

Acute ischaemic stroke attributed to multiple atrial cardioembolic sources

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Received 5 June 2023; revised 31 August 2023; accepted 16 October 2023; online publish-ahead-of-print 18 October 2023

ESC curriculum 9.7 Adult congenital heart disease • 2.2 Echocardiography

A 63-year-old man was admitted to another hospital with expressive dysphasia and incomplete paralysis.

He had no medical history and did not take any medications. Magnetic resonance imaging of brain on admission revealed multiple acute cerebral ischaemic lesions. Transthoracic echocardiography (TTE) showed normal wall motion (ejection fraction 60%), no enlarged left atrium, no significant valvular function, and no embolic abnormalities (thrombi or vegetation). On the other hand, TTE ascertained an interatrial shunt with an atrial septal aneurysm (ASA) and a suspected atrial septal defect (ASD). Initial electrocardiogram (ECG) at admission was sinus rhythm and monitor ECG was detected no significant atrial arrhythmia during 2 weeks hospital stay. He was diagnosed with ASD associated with cryptogenic stroke and was transferred to our hospital for ASD treatment. Transoesophageal echocardiography revealed multiple defects (12 and 5 mm) with left to right shunt and a large mobile ASA with 28 mm protrusion into right and left atrium ([Figure 1A and B](#), [Supplementary material online, Video S1](#)). Furthermore, a double-membrane structure was observed in the inferior and anterior portions of the atrial septum, diagnosed as a double atrial septum ([Figure 1C](#), [Supplementary material online, Video S2](#)). Additionally, a Chiari network in right atrium was detected ([Figure 1D](#), [Supplementary material online, Video S3](#)). No left atrial appendage thrombus was detected.

The heart team evaluated the case and concluded that only complete surgical repair could be performed for these malformations owing to the technical challenges of percutaneous closure. Perioperative findings revealed an ASD and multi-fenestrated ASA ([Figure 1E and F](#)). The Chiari network was removed ([Figure 1G](#)), and the interatrial abnormalities were repaired using an autologous pericardial patch with fixing glutaraldehyde. He was discharged with antithrombotic treatment (aspirin 100 mg per day).

This is an extremely rare case of cryptogenic stroke caused by multiple embolic risk sources: the coexistence of ASD, multi-fenestrated ASA, double atrial septum, and the Chiari network. Atrial septal defect, ASA, and Chiari network are well-recognized causes of embolic strokes.¹ Furthermore, a double atrial septum (a very rare congenital anomaly), a double-walled atrial septum that distinguishes the midline interatrial chamber between the two atria, is a risk factor for embolic stroke because of a thrombus originating from this interatrial space.² Percutaneous closure of these abnormalities is generally very challenging and limits treatment.² It is crucial to accurately assess these abnormalities using echocardiography and select the appropriate treatment. However, the exact cause of acute ischaemic stroke in our patient may be multifactorial and other contributing factors such as atrial arrhythmia, thrombophilia, or other culprits may have partially involved.

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Handling Editor: Filippo Puricelli

Peer-reviewers: Waqas Akhtar; Vasilios Giampatzis; Michael ZL Zhu

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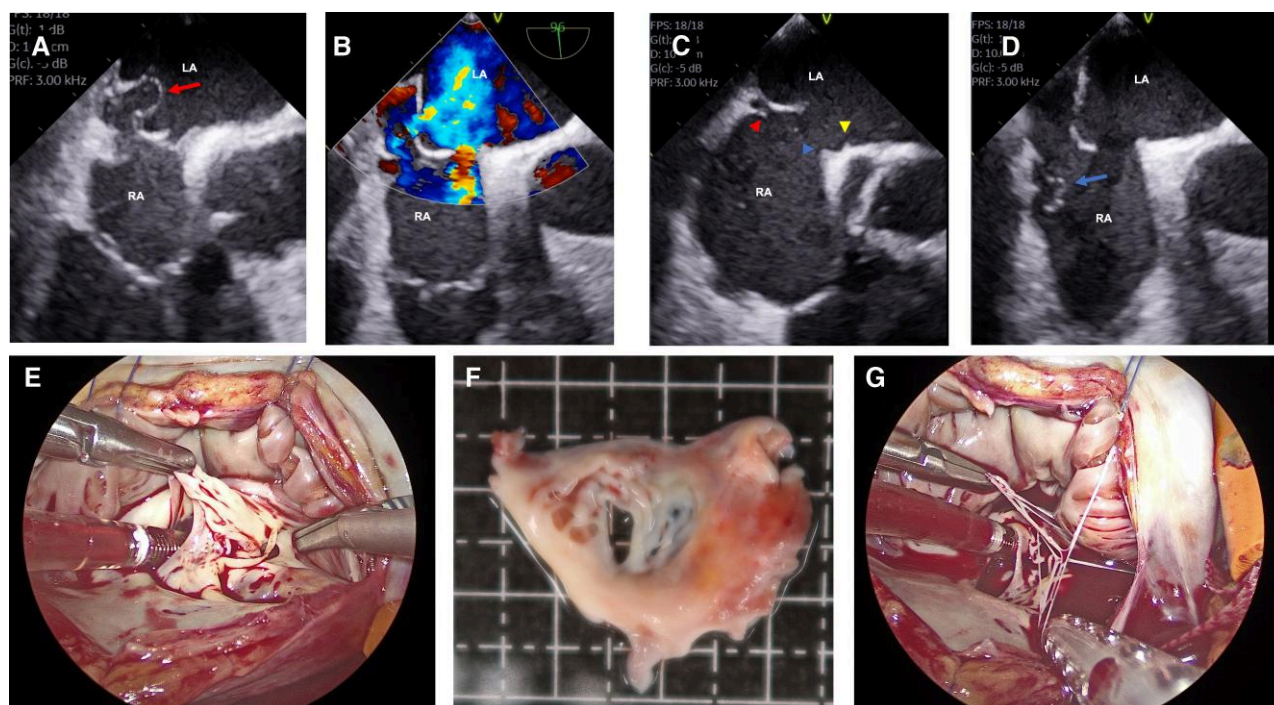


Figure 1 Transoesophageal echocardiography and perioperative findings. (A) Large mobile atrial septal aneurysm (red arrow), (B) multiple defects of atrial septum. (C) double atrial septum; septum primum (yellow arrowhead); septum secundum (red and blue arrowheads). (D) Chiari network (blue arrow). (E) Atrial septal defect and multi-fenestrated atrial septal aneurysm. (F) Multi-fenestrated atrial septal aneurysm. (G) Chiari network. LA, left atrium; RA, right atrium.

Supplementary material

Supplementary material is available at *European Heart Journal – Case Reports* online.

Acknowledgements

None.

Consent: The authors confirm that written consent for the submission and publication of this case report, including images and associated text, was obtained from the patient in line with COPE guidance.

Conflict of interest: None declared.

Funding: None.

Data availability

The data underlying this article are available in the article and in its online [supplementary material](#).

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