

Outcomes in a Contemporary Series of Glioblastomas Treated at a Single Centre – Survival and Predictors of Outcomes

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Introduction: Combined multimodality treatment of glioblastomas has improved outcomes in the last decade. Data generated in a trial setting may be difficult to replicate in routine clinical practice. We reviewed our data of consecutive patients treated on a uniform protocol over the last 5 year period.

Methods: 104 consecutive patients with GBMs were analysed in this study. Radiology was reviewed in all patients. Routine clinical, surgical, and treatment details were recorded. Progression free and overall survivals were calculated. Univariate and multivariate analysis was performed to assses the role of known prognostic markers (age, KPS, RPA class, extent of resection) as well as multifocality and relation of the tumor to the subventricular zone(SVZ) areas.

Results: The demographic profile of the study cohort is as shown belo: Subventricular-zone involvement (SVZ) was seen in 61.5%. These tumors were less likely to be grosstotally resected and more likely to progress. Perioperative mortality was 3.6%. 71.2% patients completed radiotherapy and 41.4% completed adjuvant temozolomide. Median follow up of the survivors was 23.4 months. Median PFS and OAS were 6.9 and 9.9 months respectively. OAS was higher in the radiotherapy group (12.9 months), and those that received adjuvant temozolomide (19.2 months).

Table 1: Demographic, clinical and radiological characteristics of the cohort (n= 104

| | | Number | Percent |
|---------------------|-------------|--------|---------|
| Age | >50 | 76 | 73.1 |
| Gender | Male | 66 | 63.5 |
| KPS | ≤ 70 | 55 | 52.9 |
| RPA class | 3 | 10 | 9.6 |
| | 4 | 32 | 30.8 |
| | 5 | 31 | 29.8 |
| | 6 | 31 | 29.8 |
| SVZ involvement | Yes | 64 | 61.5 |
| Multifocality | Yes | 26 | 25 |
| Extent of resection | Gross total | 74 | 71.2 |
| | | | |

KPS- Karnofsky Performance Scale; RPA - Recursive Partitioning Analysis; SVZ -Subventricular zone

Tumors involving SVZ were less likely

to be gross-totally resected and more likely to progress. Perioperative mortality was 3.6%. 71.2% patients completed radiotherapy and 41.4% completed adjuvant temozolomide. Median follow up of the survivors was 23.4 months. Median PFS and OAS were 6.9 and 9.9 months respectively. OAS was higher in the radiotherapy group (12.9 months), and those that received adjuvant temozolomide (19.2 months). Univariate analysis yielded RPA class, radiotherapy and adjuvant chemotherapy to be prognostically significant for OAS and PFS. KPS and age were significant for OAS only. Though not statistically significant, the median OAS and PFS for those with SVZ involvement was much lower as compared to that for those without SVZ involvement.

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On multivariate analysis, only completion of radiotherapy and adjuvant treatment as well as RPA class were significant predictors of survival

Overall and Progression free survivals of all patient groups

| | Events | Median(months) | 95% CI | Survival Estimates |
|-------------|------------------------|--------------------|-------------|-------------------------------|
| OAS | 84/98 (85.71%) | 9.92 | 8.08-11.88 | 1 yr. = 40.9% |
| PFS | 79/98 (80.6%) | 6.93 | 4.55-9.32 | 1 yr. = 36.5% 6 mth. = 57% |
| n = 72 (pat | ients completed/ongoir | ng RT) | | |
| | Events | Median(months) | 95% CI | Survival Estimates |
| OAS | 58/72 (80.5%) | 12.94 | 10.02-15.87 | 1 yr. = 52.8% |
| PFS | 53/72 (73.6%) | 10.87 | 8.36-13.39 | 1 yr. = 45% 6 mth. = 73.6% |
| n = 42 (pat | ients completed/ongoir | ng adjuvant temozo | lomide) | |
| | Events | Median(months) | 95% CI | Survival Estimates |
| OAS | 28/42 (66.7%) | 19.19 | 13.14-25.23 | 1 yr. = 84.4% |
| PFS | 28/42 (66.7%) | 15.28 | 12.37-18.18 | 1 yr. = 67.7% 6 mth. = 90% |

OAS - overall Survival; PFS - Progression free survival

| | | Overall Survival | | | Progression free survival | | |
|-----------|----------|------------------|------------|--------|---------------------------|------------|-------|
| | | Median | 95% CI | p- | Median | 95% CI | p- |
| | | (months) | | value | (months) | | value |
| Age | ≤50 | 14.39 | 11.14- | 0.007 | 12.19 | 10.45- | 0.101 |
| | | | 16.97 | | | 13.93 | |
| | >50 | 6.97 | 3.78-10.15 | | 5.22 | 2.90-7.54 | |
| KPS | ≤70 | 7.85 | 3.67-12.03 | 0.012 | 4.24 | 1.10-7.37 | 0.085 |
| | >70 | 12.35 | 9.96-14.75 | | 10.05 | 5.46-14.65 | |
| Extent | Gross | 11.11 | 8.81-13.41 | 0.633 | 8.97 | 5.87-12.07 | 0.664 |
| of | total | | | | | | |
| Resection | Subtotal | 5.68 | 2.69-8.68 | | 4.17 | 0.64- 7.70 | |
| SVZ | Yes | 7.85 | 4.18-11.53 | 0.198 | 6.54 | 3.75-9.34 | 0.126 |
| involved | No | 12.35 | 9.61-15.10 | | 10.71 | 5.35-16.07 | |
| Multifoc | Yes | 10.88 | 3.41-18.34 | 0.921 | 5.947 | 2.30-9.59 | 0.386 |
| ality | No | 9.92 | 8.13-11.71 | | 8.016 | 5.17-10.86 | |
| RPA | Class | 14.39 | 11.69- | 0.0016 | 11.99 | 8.42-15.56 | 0.015 |
| | 3+4 | | 17.10 | | | | |
| | Class | 6.47 | 3.61-9.34 | | 4.468 | 1.53-7.41 | |
| | 5+6 | | | | | | |
| Tumor | < 4 cm | 10.55 | 7.67-13.43 | 0.493 | 6.045 | 0.327- | |
| Size | | | | | | 11.763 | |
| | >4 cm | 9.73 | 6.57-12.88 | | 6.965 | 3.59-10.34 | 0.423 |
| Adjuvant | Yes | 19.19 | 13.14- | < | 15.28 | 12.37- | |
| treatment | | | 25.23 | 0.001 | | 18.18 | |
| completed | No | 4.17 | 3.12-5.23 | | 3.61 | 2.93-4.29 | 0.001 |
| RT | Yes | 12.95 | 10.02- | < | 10.87 | 8.36-13.39 | |
| received | | | 15.87 | 0.001 | | | |
| | No | 1.94 | 0.49-3.38 | | 1.74 | 0.63-2.85 | 0,001 |
| | > 60 | | 3.554- | 1 | | 2.949- | 0.001 |
| | | 7.852 | 12.15 | | 6.571 | 10.193 | |

Learning Objective: Combined chemoradiotherapy has improved survivals in Glioblastomas.

Comparable results are obtained even outside of the trial setting (in routine practice). Every effort must be made to ensure completion of at least radiotherpay (and preferably chemoradiotherapy)

Conclusions: Multimodality treatment (surgery and chemoradiotherapy) significantly improves outcomes in glioblastomas. Young patients with better KPS and tumors not involving the subventricular zone are likely to do better.