



Stereotactic Laser Ablation: How much hippocampal atrophy optimizes seizure freedom?

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Introduction

Introduction: Hippocampal atrophy (HA) has been shown to be a predictor of improved surgical outcomes when present in the resected temporal lobe, but not following stereotactic laser amygdalo-hippocampotomy (SLAH). This study evaluates the predictive value of HA and related findings post-SLAH.

Methods

Among seven centers with prospective IRB-approved protocols for investigator-initiated studies for SLAH (Visualase, Inc., Houston, Texas), data was collected via case report forms (CRFs). Pre-ablation MRI hippocampal and amygdalar volume data (acquired by slice-by-slice analysis) was correlated to seizure freedom at 6- and 12-months post-ablation.

Results

26 subjects from 7 centers had both hippocampus and amygdala data available at both 6-month and 12-month follow-up; analysis showed the following: 8 subjects had both seizure freedom and >25% HA (compared to contralateral hippocampus); 3 had seizure freedom but not >25% HA; no subjects had >25% HA and continued seizures; and the remainder had continued seizures without >25% HA. This would suggest a very high likelihood (100% in this study) of HA predicting seizure freedom (Fisher’s exact 2-tailed test, p<0.0001); in addition, 3 subjects without >25% HA were also seizure-free. Mean amygdala volume was reduced for the analyzed subjects vs. normal, but of unclear value in predicting seizure freedom. This subset of 26 subjects chosen for volumetric analysis was part of a broader study (presented in a separate work but mentioned here for proper context of seizure freedom) evaluating 51 subjects with the majority of subjects being seizure-free at 6-month follow-up.

Conclusions

A 25% or greater volumetric disparity between hippocampi in the same patient correlated highly with seizure freedom, and can be a useful predictor following laser ablation. While this data is preliminary, it prompts the need for larger studies to establish and reinforce such parameters for optimal laser targeting of hippocampus and amygdala structures for seizure freedom.

Learning Objectives

Corelating seizure freedom with volume of hippocamal & amygdala ablation with stereotactic laser amygdalo-hippocampotomy

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