Laser Interstitial Thermal Therapy for Radiation Necrosis and Metastatic Disease of the Cerebellum

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Disclosures

• The author has nothing to disclose
Introduction

• MRI-guided laser interstitial thermal therapy (LITT)
  • Real-time MRI shows thermal dosing to target region
  • Shown promise in management of epilepsy, vascular anomalies, tumors\textsuperscript{1,2,3}

• Radiation necrosis
  • Pathophysiology: Secondary to previous stereotactic radiosurgery
  • Imaging: Contrast-enhancing mass lesion on CT/MRI, but hard to distinguish from tumor

• Challenges of the posterior fossa
  • Tight space – possible intolerance to edema, proximity to brainstem structures and difficulty with stereotaxy
Methods

Design

• Retrospective case series
• Patients at Emory University Hospital
  • 2015-2019
• Inclusion criteria:
  • LITT for a suspected cerebellar metastasis or radiation necrosis secondary to cerebellar metastasis

Measures

• Age/Sex
• Cancer pathology
• History of radiation
• Frame vs Frameless vs Robot
• Ablation volume
• Adverse events
• Local control
## Results – Demographics/Outcomes

<table>
<thead>
<tr>
<th>Pt #</th>
<th>Age/Sex</th>
<th>Pathology</th>
<th>Previous Radiation</th>
<th>Method</th>
<th>Adverse Event?</th>
<th>Local Control?</th>
<th>F/U Length (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>38/F</td>
<td>Breast</td>
<td>1</td>
<td>Frame</td>
<td>0</td>
<td>1</td>
<td>229</td>
</tr>
<tr>
<td>2</td>
<td>65/M</td>
<td>Lung</td>
<td>1</td>
<td>Frame</td>
<td>0</td>
<td>1</td>
<td>349</td>
</tr>
<tr>
<td>3</td>
<td>31/M</td>
<td>Lung</td>
<td>1</td>
<td>Robot</td>
<td>0</td>
<td>1</td>
<td>196</td>
</tr>
<tr>
<td>4</td>
<td>39/M</td>
<td>RCC</td>
<td>1</td>
<td>Frame</td>
<td>0</td>
<td>1</td>
<td>350</td>
</tr>
<tr>
<td>5</td>
<td>69/M</td>
<td>Lung vs rad. necrosis</td>
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<td>Frame</td>
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<td>1</td>
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<tr>
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<td>Robot</td>
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<td>44</td>
</tr>
</tbody>
</table>

* Minimal hemorrhage → transient neurological deficits → resolved with steroid administration
Results – Patient Example
Discussion

• 5 patients with history of cerebellar metastases + prior radiation

• No clear evidence of progression on latest imaging in any patient
  • Median 212.5 days post-ablation, inter-quartile range 310.25

• All had minimal lesion edema on early post-op MRI
  • None required decompression or CSF diversion

• 1 complication – no permanent neurological deficits
Summary

• MRI-guided LITT for metastases to the posterior fossa:
  • Safe and effective in preventing progression in this series
• Larger, longer-term studies are needed
• Right now, a palliative option – future earlier intervention?
References

