The interaction between neuropsychological and motor deficits in patients after stroke

ABSTRACT

Stroke survivors typically experience varying degrees of motor and neuropsychological deficits. Although these deficits are frequently treated as separate entities in the cognitive and physical rehabilitation settings, there is considerable interaction between them. Cognitive-motor interference, for example, refers to the simultaneous performance of cognitive and motor functions that results in diminished execution of one or both of the tasks. Studies have demonstrated that when performing dual tasks, poststroke patients will typically favor the cognitive function over the motor task. Furthermore, only certain cognitive functions will interfere with motor abilities, while the intensity of the motor task may magnify the detriment in dual-task performance. Moreover, mood disorders, particularly depression, have also been shown to interact substantially with physical functioning. Consequently, poststroke patients with depression experience greater reductions in their activities of daily living and worse rates of recovery. Recent neuroimaging studies suggest an association between white matter hyperintensities and both motor and neuropsychological poststroke deficits. The relationship between spasticity and cognition deficits needs to be further explored with regard to the deleterious consequences of poststroke spasticity on quality of life and overall motor function. These insights, among others, contribute to a growing, if embryonic, body of knowledge about poststroke motor/cognitive interaction that will ultimately inform developments in treatment and rehabilitation. Neurology® 2013;80 (Suppl 2):S27–S34

GLOSSARY

ADLs = activities of daily living; ARWMC = age-related white matter changes; CMI = cognitive-motor interference; FIM = functional independence measure; LADIS = Leukoaraiosis and Disability; SVD = small-vessel disease; WMH = white matter hyperintensities.

After a stroke, patients frequently experience a spectrum of neuropsychological and motor deficits that can significantly interfere with their cognitive, communicative, and motor functions, resulting in activity and participation limitations. Typically, these deficits include such neuropsychological impairments as amnesia, agnosia, aphasia, apraxia, executive dysfunction, and mood disorders, together with motor impairments such as paresis, spasticity, and disorders of mobility. A sense of the prevalence of poststroke neuropsychological deficits can be gathered from a systematic review of memory function studies in poststroke patients without dementia, in which 23% to 55% of patients were found to experience memory dysfunction at 3 months after stroke, declining to a range of 11% to 31% at 1 year poststroke.1 Furthermore, results from a systematic review and meta-analysis of the prevalence and predictors of poststroke dementia showed that specific stroke characteristics and complications, as well as recurrent stroke, are associated with poststroke dementia.2 In particular, approximately 10% of patients developed new dementia after a first-ever stroke, whereas 30% developed dementia after recurrent stroke.2 Similar studies of motor function in poststroke patients have observed a spasticity prevalence of 17% to 38% at 12 to 18 months after stroke.3–5

The interactions among these various poststroke deficits are complex but only partially understood—and, therefore, likely managed in an incomplete manner—and require considerably

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