



Supplementary role of once a week transcranial direct current stimulation session on visual processing rehabilitation after brain tumor: could it be unexpected additional benefit? case study.

Azar Mohammadzadeh^a Anahita Khorrami Banaraki^b

^a *Department of Psychiatry, Roozbeh Psychiatry Hospital, Tehran University of Medical Science, Tehran, Iran*

^b *Brain and cognition center, Tehran, Iran*

Abstract

Around 28% of patients with a brain tumor report a problem with their vision (visual impairment). This could be a direct result of the tumor, or its treatments and resection. How patients vision is affected can differ depending on the location and treatment of the brain tumor. Brain tumor resection side effects can include blurred or double vision, abnormal eye movements, restricted field of view and rarely complete loss of vision. The aim of this study is to report a single case who's blindness as side effect of tumor surgery is recovering by slow and step by step with our visual –neuro psychological protocol along with single session per week of transcranial direct current stimulation (TDCS).

Method

A 41-year-old male with resection of brain tumor of the right posterior cerebral artery suffering from Complete loss of right eye vision, the sight of left eye is to the extend of shadow, and Complete loss of sense of smell. The intervention contains single session anodal tDCs (2 mA, 30 min) per week combined with cognitive vision therapy was implemented one times per week, 1 hours each, for 16 weeks with every day 3 hours training program for home. In order to assess visual improvement function before and during the intervention, due to the extent of the impaired and low vision, the only method of measuring progress was retinal and perimeter examination which was conducted, and the family's report of a gradual improvement of patient's daily living complemented our information.

Results

Delivery of combined tDCS with vision cognitive training was feasible and safe. High-resolution perimeter revealed a greater shift in visual field. Patient also showed greater recovery of function in activities of daily living. He was able to identify colors that he did not recognize at all after surgery in the main three colors means blue yellow and green. also he be able to read letters, Single digit numbers and math symbols written in large font from 40cm from monitor or paper.

Conclusions:

Results of this intervention suggest that occipital cortical tDCS may enhance recovery of visual function associated with concurrent visual cognitive training even if the location of damage not to be in the visual pathways of the occipital area. And also if the occipital area is treated in conditions that are not directly impaired, the other networks and visual pathways of visual system of the brain will benefit from this reinforcement. In fact, because of the networked nature of the visual pathways, this property can be used in a variety of brain based visual impairment, even though these efforts to eliminate the damage seem minor. This single-case study demonstrates for the first time that combined application of tDCS (as shadow treatment metho) and cognitive training may enhance training-induced improvements in measures of visual percept, Future studies may benefit from incorporating protocol refinements such as those described here, which include global capture of function, and investigation of underlying neural substrates of recovery.

Key words:

one per week tDCs session, vision neuropsychology rehabilitation, vision restoration, transcranial direct current stimulation

***Correspondence to:**

Anahita Khorrami Banaraki, PhD of neuroscience. Brain and cognition center Tehran 139394 Iran E-mail: khorramiaanahita@gmail.com