Deep Supratentorial Extension is Associated with Poor Clinical Outcomes After Glioblastoma Resection

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Glioblastoma with deep supratentorial extension is associated with worse overall survival

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Introduction

• GBM: heterogenous disease w/ few prognostic risk factors\(^1\) and a 5-year survival rate of <5\(^2\)
  – Tx: Attempted gross total resection (GTR) followed by chemoradiation

• Deep supratentorial extension (DSE): GBM extension into the basal ganglia, thalamus, corpus callosum, internal capsule, hypothalamus, caudate, or putamen as identified on preoperative MRI

• Certain DS structures associated with worsened survival-- never clinically evaluated as prognosis of DSE\(^3\)

• 1. Quantify effect of GBM deep supratentorial extension on post-resection overall survival (OS)
  – We hypothesize that DSE GBM will have worse PFS and OS
• 2. Evaluate whether specific DS structures or number of structures involved portend worsened survival
  – We hypothesize that Thalamus, Corpus Callosum involvement will portend worse survival
  – We hypothesize that involvement of more structures will portend worse structure
Approach

- Identify, exclude and stratify patients as shown
- Extract de-identified data from Epic and public obituaries
- Calculate **overall survival** as primary endpoint
- Assess statistical significance w/ log rank Kaplan Meier analysis

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Glioblastoma Resections (2012-2018)

- Biopsy Patients Excluded: n = 582
- Radiology Report Not Available: n = 71 (14.5%)
- Infratentorial Tumors Excluded: n = 10 (1.7%)
- Multiple Tumors Excluded: n = 33 (5.7%)
- Supratentorial Tumors: n = 479 (82.6%)
- DSE: n = 143 (24.7%)
- No DSE: n = 276 (60.9%)
Results

**Deep supratentorial extension**

- **Progression Free Survival**
  - Log rank: p=0.276

- **Overall Survival**
  - Log rank: p=0.003

*Y-axis: Progression Free Survival / Overall Survival*
*X-axis: Months from resection*
Results

Number of deep supratentorial structures

Progression Free Survival

Log rank: p=0.046

Months from resection

Overall Survival

Log rank: p=0.000

Months from resection
Conclusions

• DSE is valuable negative prognostic indicator
  – DSE associated with worse OS, not PFS
  – 2+ DS structures associated with worse OS and PFS
  – Thalamic involvement associated with worse OS and PFS

• DSE increases utility of attempting GTR
  – DSE portends worse OS only among those without GTR
Future Directions

• Convey prognostic importance of DSE and GTR to neurosurgeons
  – Abstracts submitted to 2021 AANS conference
  – Manuscript submitted to World Journal of Oncology

• Further investigate significance of specific structure involvement, new surgical techniques for improving odds of GTR
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