Thromboembolus Crossing Patent Foramen Ovale: Appearance in Multislice Computed Tomography and Echocardiography

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A 31-year-old woman was referred to our hospital due to progressive dyspnea and a family history of pulmonary embolism. Multislice computed tomography depicted massive bilateral pulmonary embolism, and transesophageal echocardiography demonstrated a serpentine structure in both atria with the appearance of a thrombus. Furthermore, a highly mobile mass trapped in her patent foramen ovale was identified. She underwent emergency cardiac embolectomy and was discharged from our hospital with conventional anticoagulant therapy.

Keywords: patent foramen ovale, thrombus, computed tomography, transesophageal echocardiography

Introduction

Thrombotic material trapped in a patent foramen ovale (PFO) accompanied with acute pulmonary embolism are very rare clinical conditions seen together and can be life-threatening. The foramen ovale remains patent in about 22%–38%1 of individuals after the establishment of adult circulation and has been identified as a risk factor for the development of stroke.2–4)

Case Report

A 31-year-old woman presented with tachycardia, progressive dyspnoea, and a family history of pulmonary embolism to our institution. She had recently received treatment for suspected pneumonia. Examination of the lungs did not show any pathological findings.

A subsequently performed contrast-enhanced ECG-gated multislice CT study depicted massive bilateral pulmonary embolism (Fig. 1A and 1B). Multiplane transesophageal echocardiography, including real-time three-dimensional echocardiographic reconstructions, demonstrated decreased right ventricular function and a serpentine structure in the left and right atrium with the appearance of a thrombus (Fig. 1C and 1F). Furthermore, a highly mobile mass trapped in her patent foramen ovale (PFO) was identified (Fig. 1D) with floating parts in both atria, commuting through the mitral valve into the left ventricle (Fig. 1E).

On the basis of these findings, emergency cardiac embolectomy was performed and revealed a multi-chamber thromboembolus (Fig. 1H), which was removed through an atrial approach (Fig. 1G) and, additionally, through the opening of the main pulmonary trunk. No residual fragments of the thrombus were found in the main pulmonary trunk or atria, and the foramen ovale was closed in a single layer. Conventional anticoagulant therapy was initiated, and the patient recovered smoothly from surgery.
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(A and B) Contrast-enhanced ECG-gated multislice computed tomography. Representative axial (A) and sagittal (B) images illustrating massive pulmonary embolism in both the left and the right pulmonary artery (indicated by arrows).

(C–F) Multiplane transesophageal echocardiography depicting a serpentine structure (indicated by arrows) in the left (C) and right (F; three-dimensional reconstruction) atrium. The mobile structure has prolapsed into a patent foramen ovale (D, arrow) with commuting parts in the left atrium and the left ventricle (E, arrows).

(G and H) Intraoperative view with the thrombus (asterisk) in the right atrium (G, RA indicates right atrium and RV right ventricle) and complete biatrial (H, arrows; LA indicates left atrium, PFO patent foramen ovale) and pulmonary thrombembolectomy (H, asterisks).
Discussion

There are several therapeutic options like surgical thrombectomy or anticoagulation / thrombolytic therapy, but there is no consensus on an ideal treatment. The surgical approach with closure of the PFO appears to be safe and efficient, but involves the need of cardiopulmonary bypass. However, in elderly patients in poor condition and in stable patients, anticoagulation/thrombolytic therapy may be a better choice.

Conclusion

As illustrated in the present patient, the therapy of a thrombus crossing a PFO represents a severe clinical situation with potential fatal outcome and remains a challenge for physicians. Transesophageal echocardiography is an efficient tool to investigate a transseptal thrombus and provides together with real-time three-dimensional reconstruction an outstanding method in this situation.1–4)

Disclosure Statement
None.

References