First direct evidence of a Patent Foramen Ovale (PFO): a large thrombus straddling the foramen ovale

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A 40-year-old male experienced intermittent heart palpitations and chest pain for 2 years was unconscious 20 h ago before being admitted to our hospital. In addition, a month prior to this incident, the patient had fractured his left calcaneus during an accident. Echocardiography revealed a large thrombus (39 mm × 18 mm) crossing the midst of the atrial septum, swinging in the right ventricular inflow tract with cardiac cycle (Panel A) (see Supplementary material online, Videos S1 and S2). Dual-source computed tomography (CT) showed a continuous low-density shadow in the left atrium (16.7 mm × 9.9 mm) and right atrium (41.4 mm × 14.4 mm), and a filling defect shadow was found in the bifurcation of the pulmonary arteries in both lungs and distal lumen (large bilateral pulmonary embolism, with a thrombosis index of ~75%) (Panel B). Brain CT showed a low-density C-shaped patchy shadow on the right parietal lobe (Panel C), which indicated encephalomalacia. Colour-coded Doppler flow image showed no blood flow in the left distal popliteal veins, indicating a thrombo-embolism (Panel D). The patient underwent a pulmonary artery embolectomy to remove the pulmonary thrombus (Panel E), followed by a pathological examination. The presence of red blood cells, platelets, and fibrin confirmed that the tissue was a thrombus.

To our knowledge, this is the first time that a thrombus has been observed straddling the PFO. This discovery provides direct evidence for a paradoxical embolism, and lays out a foundation for PFO intervention.

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