

Assessment of cognitive outcomes in patients undergoing magnetic resonance imaging-guided focused ultrasound thalamotomy (MRgFUS): long-term safety and efficacy

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Introduction: Data about cognitive changes in patients with Essential Tremor (ET) and Parkinson's disease (PD) treated with Magnetic Resonance Imaging-guided Focused Ultrasound (MRgFUS) are controversial.

Objective: Our aim was to assess cognitive changes associated with the procedure.

Methods: In this prospective study, patients consecutively undergoing MRgFUS were assessed through a comprehensive neuropsychological battery [(Montreal Cognitive Assessment (MOCA), Frontal Assessment Battery (FAB), Verbal and Semantic Fluency Test, Mini-mental State Examination (MMSE), Rey Auditory Verbal Learning Test (RAVLT), Raven's progressive Matrices, Beck Depression Inventory-II (BDI-II), Hamilton Anxiety Rating Scale (HAM-A), Quality of Life in Essential Tremor Questionnaire (QUEST) and PD Questionnaire-8 (PDQ-8)] before and three and six months following the treatment. Data were analyzed with paired T-Test or Wilcoxon signed-rank tests and verified with Bonferroni's correction (0,05/3). A p value < ,016 was considered significant.

Results: Thirty patients (mean age 66,57±10,39, mean disease duration 9,96±5,53) with ET (n=18) and PD-related tremor (n=12) were included. At three months, an improvement in anxiety (HAM-A 5.47±4.64 Vs 2.23±3.42, p ,001), quality of life (QUEST 33.11±11.19 Vs 7.56±6.78, p < 001, PDQ-8 7.08±4.54 Vs 2.50±2.27, p ,005, mnesic functions (RAVLT: Immediately re-enactment 31.82±7.75 Vs 34.53±7.71, p ,014; RAVLT: Deferred re-enactment 5.32±3.16 Vs 6.28±2.26, p ,012), verbal fluency (Semantic Fluency 9.74±2.68 Vs 11.75±4.87, p ,005) and in the overall cognitive status (MOCA 23.73±4.05 Vs 25.07±3.03, p ,010) was observed. Anxious feelings (HAM-A 5.47±4.64 Vs 2.93±4.21, p ,004) as well quality of life [(QUEST 33.11±11.19 Vs 3.56±5.25, p < 001), (PDQ-8 7,08±4,54 Vs 1,33±1,49, p ,003)] and overall cognitive functions (MMSE 26,60±3,60 Vs 28,21±1,74, p ,013) also were improved at six months. No changes were detected in others cognitive domains.

Conclusions: Our study takes a step toward in endorsing the neuropsychological safety of MRgFUS, with a view to consider possible bilateral treatments, to date unapproved yet.