Cerebrovascular disease

RESEARCH PAPER

Brief screening tests during acute admission in patients with mild stroke are predictive of vascular cognitive impairment 3–6 months after stroke

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ABSTRACT

Objectives To determine the prognostic value of brief cognitive screening tests administered in the subacute stroke phase for the detection of significant cognitive impairment 3–6 months after stroke, the authors compared the Montreal Cognitive Assessment (MoCA) and the Mini-Mental State Examination (MMSE).

Methods Patients with ischaemic stroke and transient ischaemic attack were assessed with both MoCA and MMSE within 14 days after index stroke, followed by a formal neuropsychological evaluation of seven cognitive domains 3–6 months later. Cognitive outcomes were dichotomised as either moderate (impairment in ≥2 cognitive domains) or moderate−severe (impairment in ≥3 cognitive domains) vascular cognitive impairment. Area under the receiver operating characteristic (ROC) curve analysis was used to compare discriminatory ability.

Results 300 patients were recruited, of whom 239 received formal neuropsychological assessment 3–6 months after the stroke. 60 (25%) patients had moderate−severe VCI. The overall discriminant validity for detection of moderate−severe cognitive impairment was similar for MoCA (ROC 0.85 (95% CI 0.79 to 0.90) and MMSE (ROC 0.83 (95% CI 0.77 to 0.89)), p=0.96). Both MoCA (21/22) and MMSE (25/26) had similar discriminant indices at their optimal cutoff points; sensitivity 0.88 versus 0.88; specificity 0.64 versus 0.67; 70% versus 72% correctly classified. Moreover, both tests had similar discriminant indices in detecting impaired cognitive domains.

Conclusions Brief screening tests during acute admission in patients with mild stroke are predictive of significant vascular cognitive impairment 3–6 months after stroke.

INTRODUCTION

Post-stroke vascular cognitive impairment (VCI) is prevalent1 (44%) with significant functional consequences.2 3 The majority (57%) of VCIs are vascular cognitive impairment, no dementia (VCIND).4 Patients with moderate VCIND are at elevated risk (HR=6.4) for incident dementia.5 Although formal neuropsychological assessment is a reliable means of evaluating VCI, it is not practical for the assessment of all patients. Therefore, it is necessary to establish a sensitive screening tool for use in subacute stroke phase to identify high-risk groups for intensive reduction of vascular risk factors and improve prognosis.6

The widely used Mini-Mental State Examination (MMSE)7 is reportedly poor in detecting VCI due to a lack of sensitivity to complex cognitive deficits,8 while the Montreal Cognitive Assessment (MoCA)9 was found to be more sensitive.10 11 However, both MoCA and MMSE were recently reported to be equivalent and moderately sensitive (sensitivity: 0.67 vs 0.7, specificity: 0.9 vs 0.97) in detecting VCI at the post-acute stroke phase.12 This was due to the high frequency of instrumental deficits (ie, language) to which the MMSE is more sensitive, while the MoCA may be more sensitive to impairments in executive function and visuomotor-speed, particularly in patients with small vessel disease (SVD).13 Hence, the recommended use of the MoCA over the MMSE in screening for VCI14 remains to be empirically established.

The predictive ability of either MoCA or MMSE administered in the subacute stroke phase for cognitive impairment 3–6 months after stroke has not been studied. Thus, we aimed to: (1) examine whether the total scores of subacute MoCA and MMSE could predict moderate−severe VCI 3–6 months after stroke; (2) compare the discriminatory ability of subacute MoCA and MMSE scores using their respective optimal cut-off points in detecting impaired cognitive domains at 3–6 months after stroke.

METHODS

Subjects

Three hundred clinically stable patients (≥21 years of age) with a recent ischaemic stroke or transient ischaemic attack (TIA) (≤14 days) admitted to the stroke neurology service at the National University Health System of Singapore were recruited.

Patients were excluded if they had a major disability (modified Rankin scale15 (mRS) >4), significant aphasia or dysarthria (National Institute of Health Stroke Score (NIHSS)),16 best language (Aphasia) and dysarthria score >1) that impeded cognitive assessment. Patients were also excluded if they had a major and active psychiatric illness and pre-existing dementia, and a score of >3.58 on the Informant Questionnaire on Cognitive Decline in the Elderly.17 18 The Delirium Rating Scale-Revised-9819 was used to exclude patients with...