

Waiting for evidence seems to make sense – except for the one providing the evidence

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Summary

A 58-year-old male presented with a history of two prior transient ischaemic attacks and was found to have a patent foramen ovale (PFO) in the absence of atrial fibrillation or relevant carotid atheromatosis. PFO closure was deferred at this stage due to the lack of clinical evidence. Three years later the patient was re-admitted after a major stroke with residual symptoms and finally underwent PFO closure in a minimally invasive procedure using an Amplatzer PFO Occluder.

Key words: stroke; patent foramen ovale

Case report

A 58-year-old mechanic actively involved in motocross racing was thrown off track four years prior when he experienced a transient left oro-facial palsy that spontaneously resolved within hours. A few months later these symptoms recurred accompanied by temporary motor aphasia and prompted hospitalisation. He admitted to casual smoking and had no significant past medical history except for a mildly elevated lipid profile. Transoesophageal echocardiography identified >25 microbubbles (agitated saline) crossing the atrial septum and appearing in the left atrium within three heart cycles after a Valsalva manoeuvre, consistent with a PFO grade III [1]. No atherosclerosis of the aortic arch was documented. Atrial fibrillation was ruled out by in-hospital monitoring and an ambulatory Holter ECG, and Duplex ultrasound and transcranial Doppler studies revealed only minimal atheromatosis of the left carotid bifurcation. Screening for a hypercoagulable state was foregone because there was no personal or family history of venous thromboembolism. Again, the symptoms completely resolved within hours.

Upon discharge smoking cessation was encouraged, antiplatelet therapy with acetylsalicylic acid was initiated as a secondary prophylaxis and a statin was implemented for lipid control in accordance with current guidelines. The treating

Figure 1

Embolitic occlusion of the right internal carotid artery on MRA.



physician was reassuring the patient concerning the PFO and refrained from referral for closure. Three years later the patient returned to the emergency room with motoric aphasia that rapidly progressed to a hemisindrome primarily with paralysis of the left upper extremity corresponding to a NIHSS score of 7/42. After intracranial haemorrhage was ruled out by com-

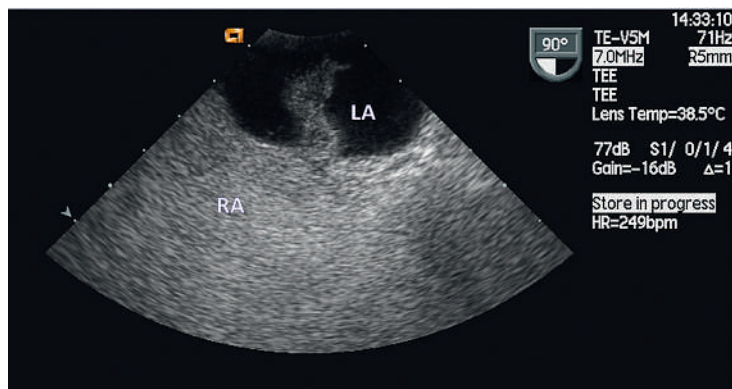
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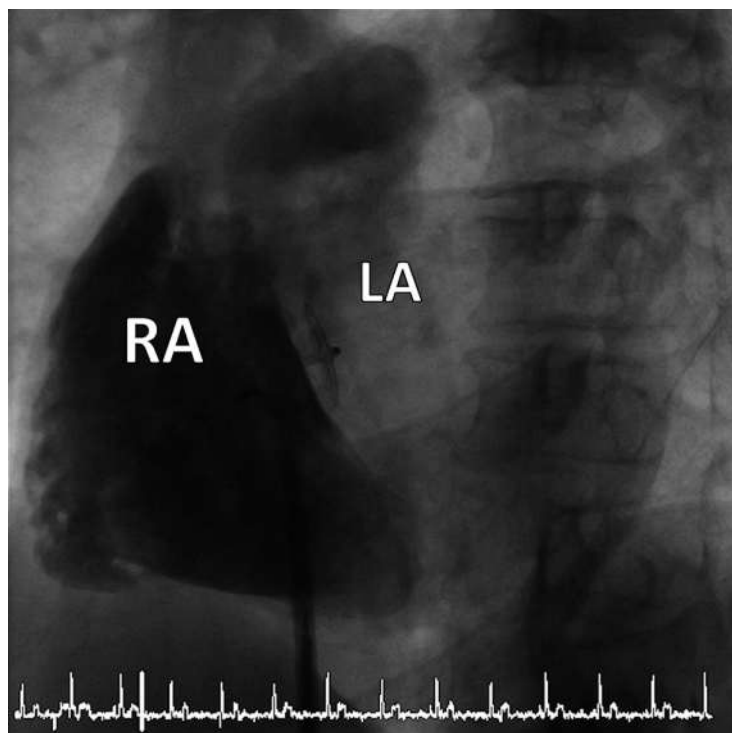
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Figure 2

Bubbles passing the PFO from the right (RA) to the left (LA) atrium on transoesophageal echocardiography.

**Figure 3**

Successful closure of the PFO with an Amplatzer PFO Occluder confirmed by contrast injection into the right atrium (RA) under fluoroscopy. LA = Left atrium.



puted tomography intravenous thrombolysis with alteplase was started two hours after symptom onset. Magnetic resonance angiography identified a small cortical lesion in the right paracentral area as well as a delayed perfusion in the area of the middle cerebral artery and revealed a complete occlusion of the right internal carotid artery suggesting an embolic event (fig. 1). While speech was recovering steadily, residual fine motor skill disabilities of the left hand persisted. A 24-hour-ECG was repeated and again demonstrated regular sinus rhythm with no episodes of atrial fibrillation and a repeated transoesophageal echocardiogra-

phy was consistent with the previous study showing a PFO grade III suggesting paradoxical embolism as the only obvious mechanism (fig. 2). There was no atrial septal aneurysm. According to the guidelines, the treating physician/neurologist switched the antiplatelet regimen from acetylsalicylic acid to clopidogrel as a secondary prevention and a follow-up carotid Duplex ultrasound with Doppler study was scheduled which was again consistent with minimal atherosclerosis. With respect to the PFO, conflicting recommendations were made by the treating physician and the cardiologist. While the first related the lack of a randomised clinical trial that would dictate PFO closure in this setting, the latter convinced the patient with sound reasoning.

In a minimally invasive outpatient procedure under local anaesthesia the patent foramen ovale was crossed via the right femoral vein under fluoroscopic guidance and occluded using an Amplatzer PFO Occluder with a diameter of 25 mm (fig. 3). Adequate position of the device was confirmed prior to discharge by transthoracic echocardiography and a relevant residual shunt was ruled out.

Discussion

The foramen ovale, an interatrial connection, is a prerequisite for the intrauterine circulation to bypass the immature lungs. It functionally closes after birth due to the subsequent decrease of right atrial pressure that sucks the septum primum against the septum secundum. The prevalence of PFO declines with advancing age and is found in around one quarter of the population during the fourth to eighth decade of life. While asymptomatic in most people, the PFO harbours a risk of paradoxical embolism and has also been associated with migraine with aura, decompression illness in divers, platypnoea-orthodeoxia syndrome, obstructive sleep apnoea, and high altitude oedema.

In up to 40% of cases the aetiology of an ischaemic stroke cannot be determined despite extensive work-up [2, 3]. Whereas case-control studies revealed a strong correlation between the presence of PFO and cryptogenic stroke in adults aged <55 years, this relationship is still controversial in older age groups [4–9]. Even with medical treatment, patients with cryptogenic stroke with PFO are at increased risk for recurrence [10–13]. Whereas non-randomised data suggest an advantage of percutaneous PFO closure over medical treatment [14–17], a recent randomised trial comparing PFO closure or medical therapy for cryptogenic stroke did not show a significant benefit with regard to a composite of stroke or TIA at two years of follow-up [18]. Longer follow-up is of essence in this realm.

Transfemoral closure of a PFO can be performed under local anaesthesia as a safe procedure with favourable long-term outcome [14, 16, 17]. The consider-

able risk of recurrent cerebrovascular accidents in patients with symptomatic PFO outweighed the infrequent occurrence of periinterventional complications mostly confined to the access site. Transcatheter closure of patent foramen ovale with significant right to left shunt can hence be recommended to patients suffering from cryptogenic stroke based on common sense while awaiting randomised clinical trials in parallel to thorough evaluation of possible other sources of stroke.

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