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Cryptogenic Near-Complete Left Internal Carotid Artery Occlusion in a 20-Year-Old Male: A Diagnostic and Pharmacological Challenge.

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Case Report

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Abstract

Background

Large vessel occlusions (LVO), particularly those involving the internal carotid artery (ICA), are exceedingly rare in young adults. These events typically prompt aggressive screening for underlying prothrombotic and metabolic disorders.

Case presentation

A 20-year-old male presented with severe headache, slurred speech, right-sided seizures, and hemiplegia. Magnetic Resonance Angiography (MRA) identified a near-complete occlusion of the intracranial segments of the left ICA. Despite the severe cerebrovascular event, comprehensive screening for metabolic and hypercoagulability factors remained unremarkable, which notably included a strictly normal baseline serum homocysteine level of 6.67 μmol/L. The patient was successfully managed with aggressive dual antithrombotic therapy alongside empirical folic acid supplementation. During regular clinical follow-ups every 2 months over a 2-year period, the patient demonstrated significant neurological recovery without any recurrent ischemic events.

Conclusion

This case underscores the diagnostic challenges associated with cryptogenic LVOs in young adults. It emphasizes the likelihood of spontaneous arterial dissection when metabolic anomalies are absent. Furthermore, the case discusses the pharmacological rationale for utilizing empirical metabolic interventions in cases of unexplained early-onset stroke.

Introduction

Ischemic strokes involving large vessel occlusions (LVO) in patients under the age of 45 represent a unique clinical cohort. Unlike older populations where atherosclerosis and cardioembolism predominate, young-onset strokes often stem from spontaneous cervical artery dissections, genetic thrombophilia, or metabolic disturbances such as hyperhomocysteinemia(1). When a young patient presents with a major LVO, establishing the precise etiology is critical for dictating secondary prevention strategies. This report details a 20-year-old male with a cryptogenic near-complete occlusion of the left internal carotid artery (ICA) who presented without any identifiable metabolic or prothrombotic risk factors, presenting a distinct pharmacological and diagnostic challenge.

Case Presentation

A 20-year-old male was admitted to the hospital on February 15, 2026, presenting with a severe headache and slurred speech. His clinical presentation was complicated by right-sided seizures and hemiplegia.

Initial diagnostic imaging confirmed a major cerebrovascular event. Magnetic Resonance Imaging (MRI) of the brain demonstrated multiple small to medium-sized acute infarcts involving the left fronto-parietal lobe, the posterior temporal lobe, and the left ganglio-capsular region. Subsequent Magnetic Resonance Angiography (MRA) revealed a near-complete occlusion involving the intracranial segments of the left ICA. The imaging noted very poor, absent flow-related signal intensity with wall thickening in the left ICA, alongside the reformation of a normal caliber left middle cerebral artery (MCA) through opposite circulation(Fig. 1). The right ICA and basilar arteries were unremarkable.

A comprehensive diagnostic workup was initiated to identify a prothrombotic or structural etiology. A 2D Echocardiogram with color Doppler was normal, showing a left ventricular ejection fraction of 60% with no evidence of clots, vegetations, or patent foramen ovale. The patient's lipid profile was strictly within normal limits, including a total cholesterol of 132.0 mg/dL and an LDL of 65.40 mg/dL. Coagulation and inflammatory markers were also unremarkable, with a D-Dimer of 100.0 ng/mL.

Given the patient's young age, hyperhomocysteinemia was highly suspected. However, serum homocysteine measured shortly after admission on February 17, 2026, was definitively normal at 6.67 µmol/L (reference interval: <15 µmol/L).

The patient was discharged on an aggressive secondary prevention regimen. Pharmacological management included dual antiplatelet therapy with aspirin (75 mg/day) and clopidogrel (75 mg/day) alongside anticoagulation with acenocoumarol (2 mg/day). Furthermore, despite the normal homocysteine profile, empirical metabolic management was initiated with oral folic acid (5 mg/day), and the patient was maintained on long-term vitamin supplementation.

At the every 2 month follow-up evaluation for over 2 years, the patient demonstrated marked neurological improvement, with resolution of slurred speech and no recurrence of seizure activity or new neurological deficits (Modified Rankin Scale score = 0). Follow-up imaging showed stable collateral circulation (Fig. 2).

Discussion

The etiology of a near-complete ICA occlusion in a 20-year-old male with a perfectly unremarkable metabolic profile presents a profound diagnostic dilemma. Because young-onset large vessel occlusions (LVO) frequently stem from metabolic prothrombotic states, hyperhomocysteinemia was initially highly suspected. However, the patient's baseline serum homocysteine level of 6.67 µmol/L (reference interval: <15 µmol/L) definitively eliminated this as the causal factor.

In the absence of metabolic, cardioembolic, or atherosclerotic triggers, structural vascular anomalies must dictate the diagnostic focus. The MRA findings noting "wall thickening" alongside the absent flow in the occluded left ICA strongly suggest an intramural hematoma, which is the pathognomonic radiological sign of a spontaneous carotid artery dissection. Arterial dissection is a leading cause of cryptogenic stroke in young adults, often triggered by minor cervical trauma or underlying connective tissue fragility, and aligns precisely with the patient's acute presentation of a severe, sudden-onset headache(2).

The pharmacological management of this case is particularly compelling and warrants critical evaluation. The optimal antithrombotic strategy for cervical artery dissection remains a subject of ongoing clinical debate between antiplatelet and anticoagulant regimens. The decision to manage this patient with aggressive dual therapy incorporating both dual antiplatelet therapy (aspirin and clopidogrel) and a vitamin K antagonist (acenocoumarol) reflects a highly targeted approach reflects a highly targeted approach to prevent early thromboembolic propagation from the intimal flap while collateral circulation stabilizes.

Furthermore, the empirical initiation of folic acid in despite the firmly normal homocysteine profile highlights a critical paradigm in preventative cardiovascular pharmacology. While folic acid is primarily indicated for documented hyperhomocysteinemia, its continued empirical use in this cryptogenic LVO points to reliance on its pleiotropic properties. Folic acid is known to improve endothelial function independent of homocysteine lowering by enhancing naitric oxide (NO) bioavailability and reducing intracellular oxidative stress(3). In the context of a young patient with an extensively damaged vascular endothelium (as seen in severe arterial dissection), this empirical supplementation acts as a broad-spectrum endothelial stabilizer.

Ultimately, this case illustrates the necessity of prioritizing structural vascular evaluations over metabolic assumptions in young stroke patients, while also underscoring the complex, dual-purpose role of preventative pharmacotherapy when absolute etiologies remain elusive.

Declarations

- **Conflicts of Interest:** The authors have no relevant financial or non-financial interests to disclose.
- **Consent to Participate:** Written informed consent was obtained from the patient for participation.
- **Consent for Publication:** Written informed consent was obtained from the patient for the publication of this case report and any accompanying radiological data.

Author Contribution

Author 1 (Stuti Haresh Rajani) and Author 2 (Aryan Rajesh Sharma) wrote the main manuscript.Author 3(Vanshi Rajani) and Author 4 (Divyansh kakkad) helped in collecting data from the patient including history.Author 5(Dr. Rajesh Sangani) is our senior author and mentor. He is senior cardiology consultant

at Sangani hospital, Keshrod, Gujrat,India. He has done MBBS,MD(Internal Medicine), DM(Cardiology) and he is DHA accredited.All authors have reviewed the manuscript.

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Figures

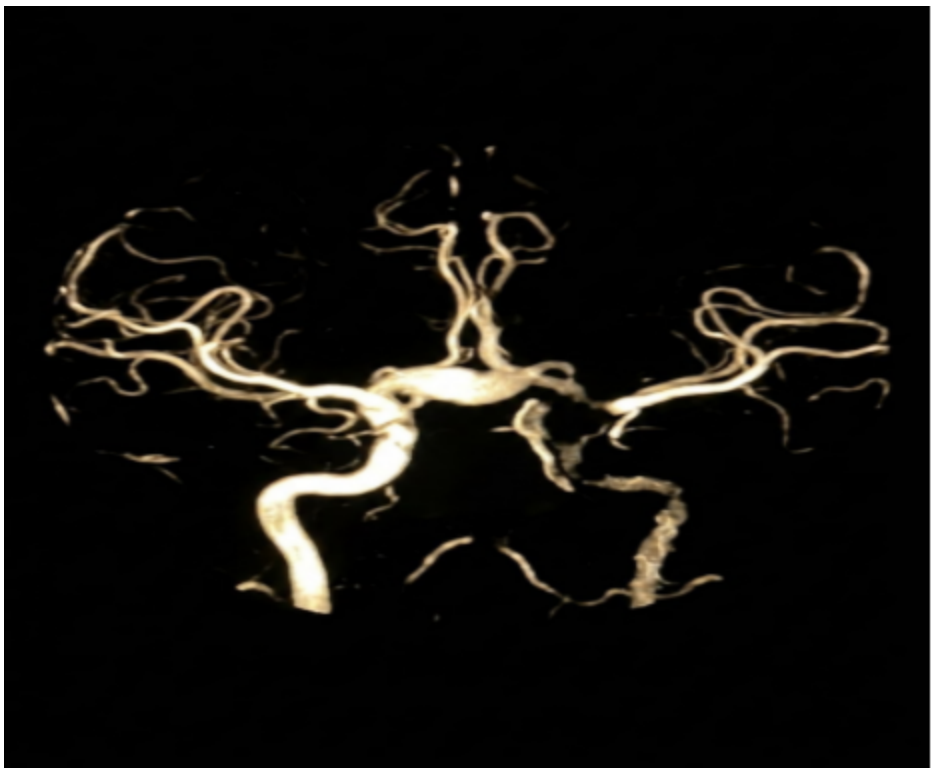


Figure 1

Brain MRI and MRA Findings.

MRA demonstrating near-complete occlusion of the intracranial left internal carotid artery (ICA) with arterial wall thickening. (MR angiography using 2D/3D time-of-flight technique on 1.5T MRI scanner.)(Done on 15

February 2026)

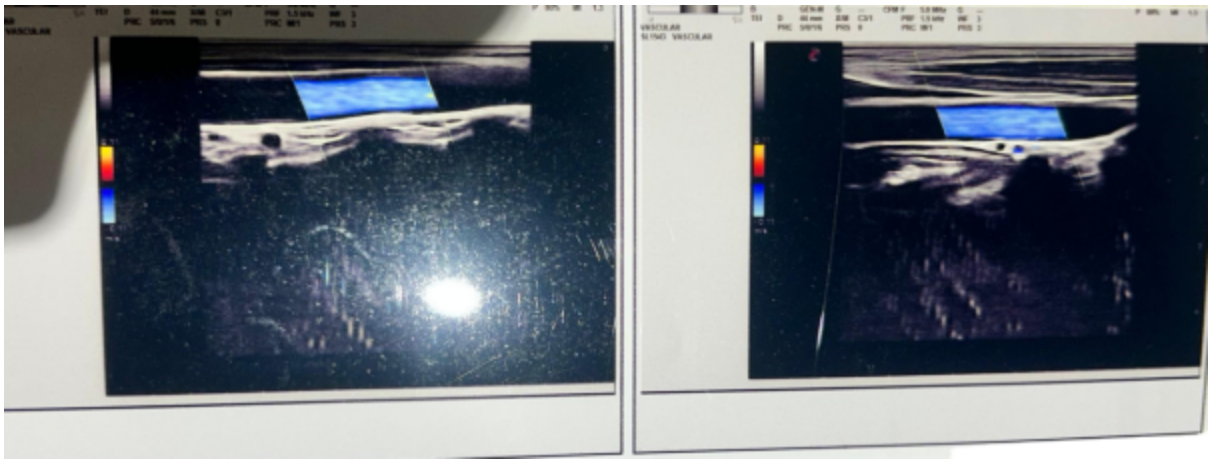


Figure 2

2D echo with colour Doppler

2D echo with colours droppler shows normal LV size and compliance with no clot/vegetation/peri. Effusion seen. (2D echocardiography with color Doppler assessed cardiac structure and blood flow.) (5 july 2026)