ROLE OF PLANNING MRI IN RADIOSURGERY TREATMENT: UNIVERSITY OF FLORENCE PRELIMINARY REPORTS

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Background
Methods and Materials

Starting from October 2012 to February 2014, we treated with Gamma Knife radiosurgery (GKRS) 62 patients with brain metastases.

On the diagnostic MRI, all the patients had a number of lesions $\leq 4$.

Median interval between dMRI and pMRI 11 days [range 5-20 days]
Methods and Materials

Diagnostic MRI (dMRI)

INDICATION TO GKRS TREATMENT

Planning MRI (pMRI)

GKRS

- Post-contrast study with **T1-weighted, 3DMPRAGE** sequence
  - Slice thickness: **1 mm**
  - GBCA: gadobenate dimeglumine
  - Double dose contrast in selected cases
22 out of 62 (35.5%) patients had an increased number of lesions in the planning MRI.

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>NSCLC</th>
<th>Breast</th>
<th>Kidney</th>
<th>Melanoma</th>
<th>Thyroid</th>
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</thead>
<tbody>
<tr>
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<td>13</td>
<td>5</td>
<td>2</td>
<td>1</td>
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<table>
<thead>
<tr>
<th>RPA Class</th>
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<tbody>
<tr>
<td>Class 1</td>
<td>16</td>
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<tr>
<td>Class 2</td>
<td>8</td>
</tr>
</tbody>
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Results

- 22 patients
- 54 additional brain metastases in total
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RS without WBRT as the initial treatment for 1194 pts with brain metastases (1-10)

- ten or fewer lesions
- largest lesion < 10 mL
and <3.0 cm in longest diameter
- cumulative volume of all mets < 15.0 mL
- no leptomeningeal dissemination
Results

- 22 patients
- 54 additional brain metastases in total

Number of patients

- Single met: 12
- 2 mets: 6
- 3 mets: 5
- 4 mets: 3
- 5-10 mets: 6
- >10 mets: 2
Conclusions

- Thin slices
- 3D GE T1-weighted post-contrast imaging

<table>
<thead>
<tr>
<th>GBCA</th>
<th>High relaxivity</th>
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<tr>
<td></td>
<td>Double dose</td>
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<td>Delayed acquisition</td>
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</table>

Higher field strength if available
Conclusions

Diagnostic MRI

INDICATION TO GKRS TREATMENT

High resolution Pretreatment MRI

CONFIRMATION OF INDICATION TO GKRS TREATMENT

High resolution Planning MRI

GKRS

Diagnosis

Proper selection of patients

Planning

Diagnosis
Take-home message

A double-contrast study with T1-weighted, volumetric MPRAGE sequence may offer better staging for patients with brain metastases.

Wherever the numeric cutoff for radiosurgery will be placed, **precise intracranial staging** will be crucial because the success of radiosurgery depends on appropriate identification of each single brain metastases.
Grazie per l’attenzione