

Introduction

Magnetic resonance guided focused ultrasound (MRgFUS) is a non-invasive procedure that has recently been investigated as a new treatment modality for essential tremor (ET). Although an initial report demonstrated significant reduction in tremor at one year(1), the long-term durability of the procedure has not yet been evaluated. This study reports results at a 2- year follow-up after MRgFUS thalamotomy for ET.

Methods

76 patients with moderate-to-severe ET, who had not responded to at least two medications, were enrolled in the original randomized study of unilateral MRgFUS thalamotomy and evaluated using the clinical rating scale for tremor (CRST).

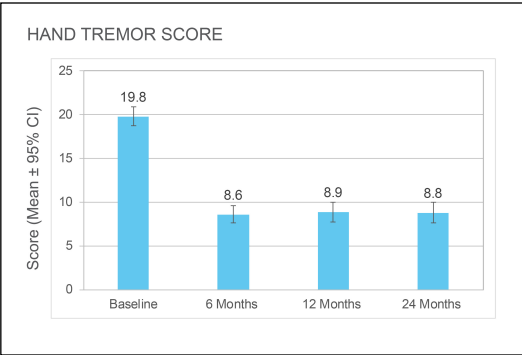
67 of the patients continued in the open -label extension phase of the study with monitoring for 2 years.

9 patients did not continue to the 2 year endpoint.

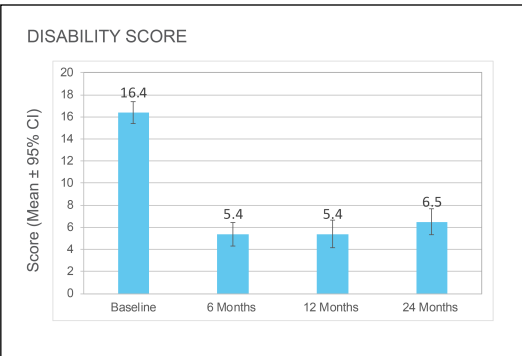
All patients remaining in the study at each follow-up period were analyzed for improvement in tremor persistent adverse effects.

Results

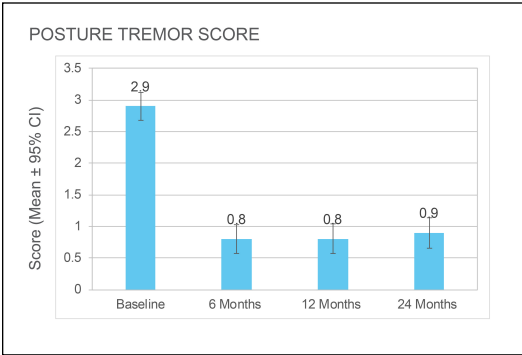
- **Hand Tremor Score** - improved by 55% at 6 months (8.6±4.5; 75 patients) from baseline (19.8±4.9; 76 patients). This improvement was also sustained at 1 year (53%; 8.9±4.8; 70 patients) and at 2 years (56%; 8.8±5.0; 67 patients).



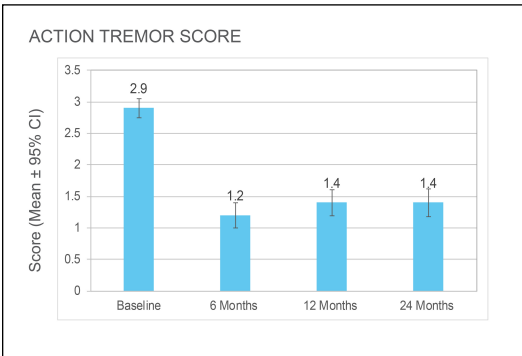
- **Disability Score** - improved by 64% at 6 months (5.4±4.7, 75 patients) from baseline (16.4±4.5, 76 patients). This improvement was also sustained at 1 year (5.4±5.3, 70 patients) and at 2 years (60%; 6.5±5.0, 67 patients).



- **Posture Tremor Score** - improved by 69% at 6 months (0.8±1.0; 75 patients) from (2.9±1.0; 76 patients) at baseline. This improvement was maintained at 1 year (0.8±1.0, 70 patients) and at 2 years (73%; 0.9±1.0; 67 patients).



- **Action Tremor Score** - improved by 59% at 6 months (1.2±0.9; 75 patients) from baseline (2.9±0.7; 76 patients). This improvement persisted at 1 year (1.4±0.9; 70 patients) and at 2 years (52%; 1.4±0.9; 67 patients).



Adverse events - Paresthesiae and gait disturbances were the most common adverse effects at 1 year-each observed in 10 patients, with an additional 5 patients experiencing neurological adverse effects. None of the adverse events worsened over the period of follow up and 2 of these resolved. There were no new delayed complications at 2 years.

Conclusions

Improvement in tremor after MRgFUS thalamotomy for ET is stably maintained at 2 years. Latent or delayed complications do not develop after treatment.

References

(1)Elias, W. J., Lipsman, N., Ondo, W. G., Ghanouni, P., Kim, Y. G., Lee, W., et al. (2016). A Randomized Trial of Focused Ultrasound Thalamotomy for Essential Tremor. N Engl J Med, 375(8), 730-739. <http://doi.org/10.1056/NEJMoa1600159>

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Describe the 2-year results of MRgFUS thalamotomy for ET
- 2) Discuss the applicability of MRgFUS to the treatment of ET