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A Case Contradicting the Definition of Embolic Strokes of Undetermined Source: The Necessity of Transesophageal Echocardiography

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Dear Editor,

A 44 year-old female patient was admitted via the emergency room with an acute-onset left-sided frontal-temporal headache. The patient's medical history of migraines and superficial venous thrombosis was significant, but she did not take any regular medications. No history of smoking, excessive alcohol consumption, or drug use was reported, nor any family history of stroke/myocardial infarction or angiopathy. The patient did not complain of other symptoms. A neurological examination revealed no focal deficits or other findings. There were no pathological findings in a brain CT scan performed at admission. However, a MRI scan performed 24 hours later produced findings consistent with acute infarction of the temporal branch of the left middle cerebral artery (Supplementary Fig. 1 in the online-only Data Supplement). The patient was put on dual antiplatelet therapy (aspirin and clopidogrel), in accordance with current American Heart Association/American Stroke Association guidelines, pending further diagnostic workup.

Blood screening did not identify any vascular risk factors, including hypercholesterolemia, diabetes mellitus, coagulation disorders, or autoimmune diseases. The results of a cardiologic evaluation, including transthoracic echocardiography and 24-hour Holter monitoring, were normal. CT angiography revealed no stenoses in either extracranial or intracranial vessels. Transesophageal echocardiography (TEE) revealed the presence of a patent foramen ovale (PFO) with a large right-to-left shunt during the Valsalva maneuver (Fig. 1), and so the antiplatelet treatment was switched to oral anticoagulation with acenocoumarol due to the history of superficial venous thrombosis.[1] The patient remained asymptomatic during the hospital stay and was discharged with no deficit. At the 3-month after stroke onset re-evaluation the patient remained asymptomatic with no cerebrovascular incident recurrence.

There is increasing skepticism about the diagnostic utility of TEE in patients with cryptogenic cerebral ischemia, due to both the high intrarater variability for the method and the low prevalence of identified cardiac conditions that are finally considered to be causally associated with the ischemic event.[2] This controversy led to the currently proposed criteria for the definition of embolic strokes of undetermined source (ESUS), which do not include TEE in the mandatory diagnostic workup for an ESUS diagnosis.[3] In the present case report, all of the results obtained in the routine diagnostic stroke workup were normal, whereas TEE finally not only uncovered the missing link between superficial venous thrombosis, migraine,[4] and cerebral ischemia and the possible underlying pathophysiological mechanism, but also had a crucial impact on secondary prophylaxis and prognosis.[5] Because of the patient's young age, the absence of conventional vascular risk factors, the presence of a superficially located lesion (risk of paradoxical embolism score=8/10), and the history of lower limb phlebothrombosis, the discovered PFO was considered to be stroke-related rather than incidental.[6]

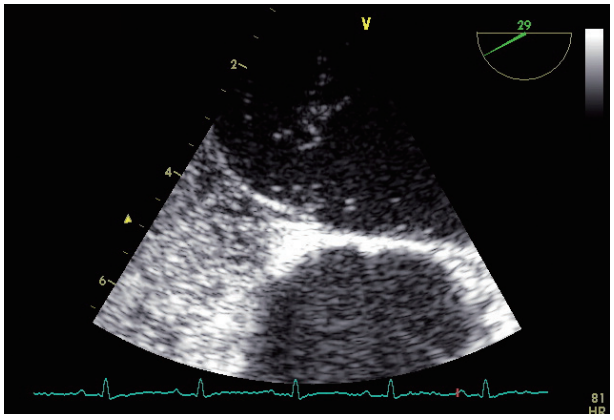

Fig. 1. Patent foramen ovale with a large right-to-left shunt during the Valsalva maneuver (>20 microbubbles) identified using transesophageal echocardiography.

This case report suggests that patients with cerebral ischemia in the absence of conventional risk factors should undergo investigation with TEE to search for potential cardiogenic or aortogenic embolic sources. It also demonstrates that examining single cases can lead to important observations with significant clinical applications.[7] Not all of the important clinical answers can be answered by large-scale analyses of possibly heterogeneous patients. In cases of ESUS, we should continue the thorough search of the locations, from which embolic material arrise.[8]

Supplementary Materials

The online-only Data Supplement is available with this article at http://dx.doi.org/10.3988/jcn.2016.12.2.241.

Conflicts of Interest

The authors have no financial conflicts of interest.

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