

Neuropsychological assessment in patients undergoing Magnetic Resonance Imaging-guided Focused Ultrasound (MRgFUS) thalamotomy

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Introduction: Unilateral magnetic resonance imaging-guided focused ultrasound (MRgFUS) ventral intermediate nucleus (Vim) thalamotomy is a well-established treatment for medically resistant Essential Tremor (ET) and Parkinson Disease (PD) related tremor. Data about the possible correlation between cognitive changes and the MRgFUS treatment are inconsistent. More evidence about this issue may be of help also in evaluating the safety of potential future bilateral treatments.

Objective: The aim of the present study was to assess the presence of any cognitive changes three months after the MRgFUS-Vim thalamotomy.

Methods: Thirty-five patients (mean age \pm SD 68.8 \pm 11.7, mean disease duration \pm SD 9.8 \pm 5.5, mean education \pm SD 10.7 \pm 4.0) with a diagnosis of medically resistant Essential Tremor (n=20) or Parkinson disease related tremor (n=15) were included in the study. Cognitive domains were evaluated by a complete neuropsychological battery [(Montreal Cognitive Assessment, Frontal Assessment Battery (MOCA), Verbal and Semantic Fluency Test, Mini-mental State Examination (MMSE), Rey Auditory Verbal Learning Test (RAVLT), Raven's progressive Matrices, Beck Depression Inventory (BDI-II), Hamilton Anxiety Rating Scale (HAM-A) and the Quality of Life in Essential Tremor Questionnaire (QUEST)] before (T0) and three months after the treatment (T1) to investigate the presence of any post-treatment impairment. Data were analyzed through the SPSS software using a paired T-Test. The level of significance was fixed at 0.05.

Results: Our data showed that BDI-II (p=0,003), HAM-A (p=0.011) and QUEST (p=0.000) scores significantly improved at the 3-month evaluation. No significant differences have been detected in the other cognitive domains.

Discussion: Our findings show that unilateral MRgFUS-Vim thalamotomy is a safe treatment not associated with cognitive changes in the short-term. In our sample, an improvement of feelings of anxiety and depression, together with a general improvement in quality of life, have been observed.

Conclusions: Future studies are necessary to assess potential cognitive and behavioral changes in the long-term.