Neuropsychological Outcomes in Patients with Complicated Versus Uncomplicated Mild Traumatic Brain Injury: 6-Month Follow-Up

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\textbf{OBJECTIVE:} To compare the extent of persistent neuropsychological impairment in patients with complicated mild traumatic brain injury (mTBI) and those with uncomplicated mTBI.

\textbf{METHODS:} Sixty-one patients with mTBI (Glasgow Coma Scale score 13–15) were recruited prospectively, categorized according to baseline computed tomography findings, and subjected to neuropsychological assessment at initial admission ($n = 61$) as well as at a 6-month follow-up ($n = 30$). The paired $t$ test, Cohen’s $d$ effect size calculation, and repeated-measures analysis of variance were used to establish the differences between the 2 groups in terms of neuropsychological performance.

\textbf{RESULTS:} A trend toward poorer neuropsychological performance among the patients with complicated mTBI was observed during admission; however, performance in this group improved over time. In contrast, the uncomplicated mTBI group showed slower recovery, especially in tasks of memory, visuospatial processing, and executive functions, at follow-up.

\textbf{CONCLUSIONS:} Our findings suggest that despite the broad umbrella designation of mTBI, the current classification schemes of injury severity for mild neurotrauma should be revisited. They also raise questions about the clinical relevance of both traumatic focal lesions and the absence of visible traumatic lesions on brain imaging studies in patients with milder forms of head trauma.

\section*{INTRODUCTION}

Traumatic brain injury (TBI) is a leading cause of death and disability worldwide,\textsuperscript{1,2} labeled a “silent epidemic” that requires close surveillance and appropriate interventions.\textsuperscript{3} The majority of these traumatic brain injuries are the result of road traffic accidents involving young adults.\textsuperscript{4} These injuries impose a considerable economic burden on society (from, eg, medical costs, loss of productivity, loss of income or earning potentials), as well as substantial social and emotional costs.\textsuperscript{5,6} Various neurologic and neuropsychological deficits are commonly reported in these patients, with dire effects on their ability to return to work and psychosocial functioning.\textsuperscript{7}

Mild traumatic brain injury (mTBI), as investigated in this study, is conventionally defined as a form of acute head injury involving nonpenetrating head trauma resulting in one or more of the following: confusion/disorientation, loss of consciousness (LOC) less than 30 minutes, post-traumatic amnesia (PTA) of $<24$ hours duration, and/or transient focal neurologic signs or seizures; and a Glasgow Coma Scale (GCS) score of 13–15 on acute clinical evaluation.\textsuperscript{8,9} This definition can be further divided into 2 broad categories: complicated mTBI and uncomplicated mTBI. A complicated mTBI is differentiated from an uncomplicated mTBI by the presence of a closed depressed skull fracture and/or trauma-related intracranial abnormality or lesion.\textsuperscript{10,11} Common demographic

\textbf{Key words}

- Complicated versus uncomplicated
- Early neuropsychological impairment
- Mild traumatic brain injury

\textbf{Abbreviations and Acronyms}

CT: computed tomography
GCS: Glasgow Coma Scale
GOS/E: Glasgow Outcome Scale—Extended
LOC: loss of consciousness
mTBI: Mild traumatic brain injury
MVA: Motor vehicle accident
PTA: Post-traumatic amnesia
S-NAB: Neuropsychological Assessment Battery—Screening Module

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http://dx.doi.org/10.1016/j.wneu.2016.10.041
Journal homepage: www.WORLDNEUROSURGERY.org
Available online: www.sciencedirect.com
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