



A Case Series of 37 Consecutive Laser Ablations for Brain Tumor

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Learning Objectives

To illustrate the dire circumstance of the patient with an "unresectable" tumor and to advance the understanding of LITT as a therapy for such tumors.

Introduction

It has been estimated that fewer than half of patients with newly diagnosed glioblastoma multiforme (GBM) are candidates for extensive open resection.[1] Reviews estimate that survival in cohorts of patients with unresectable GBM and best supportive care is approximately 3 months.[2] The addition of radiotherapy improves survival only an additional 3-4 months.[2] As a result less invasive treatment alternatives are increasingly being employed. One such treatment is magnetic resonance (MR)-guided laser-induced thermal therapy (LITT). This study describes the experience at Henry Ford Hospital in 30 patients who underwent MR-guided LITT for multiple intracranial pathologies, predominantly GBM.

Methods

Patients were identified using the Hermelin Brain Tumor Center database at Henry Ford Hospital. Retrospective chart review was carried out. All patients (n=30) underwent pre-and post-operative contrast MRI and assessment of pre- and post-treatment lesion volumes. Additional volumetric analysis on serial follow-up MRI was performed up to 8 months post-treatment.

Results

Pre-operative tumor volume (4.97 ± 4.84 cc, n =37) was smaller than post-operative tumor volume (6.68 ± 4.99 cc, n=37, $p < 0.05$), 80.11% of pre-operative tumor volumes were successfully covered with the ablation. Interestingly, post-treatment volumes increased to 8.26 ± 5.98 cc (n=29, $p = 0.12$) at 2-week follow-up MRI; a trend, which persisted at 2 months (6.60 ± 5.81 cc, n=19, $p = 0.17$). Tumor volumes declined to pre-operative levels at approximately 3 months (5.22 ± 4.38 cc, n=15, $p = 0.23$) and declined further by 4 months (4.51 ± 4.12 cc, n=8, $p = 0.35$). Continued reduction in the lesion volume was observed at approximately 6-8 months (3.38 ± 3.94 cc, n=3, $p = 0.35$).

Conclusions

Following MR-guided LITT of brain tumors, lesion volumes may increase for a period of 1-2 months before diminishing on serial MRI. It is unknown what these radiographic features represent from the standpoint of tumor biology or how they may impact survival, but these observations may have important implications for further research, therapy and prognosis.

References

1. Elder JB, Chiocca EA (2013) Editorial: Glioblastoma multiforme and laser interstitial thermal therapy. *J Neurosurg* 118:1199–1201
2. Nieder C, Grosu AL, Astner S, Molls M (2005) Treatment of unresectable glioblastoma multiforme. *Anticancer Res* 25:4605–4610