

## Paradoxical embolism and thrombus trapped in patent foramen ovale in an old woman: a case report

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An 88-year-old woman was admitted to our hospital because of confusion, sleepiness, dyspnoea and left leg edema, a few days after minor ocular surgery. Clinical examination revealed an elevated blood pressure (190/120 mm Hg), normal heart rate and rhythm, and normal oxygenation. Deviation of the rima oris and dysmetria of the left arm were noted, and the patient was unable to maintain a standing position. No hemorrhagic or ischemic lesions were seen at the first brain CT scan. A 15 × 13 mm arteriovenous malformation was present in the right hemisphere. An ultrasound examination of the lower limb veins demonstrated an uncompressible left femoral and popliteal vein. An EKG showed inverted T waves in V1–V4. Echocardiography detected signs of pulmonary hypertension with dilated right cavities, which allowed a diagnosis of pulmonary embolism in the presence of deep vein thrombosis, and revealed an embolus trapped in a patent foramen ovale (see Fig. 1). The head of this embolus, which was 4.0 cm long, was seen in the left atrium, the tail in right atrium. At each heart contraction, the extremities shook vigorously! The patient was not judged to be a candidate for surgery, and unfractionated heparin was started at a mean infusion rate of 25,000 IU

per day. The dose was adjusted by means of aPTT determination in accordance to the De Groot protocol [1].

A second brain CT scan was performed after 5 days, and demonstrated a large left cerebellar infarction, probably caused by paradoxical embolism that occurred before the start of heparin therapy, since neurologic symptoms were present at hospital admission.

Serial echocardiography examinations in the subsequent days revealed a slow but progressive reduction of thrombus dimensions, and after 2 weeks it was no longer visible, and only atrial septum aneurysm was present. During the first week, warfarin therapy was started to bridge the heparin therapy without occurrence of bleeding complications. Neurologic recovery was impressive, and the patient was discharged to a rehabilitation facility in the third week, on oral anticoagulant therapy.

In a recent literature review [2], only 93 cases of thrombus trapped in a patent foramen ovale were identified: the mean age of the patients was 58 years. A pulmonary embolism was present in 94% of cases and paradoxical embolism in 44%. Data of 84 patients were available for analysis: 55 were treated surgically, 21 with heparin and 11 with thrombolysis. The mortality rates were 13, 14 and 36%, respectively. Patients treated with heparin were older and had more strokes than the surgical group, whereas patients treated with thrombolysis were more likely to have hemodynamic compromise.

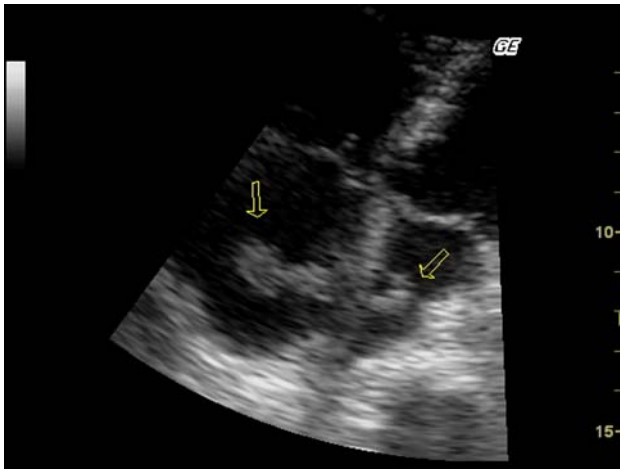
In spite of wide availability of echocardiography, thrombus trapped in a patent foramen ovale is still rarely diagnosed. The choice of treatment is empirical. In our elderly patient, heparin was preferred to thrombolysis since the patient was hemodynamically stable, and had suffered a stroke. Surgery was not considered, both because of the advanced age and because a paradoxical embolism had already occurred. Our case report confirms

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**Fig. 1** Thrombus trapped in foramen ovale (*arrows*)

previous observations that thrombus disappears generally in a few weeks under treatment with heparin and oral anticoagulants.

**Conflict of interest statement** The authors declare that they have no conflict of interest related to the publication of this manuscript.

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