Cyberknife stereotactic radiosurgery for re-irradiation of brain lesions: a single-centre experience

Muhammed Baki

Unità di Radioterapia Oncologica, Università degli Studi di Firenze, Firenze, Italia
Background

- Up to 15% of patients → brain mtx.
- WBRT survival by 3-6 months.
- Recurrence rates post WBRT: 80-100% at 1 year.
- SRS + WBRT in patients with multiple brain mtx improves LC rates to 65-69% at 2 years compared to WBRT alone.
- Radiosurgery: treatment of choice for single or oligo brain mtx.


- Some reports have suggested a short-term benefit of salvage radiosurgery for recurrent brain mtx but the incidence of long-term radiation toxicity has not been investigated.
- In this study we evaluated feasibility and local control rate after reirradiation.

asdm81@yahoo.com
Materials and Methods

Between Dec 2011 & May 2012, 13 patients underwent SRS with Cyberknife for a previously irradiated recurrent brain lesions.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No. of patients</th>
</tr>
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<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>&lt;60</td>
<td>8 (61.5)</td>
</tr>
<tr>
<td>≥60</td>
<td>5 (38.5)</td>
</tr>
<tr>
<td>Karnofsky performance status</td>
<td></td>
</tr>
<tr>
<td>&lt;70</td>
<td>4 (30.7)</td>
</tr>
<tr>
<td>≥70</td>
<td>9 (59.3)</td>
</tr>
<tr>
<td>Time from radiotherapy to Cyberknife</td>
<td></td>
</tr>
<tr>
<td>&lt;6 m</td>
<td>3 (23)</td>
</tr>
<tr>
<td>≥6 m</td>
<td>10 (77)</td>
</tr>
<tr>
<td>Irradiation volume</td>
<td></td>
</tr>
<tr>
<td>&lt;10 cc</td>
<td>3 (23.1)</td>
</tr>
<tr>
<td>≥10 cc</td>
<td>10 (76.9)</td>
</tr>
<tr>
<td>Re-irradiation volume</td>
<td></td>
</tr>
<tr>
<td>&lt;10 cc</td>
<td>7 (53.8)</td>
</tr>
<tr>
<td>≥10 cc</td>
<td>6 (46.2)</td>
</tr>
</tbody>
</table>
Methods and Materials

**Disease:**
- 11 MTX
- 2 High grade glioma

**Radiotherapy Modalities:**
- 11 met
  - 6 patients : WBRT+ SRS → CK
  - 5 Pat : SRS → CK
- 2 HGG
  - 3DCRT → CK

**Fractionation schedule CK:**
- 7 patients : 1 fraction
- 2 patients : 3 fractions
- 4 patients : 5 fractions

- Mean dose: 19.5 Gy (12 - 30 Gy)

- FU with MRI and clinical evaluation at 8 wks then every 3 mo
Results

Tumor Control (MRI images in 6 patients)
- CR in 1 (17%)
- PR in 3 (50%)
- NC in 2 (33%)
- PD in ZERO

Dosage of corticosteroids:
- In 54.6% of patients steroid medication was not changed.
  - 30% it was reduced
  - 15% increased

Toxicity:
- Only 15% (2 patients) developed Grade II toxicity resolved with corticosteroids increasing

Attention:
- 1 case RI vol was large (> 40 cc)
- 1 case received a high single dose of 16 Gy as THIRD rt.
Conclusions

*Our results are compatible with previous studies.

*RI with CK is feasible for pre irradiated recurrent lesion without excessive acute toxicities.

*Take-Home Messages:
  - Adopting >5 fx in large volumes
  - Doses < 16 Gy in single fx in lesions already received 2 previous RT
Grazie !!