



# Efficacy of Focused Ultrasound Thalamotomy in Essential Tremor

## *Esansiyel Tremorda Ultrason Odaklı Talamotominin Etkinliği*

© Halil Önder

Yozgat City Hospital, Clinic of Neurology, Yozgat, Turkey

**Keywords:** Essential tremor, focused ultrasound thalamotomy, treatment  
**Anahtar Kelimeler:** Esansiyel tremor, ultrason odaklı talamotomi, tedavi

### Efficacy of Focused Ultrasound Thalamotomy in Essential Tremor

Essential tremor is the most common movement disorder in the community and is known to cause disability at a high rate (1). Propranolol and primidone, together with establishing essential drug treatments, often have inadequate efficacy (1). Therefore, surgical treatment can be considered in patients with tremor with high disability and drug resistance. The most frequently experienced surgeries in these patients are radiofrequency thalamotomy and deep brain stimulation (DBS). However, due to being invasive, these applications have serious risks such as intracerebral hemorrhage (1-2%) or infection associated with surgical incision (5-10%), which can cause serious neurologic problems (1). For these reasons, a small proportion of patients prefer surgical treatment. At this point, focused ultrasound thalamotomy (FUT), which has recently been introduced in patients with essential tremor, has attracted attention as a different alternative.

A randomized, sham-controlled study for the efficacy of unilateral FUT was performed by Elias et al. (2) in 76 patients with moderate-to-severe essential tremor with drug resistance. In the study, the Clinical Rating Scale for Tremor and the Quality of Life in Essential Tremor Questionnaire were administered at 1, 3, 6, and 12 months. The primary outcome was planned as the between-group difference in the change from baseline to 3 months in hand tremor. At the end of the study, there was a significant improvement in hand-tremor scores in the FUT group compared

with the sham group ( $p<0.001$ ). It was determined that the improvement was maintained at 12 months. Secondary outcome measures assessing disability and quality of life were also found to be significantly improved in the FUT group ( $p<0.001$ ). On the other hand, 74 neurologic adverse events were reported in 56 patients who received active treatment. Among them, the most common findings were gait disturbance (36%) and paresthesia (38%). It was determined that these adverse events improved greatly (9% and 14%, respectively) at 12 months. However, 5% of the patients had persistent cerebellar dysfunction at 12 months. This study yielded important results in terms of demonstrating the effectiveness of the non-invasive FUT method. Along with that, DBS and radiofrequency thalamotomy have been practiced in essential tremor for many years and their efficacies are well known. For this reason, experience with these methods is much greater (3).

In various studies in which DBS in essential tremor was reviewed, significant improvements were shown in measures of tremor and quality of life both at short- and long-term follow-ups (mean=49.7 months) (3). It has also been reported in studies that adverse events due to DBS are at low rates. In light of this information, in order to clarify the functionality of FUT, it can be predicted that the results of further studies comparing FUT with relatively classic surgical methods such as DBS and radiofrequency thalamotomy may provide important information. It should also be pointed out that the benefits and risk ratios for FUT may vary between centers in which they are applied.

**Address for Correspondence/Yazışma Adresi:** Halil Önder MD, Yozgat City Hospital, Clinic of Neurology, Yozgat, Turkey

Phone: +90 537 683 68 64 E-mail: halilonder@yahoo.com ORCID ID: orcid.org/0000-0002-1823-2278

**Received/Geliş Tarihi:** 08.05.2017 **Accepted/Kabul Tarihi:** 09.07.2017

©Copyright 2018 by Turkish Neurological Society  
Turkish Journal of Neurology published by Galenos Publishing House.

## References

1. Lipsman N, Schwartz ML, Huang Y, Lee L, Sankar T, Chapman M, Hynynen K, Lozano AM. MR-guided focused ultrasound thalamotomy for essential tremor: a proof-of-concept study. *Lancet Neurol* 2013;12:462-468.
2. Elias WJ, Lipsman N, Ondo WG, Ghanouni P, Kim YG, Lee W, Schwartz M, Hynynen K, Lozano AM, Shah BB, Huss D, Dallapiazza RF, Gwinn R, Witt J, Ro S, Eisenberg HM, Fishman PS, Gandhi D, Halpern CH, Chuang R, Butts Pauly K, Tierney TS, Hayes MT, Cosgrove GR, Yamaguchi T, Abe K, Taira T, Chang JW. A Randomized Trial of Focused Ultrasound Thalamotomy for Essential Tremor. *N Engl J Med* 2016;375:730-739.
3. Lee JY, Kondziolka D. Thalamic deep brain stimulation for management of essential tremor. *J Neurosurg* 2005;103:400-403.