Poststroke Cognitive Decline is Independent of Longitudinal Changes in Cerebral Hemodynamics Parameters

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ABSTRACT

BACKGROUND: Poststroke vascular cognitive impairment is highly prevalent with significant functional consequences. However, reliable biomarkers for early prediction of cognitive decline after acute ischemic stroke (AIS) are not well established. Although parenchymal imaging in patients with AIS and transient ischemic attack (TIA) may predict the resultant cognitive impairment, it may not explain the progressive deterioration after the index event. We postulated that longitudinal changes in cerebral hemodynamic parameters may influence the cognitive performance after a cerebrovascular event.

METHODS: One-hundred consecutive AIS/TIA patients were recruited within 2 weeks following a cerebrovascular event. At 3–6 months, 69 patients were followed up with transcranial Doppler (TCD) and brief cognitive tests (Mini-Mental State Examination [MMSE]/Montreal Cognitive Assessment [MoCA]). Basic demographics, vascular risk factors, clinical, cognitive, and neurological status were recorded.

RESULTS: Considerable proportion (12%) of patients showed cognitive decline and changes in the hemodynamic parameters over 3–6 months after the index event. We showed that right middle cerebral artery (MCA) stenosis and right internal carotid artery/MCA tandem lesions at 3–6 months are associated with the change in the MMSE scores. Additionally, there was a trend toward association between increased pulsatility index of the right MCA and a decline in the MMSE score. However, we did not observe any association between cognitive decline and longitudinal changes in hemodynamic parameters.

CONCLUSION: Although hemodynamic parameters deteriorate in a considerable proportion of patients during first 3–6 months after a cerebrovascular event, cognitive decline appears to be an independent phenomenon.

Keywords: Cerebral hemodynamics, cognitive decline, transcranial Doppler.

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Introduction

Cognitive deterioration occurs in patients with nondisabling acute ischemic stroke [AIS]. Poststroke vascular cognitive impairment (VCI) is highly prevalent (44%) with significant functional consequences worldwide. The reported prevalence of VCI is 24–96% in western countries and 20–69% in Asia. Patients with VCI have a higher risk for cognitive decline following AIS. Baseline computed tomography (CT) scan of the brain in patients after AIS or transient ischemic attack (TIA) may also serve as a predictor of significant cognitive impairment at 3–6 months after the index event.

Intracranial atherosclerosis is highly prevalent among patients with Asian, Hispanic, and African ancestry. Specifically, it accounts for approximately half of all Asian AIS patients. Intracranial stenosis is associated with an elevated risk of stroke recurrence, which ranges from 10% to 50%. In addition to the parenchymal damage in AIS, the vascular compromise due to intracranial stenosis also contributes toward a disturbed