Patent foramen ovale with a riding vermicular thrombus causing paradoxical and massive pulmonary embolism

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A 46-year-old adipose woman was admitted to hospital with tachycardia and progressive dyspnoea. The week before hospitalization she collapsed several times and two days before admission she experienced an intermittent motorical weakness of her right hand. Transthoracic echocardiography revealed decreased right ventricular (RV) function, RV dilatation, and signs of pulmonary hypertension with a pressure gradient of 43 mmHg across the tricuspid valve. A patent foramen ovale was found with a mobile continuous structure in both atria spanning through the foramen and prolapsing over both tricuspid and mitral valve in diastole (Movie 1). Computed tomography (CT) scan showed massive bilateral pulmonary embolism (Panel A) due to deep vein thrombosis of the lower extremity and a structure in both atria with the appearance of a thrombus (Panel B). Transesophageal echocardiography clearly visualized a bialtrial vermicular thrombus (Panel C, Movie 2). Cranial magnetic resonance imaging showed multiple bihemispheric hyperintense signal spots using fluid-attenuated inversion recovery (FATIR) imaging, presumably due to paradoxical intracerebral embolism. Intravenous heparin treatment was initiated and the patient was admitted to the cardiac surgery department. Bialtrial and pulmonary thrombectomy was undertaken (Panel D and E). The post-operative course was uneventful with a substantial drop in transvalvular pressure to 21 mmHg 13 days after surgery. Oral anticoagulation was initiated and the patient recovered completely. This clinical case is an impressive example of pulmonary embolism subsequently causing pulmonary hypertension and paradoxical embolism via a patent foramen ovale.

See online supplementary material for Movies 1 and 2 available at European Heart Journal online.

Panel A. Axial multislice CT image of massive bilateral pulmonary embolism (see arrows).

Panel B. Axial multislice CT image of the atrial structure consistent with thrombus (see arrow). RA, right atrium; LA, left atrium.

Panel C. Transeosophageal echocardiographic image in the oblique plane (62°), at the level of the aortic root. A vermicular thrombus is trapped in a patent foramen ovale. RA, right atrium; LA, left atrium; PFO, patent foramen ovale; Ao, aorta.

Panel D. Intraoperative view with the vermicular thrombus (see arrow) in the right atrium. RV, right ventricle; RA, right atrium.

Panel E. Thrombus after operative removal. The asterisk (*) denotes the area where the thrombus was trapped in the patent foramen ovale. RA, right atrium; LA, left atrium.

Movie 1. Zoomed section from a transthoracic four-chamber view showing a large, very mobile thrombus crossing from the right to the left atrium via a patent foramen ovale. Both ends of the thrombus are prolapsing through the AV valves into the right and left ventricles.

Movie 2. Transesophageal echocardiographic view in the oblique plane (62°) at the level of the aortic root showing a vermicular, very mobile thrombus stacking in a patent foramen ovale and reaching from the right atrium to the left atrium.