Massive Paradoxical Embolism
Caught in the Act

George J. Koullias, MD, PhD; John A. Elefteriades, MD; Ihui Wu, MD; Ion Jovin, MD; Farid Jadbabaie, MD; Robert McNamara, MD

A 33-year-old scientist with recent exertional shortness-of-breath presented with new onset right flank and groin pain. For weeks, he had spent over 16 hours a day at his desk writing a grant. History and physical examination revealed resting tachypnea, sinus tachycardia, tender right flank with (+) Giordano sign, and resting oxygen saturation of 91% on room air. Computed tomography showed recent right renal infarct and ventilation/perfusion scan revealed multiple areas of mismatch. Transthoracic and transesophageal echocardiography revealed a large “snake-like” mass waving in the right atrium and a similar mobile mass in the left atrium (Figure 1), as well as thrombus in the inferior vena cava and a patent interatrial communication with positive bubble study.

The patient underwent emergency surgery. Right and left atriotomy revealed a large thrombus traversing a patent foramen ovale (Figure 2). An additional 13-cm recent thrombus was retrieved from a saddle position in the main and right pulmonary arteries (Figure 3).

Duplex examination of the lower extremities the next day revealed residual left distal popliteal vein thrombus. An inferior vena cava filter was placed and the patient started treatment with heparin transitioning to warfarin.

An extensive work up for primary and secondary causes of venous thrombosis was performed. This evaluation showed mildly elevated levels of homocysteine. The increase in homocysteine levels was deemed inadequate to induce this extensive thrombotic state. The patient was discharged on the fourth postoperative day on daily warfarin and vitamin B complex supplementation, with the conclusion that his prolonged seated immobility had caused the venous thrombosis.

The echocardiographic images and the operative findings and photographs captured the subsequent massive paradoxical embolism essentially “in the act” of traversing the interatrial septum through the patent foramen ovale.

Figure 1. Transthoracic echocardiographic imaging of a large waving tubular right atrial and left atrial thrombus through a patent foramen ovale (PFO).

From the Sections of Cardiothoracic Surgery (G.J.K., J.A.E., I.W.) and Cardiovascular Medicine (I.J., F.J., R.L.M.), Yale New Haven Hospital, Yale University School of Medicine, New Haven, Conn.
Correspondence to George Koullias, MD, Department of Cardiothoracic Surgery, Yale New Haven Hospital-Yale University School of Medicine, 333 Cedar St, 121 FMB New Haven, CT 06520-8039. E-mail Koullias@hotmail.com

The editor of Images in Cardiovascular Medicine is Hugh A. McAllister, Jr, MD, Chief, Department of Pathology, St Luke’s Episcopal Hospital and Texas Heart Institute, and Clinical Professor of Pathology, University of Texas Medical School and Baylor College of Medicine.

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Figure 2. Intraoperative demonstration of the large thrombus traversing the patent foramen ovale (arrows).

Figure 3. Intraoperative schematic reconstruction of the location of the thrombotic material through the patent foramen ovale (arrows) and the pulmonary artery in both right and left cardiac chambers.
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