



Letter to Editor *Cardiac Critical Care*

Central Retinal Artery Occlusion Secondary to Paradoxical Embolism Across a Patent Foramen Ovale

Chinmaya Nanda¹, Sudipto Banerjee¹, Yatin Mehta¹, Sarven Kumar Singh Rawat¹, Nagendra Singh Chouhan²

Departments of ¹Cardiac Anesthesia, Institute of Critical Care and Anaesthesiology, ²Interventional Cardiology, Medanta Heart Institute, Medanta the Medicity, Gurugram, Haryana, India.

***Corresponding author:**

Dr. Chinmaya Nanda, MD,
FIACTA, Senior Consultant,
Department of Cardiac
Anesthesia, Medanta the
Medicity, Sector 38, Gurugram,
Haryana, India.

nandachinu@gmail.com

Received: 15 October 2023

Accepted: 07 March 2024

Published: 15 April 2024

DOI

10.25259/JCCC_61_2023

Quick Response Code:



Dear Editor,

A 21-year-old male was referred to our hospital for the closure of the patent foramen ovale (PFO). The patient had a history of sudden painless loss of vision in the right eye two months back. The ocular examination was suggestive of central retinal artery occlusion (CRAO). Electrocardiogram, computed tomography (CT) scan of the head and neck, magnetic resonance imaging brain, and Holter monitoring were unremarkable. Venous Doppler of the lower limb showed no evidence of deep vein thrombosis. Transesophageal echocardiography (TEE) showed a small (PFO) with a left to right shunt seen on Color Doppler interrogation. The PFO was closed percutaneously using Amplatzer septal occluder #12.

CRAO is uncommon in young adults. It is usually associated with systemic diseases such as collagen vascular disorders, malignancies, intracardiac anomalies, and coagulopathy.^[1,2] CRAO due to embolization has been reported following left ventricular assist device implantation, coronary artery bypass grafting, carotid endarterectomy, and carotid stenting.^[3,4] An atrial septal defect is essentially a left-to-right shunt. Embolic cerebrovascular accidents can occur due to paradoxical embolism across a PFO following a Valsalva maneuver, such as coughing or excessive straining. The PFO was closed to prevent recurrent strokes and loss of vision in the other eye.^[5] In case of sudden onset vision loss in one eye, there should be suspicion of paradoxical embolism across a PFO.

PFO is a normal variation seen in 25% of the population and should not be considered pathological. Sometimes, the septum primum and secundum do not close completely, and a small oblique cleft remains. This opening is named probe patent PFO and is around 0.2–0.5 mm in dimension and does not allow intracardiac shunting. A PFO is either simple or of complex type. Complex PFOs are those that have a long tunnel length, multiple openings on the left atrial side or the atrial septal is aneurysmal. Excessively thickened septum secundum (≥ 10 mm), presence of Eustachian ridge/valve, or Chiari network and opening of the angle between PFO and inferior vena cava $< 10^\circ$ are also considered complex PFO. Complex PFO is more prone to develop cryptogenic strokes.^[6] PFO is essentially a left-to-right or bidirectional shunt, never purely a right-to-left shunt. TEE is very helpful in diagnosing the PFO, and injection of agitated saline and Valsalva maneuver increases the sensitivity of diagnosis. All physicians working in the emergency ward or intensive care unit must be aware that PFO is a potential cause of cryptogenic stroke and needs evaluation in that direction.

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, transform, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2024 Published by Scientific Scholar on behalf of Journal of Cardiac Critical Care TSS

Ethical approval

The Institutional Review Board approval is not required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

REFERENCES

1. Sharma S, Sharma SM, Cruess AF, Brown GC. Transthoracic Echocardiography in Young Patients with Acute Retinal

Arterial Obstruction. RECO Study Group. Retinal Emboli of Cardiac Origin Group. *Can J Ophthalmol* 1997;32:38-41.

2. Gupta S, Aryal M, Rajbhandari Y, Adhikari A, Kamble V, Aryal B. Central Retinal Artery Occlusion Associated with Atrial Septal Defect: A Case Report. *J Lumbini Med Coll* 2019;7:34-6.
3. Song G, Sun R, Chen YF, Ma Y, Wang YB, Jiao LQ, *et al.* Retinal Embolization after Carotid Endarterectomy and Stenting for Carotid Artery Stenosis. *J Clin Neurosci* 2015;22:1298-302.
4. Calway T, Rubin DS, Moss HE, Joslin CE, Beckmann K, Roth S. Perioperative Retinal Artery Occlusion: Risk Factors in Cardiac Surgery from the United States National Inpatient Sample 1998-2013. *Ophthalmology* 2017;124:189-96.
5. Wieder MS, Blace N, Szelechter MM, Shulman E, Thankenchen J, Mbekeani JN. Central Retinal Artery Occlusion Associated with Patent Foramen Ovale: A Case Report and Literature Review. *Arq Bras Oftalmol* 2021;84:494-8.
6. Bayar N, Arslan Ş, Çağırıcı G, Erkal Z, Üreyen ÇM, Çay S, *et al.* Assessment of Morphology of Patent Foramen Ovale with Transesophageal Echocardiography in Symptomatic and Asymptomatic Patients. *J Stroke Cerebrovasc Dis* 2015;24:1282-6.

How to cite this article: Nanda C, Banerjee S, Mehta Y, Rawat SK, Chouhan NS. Central Retinal Artery Occlusion Secondary to Paradoxical Embolism Across a Patent Foramen Ovale. *J Card Crit Care TSS*. 2024;8:116-7. doi: 10.25259/JCCC_61_2023