

PRESURGICAL AND POSTSURGICAL PSYCHOLOGICAL ASSESSMENT IN EPILEPSY. CLINICAL CASE STUDY.

Natalia Doțen ^{1,2}

¹ Neurobiology and Medical Genetics Laboratory, Nicolae Testemitanu State University of Medicine and Pharmacy

² National Center of Epileptology, Institute of Emergency Medicine, Chisinau, the Republic of Moldova

Introduction. Epilepsy surgery represents a valuable treatment for people with drug-resistant epilepsy, which often leads to substantial improvements in the cognitive-behavioral domains and to a better quality of life, especially for children. In this context, the presurgical psychological assessment in combination with other relevant investigations are important for assessing the risk of potential postsurgical deficits, determining the dominant hemisphere for language function; predicting the risk of memory decline and the visual and motor deficits.

Objective of the study: to assess the strengths and weaknesses in the presurgical and post-surgical cognitive domain, to compare the results and to evaluate the degree of improvement or decline in the post-surgical cognitive domain.

Material and methods: one patient was evaluated, a child, 11 years old, left-handed. The study took place at Institute of Emergency Medicine, National Center for Epileptology during 2019-2020. We applied 6 presurgical and postsurgical tests to assess cognitive function: The Raven's Progressive Matrices test; Rey auditory-verbal memory test; REY complex figure visual memory test; COWAT test for verbal fluency, the Cube coping test and the Clock drawing test.

Results: the psychological assessment emphasized a postsurgical improvement of cognitive abilities, with an increase of nonverbal intelligence and immediate recall in verbal memory, a slight decline in the language, verbal memory - delayed recall and visual memory domains associated with difficulties in coping the cube and drawing the clock. *The neuropsychological test results are presented in table 1 and 2*

Keywords: epilepsy, presurgical, postsurgical psychological assessment.

Presurgical psychological assessment

The primary role is to assess all cognitive, emotional and behavioral domains and to use the results to establish a baseline assessment against which cognitive change can be measured after the surgery.

Clinical Case Report

Patient M.A. a child, 11 years old, left-handed. The patient was followed by his epileptologist for a psychological assessment because of his two epileptic seizures and the diagnostic of a tumour in the temporal-parietal left hemisphere. As a result, the patient underwent an epilepsy/tumour neurosurgery. To assess the risk of cognitive decline, emotional and behavioural risk, the patient's cognitive function was evaluated before and 6 months after neurosurgery. The psychological assessment was comprised of 6 presurgical and postsurgical standardized tests.

Postsurgical psychological assessment

Is necessary in evaluating the outcome because cognitive decline is one of the most significant sequelae of the epilepsy surgery. The postoperative assessment should address all aspects of cognitive and behavioral function, as assessed prior to the surgery.

Table 1
Neuropsychological assessment
Presurgical and postsurgical results organized by domain of function

Presurgical assessment		Postsurgical assessment	
Domain of function	Scores	Domain of function	Scores
<i>Intellectual functioning</i>		<i>Intellectual functioning</i>	
Matrices Progressive Raven	IQ=118	Matrices Progressive Raven	IQ=121
<i>Memory function</i>		<i>Memory function</i>	
Rey auditory verbal memory test (RAVLT)	8/15; 8/15; 12/15; 11/15; 12/15 List B - 8/15 List A - 11/15 after 30 min 15 words from 15	Rey auditory verbal memory test (RAVLT)	9/15; 11/15; 11/15; 13/15; 15/15 list B 5/15 List A - 13/15 after 30 min 12 words from 15
<i>Visual memory. Rey Complex Figure Test</i>		<i>Visual memory. Rey Complex Figure Test</i>	
Copy - 90 percentiles		Copy - 80 percentiles	
Immediate recall - 90 percentiles		Immediate recall - 80 percentiles	
Time - 3 min 18 sec		Time - 4 min 8 sec	
<i>Language. Verbal Fluency</i>		<i>Language. Verbal Fluency</i>	
Phonemic: COWAT test - F-5; A-12; S - 9		Phonemic: COWAT test - F-5; A-11; S - 8	
Semantic: Animals - 15		Semantic: Animals - 13	
<i>Visual spatial skills</i>		<i>Visual spatial skills</i>	
Clock drawing test	Copied from the 3-rd trial. minutes - incorrect	Clock drawing test	Drawing from the 1st trial minutes - incorrect
Cube copy test	Copied from the 3-rd trial	Cube copy test	Copied from the 2-nd trial.

Table 2
Visual spatial skills, constructive disabilities

	Clock Drawing Test		Cube Coping Test	
	Presurgical	Postsurgical	Presurgical	Postsurgical
1st trial				
2nd trial				
3rd trial				

Conclusions

A psychological assessment is considered mandatory and should form an integral component of the presurgical evaluation and assessment of postoperative outcome for all epilepsy surgery patients. In our case study, before the surgery, the psychological assessment revealed impairment in visual spatial skills, namely in the clock drawing and cube coping test. His performance was borderline, with soft decline on measures of psychomotor processing speed, confrontation naming and semantic fluency. Otherwise, the verbal, visual memory and intelligence level was in the normal limits. Postsurgically, we noted an improvement in intelligence level and visual spatial skills, a slight decline but in normal limits in verbal and visual memory.

In conclusion we can affirm that epilepsy surgery provided seizure freedom, improvement of intellectual level, positive changes in behavioral and emotional domains and a better quality of life of the patient and his family.

References

- Sallie Baxendale 1, Sarah J. Wilson., Gus A. Baker, William Barr., Christoph Helmstaedter, Bruce P. Hermann., John Langfitt., Gitta Reuner., Patricia Rzezak., Séverine Samson., Mary-Lou Smith., *Indications and expectations for neuropsychological assessment in epilepsy surgery in children and adults. Report of the ILAE Neuropsychology Task Force Diagnostic Methods Commission: 2017-2021 Neuropsychological assessment in epilepsy surgery.* Epileptic Disord, Vol. 21, No. 3, June 2019. p 221. doi:10.1684/epd.2019.1065
- Vogt, V. L., Äikiä, M., del Barrio, A., Boon, P., Borbély, C., Bran, E., ... Cross, J. H. (2017). *Current standards of neuropsychological assessment in epilepsy surgery centers across Europe.* Epilepsia, 58(3), 343-355. doi:10.1111/epi.13646
- Ryvlin, P., Rheims, S. *Epilepsy surgery: eligibility criteria and presurgical evaluation. Dialogues in clinical neuroscience* 10(1):91-103. February 2008
- Helmstaedter, C., & Witt, J.-A. (2012). *Clinical neuropsychology in epilepsy.* Epilepsy, 437-459. doi:10.1016/b978-0-444-52898-8.00036-7
- Lezak, M. D., Howieson, D. B., Bigler, E. D., & Tranel, D. (2012). *Neuropsychological assessment* (5th ed.). Oxford University Press