemodynamics into consideration. From previous reports, anticoagulation, thrombolytic therapy, surgical thrombectomy and percutaneous catheter removal have been flexibly implemented to treat right atrial thrombus [4].

Even if CT imaging is used, actually, it is not easy to visualize the thrombus which moves fast in the heart chamber. However, echocardiography can repeatedly and easily observe it even on the way of transfer from the emergency department of surgery. It may be crucial for appropriate diagnosis to use both CT and echocardiography together.

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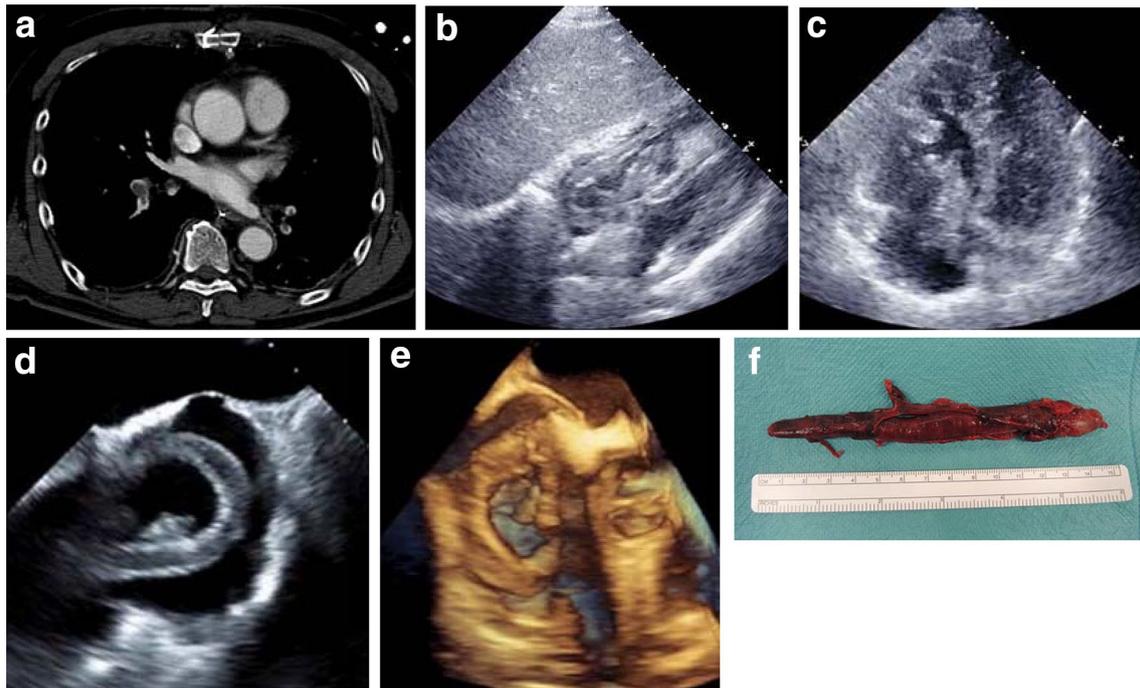


Fig. 1 **a** An axial contrast-enhanced computed tomography. **b** Transthoracic echocardiography from epigastric view revealed bending in the right atrium and ventricle. **c** Apical four-chamber view of transthoracic echocardiography shows thrombus in the right heart. **d** Transesophageal two-dimensional echocardiography with the trans-

ducer at 180° shows a giant thrombus that turns around in the right atrium. **e** Transesophageal three-dimensional echocardiography with the transducer at 45° shows a giant thrombus in the right atrium. **f** Right atrial thrombus

In conclusion, we could visualize precisely the floating right atrial thrombus by three-dimensional transesophageal echocardiography. It is worth emphasizing in this case that echocardiography contributed to a speedy diagnosis and successful thrombectomy for the patient's life.

Compliance with ethical standards

Conflict of interest Yasuyo Takeuchi, Hiroki Sakamoto, Genichi Sakaguchi and Toshio Shimada declare that they have no conflict of interest.

Human rights All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later revisions.

Informed consent Informed consent was obtained on his own will.

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