



An Interesting Case with Recurrent Ischemic Attacks; A New Conception for Brain Blood Supply

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ABSTRACT

Bilateral extracranial internal carotid artery occlusion is a rare cause of transient ischemic attacks and stroke. In this situation, usually posterior circulation is the main source of brain blood supply. Insufficient posterior circulation with bilateral internal carotid artery is scarce, and its clinical picture in this condition is unpredictable. A 64-years-old man was admitted with recurrent transient ischemic attacks as hemiparesis (right hemiparesis except for one which left hemiparesis). Evaluations disclosed bilateral extracranial internal carotid artery occlusion accompanied with hypoplastic left vertebral artery and about 90% of stenosis in right vertebral artery as a main source of brain blood supply. This is a rare of case stenotic right vertebral artery as the only source of anterior and posterior brain blood supply, in absence of persistent neurologic sign, that has not been reported by now.

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Introduction

Unilateral incomplete internal carotid arteries (ICA) stenosis is one of the causes of ischemic stroke or transient ischemic attack (TIA), and incidence of which

estimated about 9% of hospitalized patients; however it may be asymptomatic, being detected only by imaging assessments for other reasons (1, 2). Bilateral ICA occlusion was reported in 0.4% of patients by Mead

et al., who studied 2228 cases of patients with cerebrovascular events (1).

Other studies suggested that collateral blood flow pathways are the main cause of survival from extensive strokes with major disability in patients with bilateral carotid artery occlusion (3-5). However, some studies suggest no evidence that severity of stroke in internal carotid occlusion is related to collateral arteries (1).

Clinical picture of bilateral ICA occlusion varies from asymptomatic to severe disabling strokes; some studies tried to determine why this occurred, and often suggested the collateral pathways as a reason (5-8). In bilateral occlusion, often posterior circulation is the main source of brain supply (6-8), but what happens if posterior circulation is insufficient too? We cannot answer this question; because it is a rare position that is not reported until now.

Case Report

A 64-year-old man with history of hypertension and coronary artery bypass graft due to ischemic heart disease was admitted due to left hemiparesis and speech difficulty. In neurological exams, he had Broca's aphasia that was sequel of the previous right hemiparesis attack, happened 3 months ago. Brain magnetic resonance imaging (MRI) revealed restriction [in diffusion-weighted imaging/apparent diffusion coefficient (DWI/ADC) map] in right middle cerebral artery territory (Figure 1).

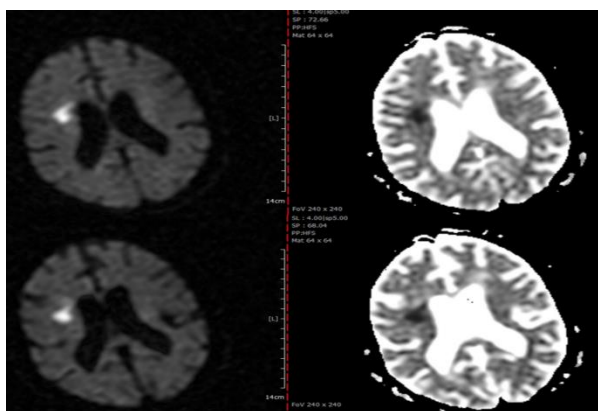


Figure 1. Restriction in diffusion-weighted imaging (DWI) after recurrent left hemiparesis attacks in right middle cerebral artery territory

Electrocardiogram (ECG) was normal; and transthoracic echocardiography indicated that ejection fraction was 40% and no left ventricle clot was seen. Carotid and vertebral arteries color Doppler sonography showed complete occlusion in right ICA, 90% stenosis in left ICA, and more than 70% stenosis in right vertebral artery, and left vertebral artery was not seen.

According to this evidence, 4-vessel brain angiography was done, and the result was bilateral ICA occlusion with hypoplastic right vertebral artery and more than 90% stenosis in right vertebral artery as the only source of brain supply (Figure 2).

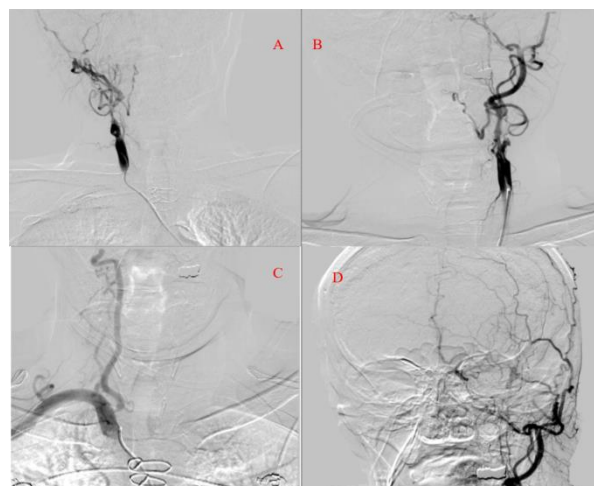


Figure 2. Right extracranial internal carotid arteries (ICA) and common carotid artery (CCA) (A), left extracranial ICA and CCA (B), origin of right vertebral artery (C), and left intracranial ICA (D)

According to frequent patient attacks and paraclinical evaluation results, despite stent placement was controversial for this patient. We were convinced that stent placement should be done for him (Figure 3); and surprisingly, the patient's symptoms (recurrent TIA) were resolved just after stenting. In follow-up visits, after 1, 3, 6, and 12 months, no new objective or subjective neurological complaints were detected.

Discussion

Clinical presentation of bilateral ICA occlusion varied from symptom free to severe

stroke and disability; some studies suggested pattern of collateral pathways for this variation (4, 5, 9), and some others disagreed such proposition (1). In our patient, in addition to the bilateral ICA occlusion, insufficient posterior circulation led to recurrent hemiparesis.

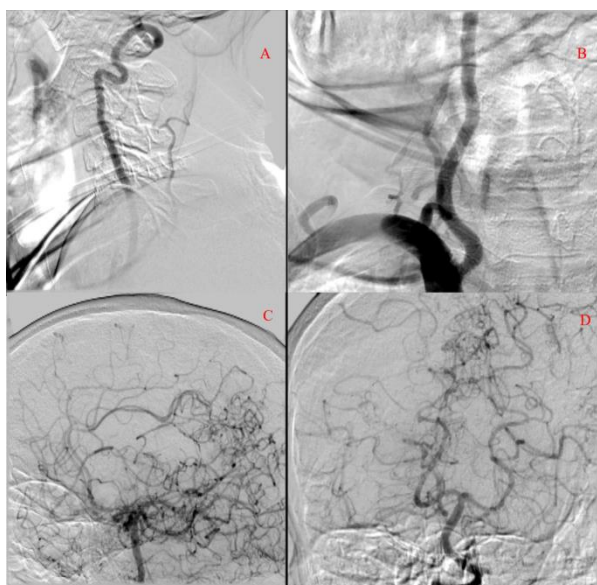


Figure 3. Post-stenting right vertebral artery, intracranial (A and B) and extracranial (C and D)

Although cerebral blood flow supply by collateral pathways has been suggested in this situations, but in our patient, stent placement led to resolve transient ischemic attacks and this finding differ from this theory.

This case showed that despite rule of collateral pathways in cerebral blood flow supply, and the fact that decrease in ischemic event injuries is undeniable, but this is not common; and neurointerventional procedure may be useful in bilateral ICA occlusion if posterior circulation is insufficient due to stenosis.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

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