“HIGH-GRADE GLIOMAS: MULTIDISCIPLINARY APPROACH”

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Radiation Oncology
KEY POINTS

Combination therapy improves the overall survival for Glioblastoma (GBM) patients compared to surgery alone (*)

The GBM is refractory to treatment with survivals <2 years

✓ Multidisciplinary Decision Making

✓ Technological Advances

✓ Combined Therapies

✓ Individualized treatments

GBM TREATMENT EVOLUTION


<table>
<thead>
<tr>
<th>Treatment</th>
<th>Weeks of Survival (median)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservative Treatment</td>
<td>14</td>
</tr>
<tr>
<td>Surgery</td>
<td>20</td>
</tr>
<tr>
<td>Surgery + RT</td>
<td>36</td>
</tr>
<tr>
<td>Surgery + RT + CT</td>
<td>50</td>
</tr>
<tr>
<td>Surgery + RT + GLIADEL</td>
<td>60</td>
</tr>
<tr>
<td>Surgery + RT + Temozolamide</td>
<td>63</td>
</tr>
</tbody>
</table>
NEUROSURGERY

- LASER Surgery
- Ultrasonic Aspiration
- Operating Microscope
- Endoscopy
- Neuronavigation (intravascular, functional...)
- Deep Brain Stimulation
- Stereotaxic Techniques
- Carmustine Implant
- Talairach’s Grid
- 5-AMINOLEVULINIC
- Brain surgery with the patient awake
NEURORADIOLOGY

Radiology
✓ Computed Tomography (CT) in the 70’s
✓ Magnetic Resonance (MR) in the 80’s
✓ Gadolinium
✓ Perfusion
✓ Diffusion
✓ Spectroscopy
✓ 3 Tesla
✓ Intraoperatory MR

Nuclear Medicine
✓ SPECT
✓ PET

Radiology and Physical Medicine
The neurophysiological aspects are complementary to the structural image information (Perry JR, 2003)

TI SPECT shows a low spatial resolution and image quality (Minn H, 2005)

FDG-PET improves the spatial resolution and high specificity. But is limited by the uptake of glucose by the brain cortex (Spaeth N, 2006)
RADIATION ONCOLOGY

IMRT / IGRT

Justification

- 80% of relapses are within 2-3 cm of the bed. Intensify dose may be an option
- Increasingly complex conformation PTV
- Avoid Risk Organs (optic organs, pituitary, trunk)

Glioma + Edema Delineation:

- With MR difficult because the tumor is not demarcated and the HEB is intact
- Enhanced dose precise gadolinium RM, spectroscopy, SPECT and/or PET
RADIATION ONCOLOGY

CT

GTV + 2 cm + Edema

CT + MR

PTV = GTV + 2 cm + Edema
ITS ROLE HAS NOT BEEN DEMONSTRATED!

“ASTRO evidence-based review”

Tsao MN, et al. IJROBP 2005
New advances (IMRT and VMAT) are not yet fully analyzed

EC are needed to establish dose fractionation and establish its role in:
- Survival
- Disease Progression
- Neurocognitive Outcomes
- Reduction of Toxicity
- Quality of Life

- 12.1 months median survival (60 Gy; 2 Gy/s;3D-RT)
- 14.6 months with 3D-RT + TMZ
- IMRT or VMAT roles have to be established
RT + Temozolamide

Survival Benefit:
3 years --- 16%
4 years --- 12.1%
5 years --- 9.8%