Laser Interstitial Thermal Therapy for Recurrent Glioblastoma

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Disclosures

- I have no actual or potential conflict of interest in relation to this presentation
Introduction

• There is no consensus regarding optimal management of recurrent glioblastoma (GBM)

• Laser Interstitial Thermal Therapy (LITT) is a minimally invasive technique that has been demonstrated to be safe in treating primary and metastatic brain tumors. We review our institutional experience using LITT for the treatment of recurrent GBMs.

• The aim of this study is to evaluate the use of LITT in the treatment of recurrent GBMs
Methods

• Single institution retrospective study with all patients that underwent LITT for recurrent GBMs from 2013 - 2018.
• Pre - LITT characteristics and post - LITT outcomes are reported.
• Kaplan - Meier method and Cox models were used to identify factors associated with overall survival (OS) and progression free survival (PFS).
Results

- 51 patients were included in this analysis.
- Median age was 55 years, median KPS was 90,
- 40 patients had *de novo* GBMs, 11 had secondary GBMs (5 low grade gliomas and 6 anaplastic gliomas).
- IDH wild - type was identified in 39 patients.
- The most common locations were temporal (14), parietal (12), insula/central core (10), frontal (9) and corpus callosum (6).
- Median hospital length of stay was 2 days.
- Median tumor volume was 10.4cc (1.2 - 25.3), median extent of ablation was 78.5%, 49% of the patients had extent of ablation greater than 90%.
- Both major and minor complication rate was 29%, with motor weakness as the most common outcome.
- Median follow - up time was 26 months and median time from diagnosis to LITT was 17 months.
- Median OS was 36 months (24.8 - 47.1), median OS after LITT was 14 months (8.2 - 19.7), median PFS after LITT was 4 months (2.4 - 5.5).
- Median time to resume chemotherapy was 17 days(range 308).
Results

• Multivariate analysis demonstrated that extent of ablation (%), age at LITT and tumor volume (cc) were independent predictors of OS

Table 1. Multivariate Cox-Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>HR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent of ablation (%)</td>
<td>0.982 (0.966-0.998)</td>
<td>0.026</td>
</tr>
<tr>
<td>Age at LITT</td>
<td>1.022 (1.000-1.044)</td>
<td>0.050</td>
</tr>
<tr>
<td>Tumor volume</td>
<td>1.033 (1.012-1.055)</td>
<td>0.002</td>
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*Other variables that were assessed for inclusion but did not remain in the final model included age, functional location, IDH status

• Complications were more frequent in tumors near or in eloquent cortex

Table 2. Complications in relation to functional location (p<0.001)

<table>
<thead>
<tr>
<th>Functional Location</th>
<th>No</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (27.3%)</td>
<td>Yes (22.2%)</td>
</tr>
<tr>
<td>Non-eloquent</td>
<td>9 (27.3%)</td>
<td>0</td>
</tr>
<tr>
<td>Near Eloquent</td>
<td>23 (69.7%)</td>
<td>4 (22.2%)</td>
</tr>
<tr>
<td>Eloquent</td>
<td>1 (3%)</td>
<td>14 (77.8%)</td>
</tr>
</tbody>
</table>
Figure 1. Kaplan Meier curves for Overall Survival and Progression Free Survival
Figure 2. Kaplan Meier curves for Overall Survival divided by: (A) Tumor volume (>12cc vs <12cc); and (B) Extent of Ablation (>98% vs <98%)
Discussion

• LITT has demonstrated to be a feasible treatment option for recurrent GBM
• The ideal candidates would be patients with smaller tumor volume (<12cc)
• The extent of ablation seems to correlate with the extent of surgical resection since patients were ablations achieved more than 98% of the tumor had a significant benefit in the OS
• Patients with tumor near or in eloquent areas had higher rates of complications and therefore require careful consideration when planning LITT
Summary Points

• LITT is feasible alternative for unresectable recurrent GBMs

• Patients with tumors in or near eloquent areas should undergo careful consideration

• Tumors smaller than 12cc or where greater than 98% tumor ablation are the best candidates for the procedure