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Short Report

NEUROPSYCHOLOGICAL ASSESSMENT OF COGNITIVE DEFICITS IN TUMOUR PATIENTS

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The present research focused neuropsychological assessment of cognitive deficits in tumour patients for pre and post brain surgery. It was hypothesized that brain surgery enhances the impairment of cognitive functions. A sample of 26 brain tumor sufferers (13 males & 13 females) was selected from neuropsychiatry department of General Hospital, Lahore. Four tests were used to measure neuropsychological deficits. The patients were tested two days before brain surgery and were retested after three weeks of brain surgery. The results of t-test indicated significant differences of pre and post surgery performance of the patients on three tests indicating organic, memory, speech, visual and motor disturbances, while a non-significant difference was found regarding intelligence.

The researchers in the area of neuropsychology have examined deficits of performance, psychological tasks and cognitive functioning in human beings. The cognitive functioning depends on the cerebral cortex, any damage which can cause serious cognitive and behavioral impairment. Any disturbance to the left temporal lobe leads to agnosia and to the right temporal lobe to amnesia. The damage to the right cerebral hemisphere may cause paralysis on the left side of the body and to left hemisphere to Wernicke's aphasia i.e., disability to comprehend language. The damage to the left frontal cortex produces Broca's aphasia i.e., disturbance in speech production and to the right temporal lobe causes visual and auditory memory disruptions (Bootzin, Bower, & Zajone, 1986). The Parkinson's disease is caused by degeneration of dopaminergic neurons located in basal ganglia.

The role of thalamus and hypothalamus is crucial in feeding, drinking, sexual functions, emotional and physiological response to stress (Bootzin et al., 1986).

The cerebral impairment is mostly accompanied by changes in orientation, memory, intellect, judgment, affect and psychological functioning. Through collaborative studies, neurologists and psychologists had tried to evaluate the effects of central nervous system impairment by using comprehensive neuropsychological measures (Meyer & Salmon, 1984). Although it is possible to evaluate the status of sensory and motor areas of cerebral cortex through routine neurological evaluations, but without comprehensive psychological testing much of the cerebrum functioning is left unevaluated. Secondly, neuropsychological assessment may provide early signs of CNS impairment and subtle changes in behavioral patterns. The aim of the present study was neuropsychological assessment of cognitive deficits in tumor patients before and after brain surgery. It was hypothesized that subjects' pre and post-operative performance would be different.

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Method

Participants

A sample of 26 brain tumor patients (13 males & 13 females) was taken from General Hospital, Lahore under the supervision of a trained neuro-radiologist in the

department of neuropsychiatry. The age range of the patients was 25 to 45 years with minimum educational level of matric.

Instruments

Four psychological measures were used including Memory for Design test (Graham & Kendall, 1975) in which reproduction of simple geometrical designs is required and inability to perform indicates organic impairment. Bender-Gestalt test (Pascal & Suttle, 1951) consists of nine simple designs presented to the subject to copy on a blank paper. The deviations in reproductions from the stimuli are indicator of motor and visual disturbance. The Minnesota Test for Differential Diagnoses of Aphasia (Schuell & Lawrence, 1965) is a tool for exploring disturbances in five areas i.e., auditory disturbances, visual and reading disturbances, speech and language disturbances, visual-motor and writing disturbances, disturbances of numerical relations and arithmetic processes. Two performance scales of Wechsler Adult Intelligence Scale (1955) including picture arrangement and block design were used for the present study to measure intelligence.

Procedure

The patients with brain tumor were taken from neuropsychiatry ward of General Hospital, Lahore after obtaining their consent. In the first step, four tests including MFD, Bender Gestalt, MTDDA and two scales of WAIS were administered to the patients two days before and three weeks after their brain surgery to see the difference in their performance on tests.

Results

The data were analyzed while computing test to see the difference between pretest and posttest scores of the subjects on four tests. The results showed a significant difference in the pre and post test scores of subjects on Memory for Design Test indicating poor performance after surgery $t(25) = 6.08$, $p < .001$. The differences are also highly significant in pre and post tests scores on Bender-Gestalt ($t = 6.19$, $p < .001$) and Minnesota Test for Differential Diagnoses of Aphasia ($t = 10.19$, $p < .0001$) indicating severe deficits in the posttest performance of the subjects. The results further indicated a non-significant difference of pretest and posttest scores on

Table 1

Means, Standard Deviations and t-values of Four Tests Used With Subjects (N = 26)

Tests	*M*	*SD*	*t*
	MFD		
Pretest	17.50	9.30	6.08*
Posttest	26.3	10.0	
	Bender-Gestalt		
Pretest	122.19	46.85	6.19*
Posttest	146.92	42.9	
	MTDDA		
Pretest	155.69	96.30	10.19**
Posttest	216.88	87.43	
	WAIS		
Pretest	23.96	10.30	1.32
Posttest	20.00	8.30	

df = 25. * $p < .001$. ** $p < .0001$.

WAIS (t = 1.32, with pretest M = 23.96, posttest M = 20.0).

Discussion

The present research focused the neuropsychological assessment of pre and post brain surgery cognitive deficits of tumor patients while comparing pre and post-operative performance of the subjects on four neuropsychological measures to detect impairment after brain surgery. The underlying assumption of the study was related to the difference of pre and post-operative performance of the patients. The findings indicated highly significant impairment in the post surgery performance of the subjects on Memory for Design test, Bender-Gestalt and Minnesota Test for Differential Diagnosis of Aphasia suggesting severe cognitive deficits. The disturbance of perceptual-motor coordination of the subjects was measured through Bender-Gestalt test that was evident in attending to and perceiving a visual stimulus, retaining to and perceiving a patterned visual stimulus, retaining the perception and reproducing the stimulus. The auditory and visual speech and language disturbances, writing disturbances, numerical and arithmetic processes of the subjects were tested through Minnesota Test for Differential Diagnoses of Aphasia. The higher post surgery scores of the subjects on this test also supported the underlying assumption of the study. The results of the current research are consistent with the findings described by Amemori and Buresova (1989) that brain transplant enhances than reducing the impairment of spatial memory. The patients' performance on WAIS was not found to be very different before and after brain surgery suggesting a non-significant effect regarding changes in intelligence, the practice effect may be the reason.

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