Introduction

- Magnetic Resonance Guided Focused Ultrasound Thalamotomy (MRgFUS) was approved by the FDA for the treatment of medically refractory Essential Tremor (ET) in 2016.
- Tremor has been reported as a potential sequela after thalamic lesions, typically following stroke, tumors, or other tissue disruptions.
- To our knowledge, no cases of dystonia and/or tremor have been described following MRgFUS thalamotomies.

Report of a Case

- A 70-year-old right-handed male ET patient developed dystonic posturing with a novel low-frequency tremor of the right hand >1 year after MRgFUS of the left thalamus.
- The diagnosis ET has been confirmed in our clinic, where the patient is being followed for >10 years. Other than bilateral action- and postural tremor, with amplitudes right-left, there were no other abnormal movements in his neurological exam, in particular no signs of dystonia or parkinsonism.
- MRgFUS was performed in 2016 for treatment of refractory right hand ET.
- Here we aimed to examine the neuroanatomical and neurophysiological correlates of the newly developed movement abnormality, and compare to pre-intervention findings.

Methods

- Tremor electrophysiology was recorded using bilateral
- Electromyography (EMG) of the extensor digitorum communis (EDC) and flexor carpi ulnaris muscles (FCU).
- Accelerometry, recorded from sensors on the dorsum of the hand.
- Accelerometry was recorded during posture of both hands, as well as after the addition of 1 lbs weight to each hand to separate the peripheral from the central tremor component.
- 3T and 7T MRI scan were performed for lesion anatomical localization.
- Electrophysiological data were analyzed using in-house developed MATLAB scripts.
- MRI data were analyzed with AFNI software suite.

Discussion

- Localization of the lesion demonstrated between the VPLN and the VPMN.
- Lesions to the VPLN and the VPMN nuclei have been shown to cause tremor and dystonia.
- The symptoms following MRgFUS may result from plastic changes or maladaptive rearrangement in the thalamus.
- Lesions to these areas are understood to project to sensory cortices and process somatosensory information.
- More analysis is needed to explore changes in the thalamus post MRgFUS and the symptoms that result.

References