MRI-guided Stereotactic Laser Ablation of Mesial Temporal Structures for Refractory Temporal Lobe Epilepsy – Efficacy and Early Outcome

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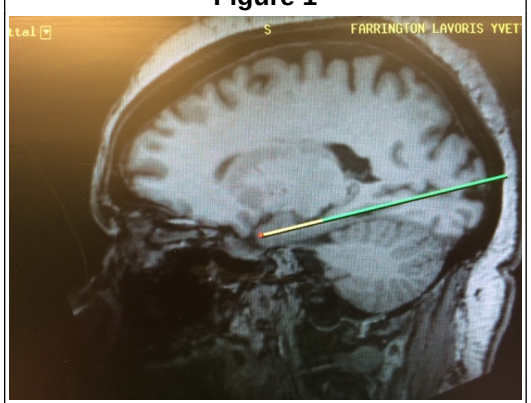
Introduction

Laser ablation of the refractory temporal lobe seizures was first reported about 2 years ago. This is a minimally invasive approach for the resection of affected temporal lobe. We present our data on epilepsy patient treated by the second author.

Methods

We performed a retrospective chart review of 15 patients who underwent this procedure and during November 2013 to April 2014. Patients were followed at one, four, twelve and 24 weeks after surgery. During each visit, we evaluated for seizure frequency, cognitive, neuropsychiatric and psychiatric symptoms as well as any adverse event of AEDs.

Figure 1



Stealth station planned trajectory shown on sagittal image through the tail, body, head of hippocampus and amygdala

Learning Objectives

1. Laser ablation of temporal lobe in intratable epilepsy is a feasible

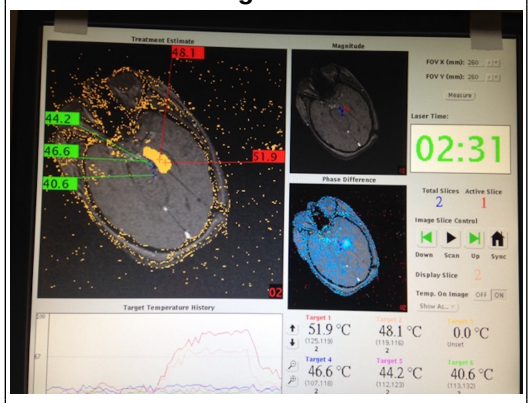
Results

Our data revealed the mean age was 44 years with seven patients over 50 years. All patients were right handed. One patient had bilateral independent ictal foci, with >90% of seizures from the ablated side. Another had dual pathology with an ipsilateral focal dysplasia posterior to the left hippocampus. Eleven patients have been seizure free, and two reported auras. Two patients had a breakthrough seizure after missing several days of their AEDs. There were no neurological or neurosurgical complications post-surgically. Recurrence and /or worsening of existing depression occurred in 5 patients and a hypomanic episode in one. Our first patient reported a mild worsening of his verbal memory. Neuro-psychology evaluation was performed on 7 of them at the time of this abstract and were evaluated for multiple outcomes but mainly visual memory for the non dominant side and verbal memory for the dominant side. Our first patient had worsening of the verbal memory but there was no deterioration among the rest.

Conclusions

Minimally invasive laser ablation is an excellent alternative option for open resection of temporal lobe. Further long term follow up

Figure 2



Thermal map during an actual ablation with the yellow representing the “kill zone”

References

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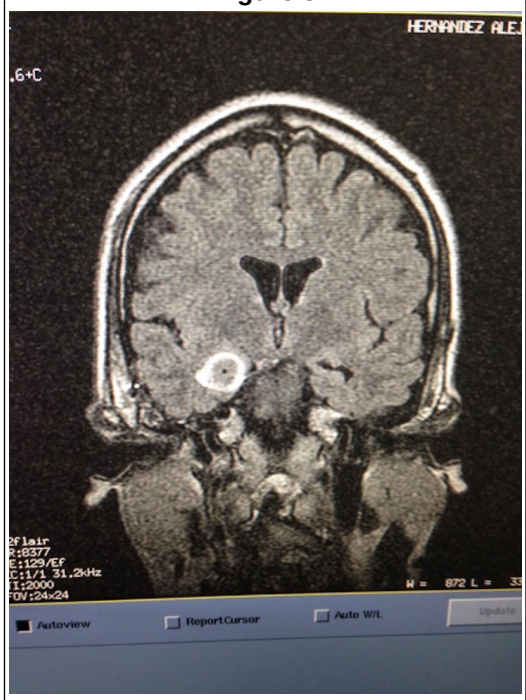
2.Better object recognition and naming outcome with MRI-guided stereotactic laser amygdalohippocampotomy for temporal lobe epilepsy. Drane DL, Loring DW, Voets NL, Price M, Ojemann JG, Willie JT, Saindane AM, Phatak V, Ivanisevic M, Millis S, Helmers SL, Miller JW, Meador KJ, Gross RE. Epilepsia. 2015 Jan;56(1):101-13. Epub 2014 Dec 8. PMID: 25489630

3. Real-time magnetic resonance-guided stereotactic laser amygdalohippocampotomy for mesial temporal lobe epilepsy. Willie JT, Laxpati NG, Drane DL, Gowda A, Appin C, Hao C, Brat DJ, Helmers SL, Saindane A, Nour SG, Gross RE. Neurosurgery. 2014 Jun;74(6):569-84; discussion 584-5. PMID: 24618797

Figure 3



FLAIR w gad sequence done just after completion of the ablation with the laser fiber still in place (black dot in center of ablated field)