Neuropsychological assessment in left frontal glioma patient’s: the role of executive functions and memory skills for postoperative functional outcome and health related quality of life.

Quattropani M.§, Sindorio C.°, Raffa G.*, Scibilia A.*, Conti A.*, Germanò A.*

§ Department of Humanities and Social Sciences - Psychology Division
° Department of Clinical and Experimental Medicine
*Department of Neurosciences - Neurosurgery, University of Messina, Italy

INTRODUCTION: The functional outcome, including neurological, cognitive, social and professional skills of patients with brain tumors, represents the most important measure of surgical success and it determines the health related quality of daily life (HRQOL). Cognitive domains, as language, memory, executive functions, have a critical impact on interpersonal relationship of patients. The preoperativeneuropsychological assessment plays asignificant role to evaluate cognitive functions, and to identify the occurrence ofeventual cognitive impairments. In neurosurgical daily practice, only language functions have been to-date assessed. However, the executive system manages all cognitive processes, such as language, while short and long-term memories play a critical role in everyday life and semantic fields.

The aim of this study is to evaluate the association between preoperative cognitive impairment of executive functions, memory and language, in patients with left frontal gliomas, in order to design a customized preoperative protocol.

MATERIALS AND METHODS: We prospectively enrolled 18 patients with brain tumor located in left perysilvian area and administered a series of neuropsychological tests, includingMini Mental State examination, Edinburgh Handedness Inventory, Frontal Assessment Battery, Rey Auditory Verbal Learning Test, Western Aphasia Battery (WAB). We mapped with navigated Transcranial Magnetic Stimulation (nTMS) the cortical language. The obtained preoperative data were transferred into operative room with neuronavigation system. Postoperative neuropsychological follow-up have been performed after one month.

RESULTS: The preoperative neuropsychological results showed absence of major or mild neurocognitive disorders (M.M.S.E. 24/30). Test scores highlight focal impairments in immediate and delayed memories (R.A.V.L.T imm 25,5±4 diff 3,25±2), in executive functions (F.A.B 13±3), in language (WAB 77.8±25.2) performances. Follow-up neuropsychological assessments showed significant cognitive improvements exclusively in language abilities (WAB 77.8±25.2 vs 86.8±12.2).

DISCUSSION: It is common neurosurgical opinion that a) these cognitive functions may rarely be surgically damaged; b) are diffusely localized; c) are less vulnerable as motor and language functions. Conversely, neuropsychological assessment show that these cognitive deficits are far more common than previously assumed on the basis of clinical impression and observation, both before and after surgery.

Our preliminary results suggest the importance in neurosurgical practice to preoperatively assess not only language functions, but also additional different cognitive domains, such as executive functions and memory skills, and to develop a standardized cognitive task protocol for cortical language areas, for memory, and for executive functions. These functions are critical in postoperative functional outcome, interpersonal and social relationships, and health related quality of life in brain tumor patients.