



Original Research Article

Life expectancy with glioblastoma at GMC, Bhopal

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ABSTRACT

Materials Methods: The majority of the patients who were diagnosed with the glioblastoma at GMC, Bhopal. The only exceptions are the patients that have died or were not fit enough for referral. Among these patients, we have searched for those, which were older than 70 years at the time of diagnosis

Result: When comparing the groups of the patients younger than 70 with those older, the difference in median survival between groups was statistically significant at $p < 0.001$.

Conclusion: Microsurgery is safe and effective in order to improve or preserve short-term quality of life in glioblastoma patients. Total tumor resection is not associated with a significantly greater risk for neurological deterioration, either in patients with preoperative functional impairment, or in functionally independent patients. For glioblastoma the survival also depends on person's age, type of tumor, and overall health play a role as treatments improve people newly diagnosed with these aggressive brain tumors may have a better outcome.

Glioblastoma is linked to age, with better rates for those below 65 years of age, but also to aggressive and complete surgical excision, a good Karnofsky index score before surgery and the application of radiotherapy after surgery

Study Design: Observational Study

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1. Introduction

Glioblastoma is a type of highly malignant brain cancer. It's the most common type of malignant brain tumor among roughly 130 different types of brain and central nervous tumours in the adults and it is usually very aggressive and lethal despite advances in the Therapeutic strategies.

Although there is no cure, there are treatments to help ease the symptoms.¹ These patients have dismal prognosis. The peak incidence is between 50 years and 75 years.

1.1. Survival rates and life expectancy

The median survival time with Glioblastoma is 15 to 16 months in people who get surgery, chemotherapy, and radiation treatment. Median means half of all patients with this tumor survive to this length of time.²

Everyone with Glioblastoma is different. Some people don't survive as long. Other people may survive up to five years or more, although it's rare.

Children with higher-grade tumors tend to survive longer than adults. About 25 percent of kids who have this tumor live for five years or more.

1.2. Extending life expectancy

New treatments are extending life expectancy even more. People whose tumors have a favorable genetic marker called MGMT (Methyl Gyanine Methyl Transferase) methylation have better survival rates.

MGMT is a gene that repairs damaged cells. When chemotherapy kills Glioblastoma cells, MGMT fixes them. MGMT methylation prevents this repair and ensures that more tumor cells are killed.

Current data shows a 30 percent two-year glioblastoma survival rate for 2015 to 2018. However, many people

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live beyond two years following diagnosis and rates are improving. This can be attributed to updates in technology, as well as treatment options. Thanks to the dedication of researchers and doctors, the understanding of glioblastoma and how to treat it improves year over year.

Of the estimated 17,000 primary brain tumors diagnosed in the US each year, approximately 60% are gliomas.³ Glioblastoma (GB), or grade IV astrocytoma, is the most aggressive of primary tumors of the brain for which no cure is available. Management remains palliative and includes surgery, radiotherapy, and chemotherapy. With optimal treatment, patients with GBs have a median survival of less than one year. About 2% of patients survive three years previously reported long-term survivors (LTSs) of GB may have been patients who actually harbored other low-grade gliomas⁴. The overall prognosis for GB has changed little since the 1980s, despite major improvements in neuroimaging, neurosurgery, radiotherapy, and chemotherapy techniques.⁴

The higher the grade of tumor, the more malignant the tumor is and the worse the prognosis is. Tumors are graded mainly on the basis of their proliferation index, which is an important prognostic factor in GB. The Ki-67 protein is expressed in all phases of the cell cycle except G0 and serves as a good marker for proliferation. Studies that have evaluated proliferation index by Ki-67 immunohistochemistry in GB have shown a significant correlation between high proliferation rates and shorter disease-free and overall survival.

2. Materials and Methods

Between Apr 2016 to Dec 2018, 200 patients, diagnosed with Glioblastoma have been referred to the Gandhi Medical College, Bhopal. They represent the majority of the patients who were diagnosed with the glioblastoma in this time period. The only exceptions are the patients that have died or were not fit enough for referral.

Among these patients, we have searched for those, which were older than 70 years at the time of diagnosis. For these, we calculated their survival, compared these with the survival of the younger patients and then made the analysis of the survival patients and treatment relating factors.

For the statistical analysis we used MS Excel. We calculated demographic characteristics, frequencies of patients in the corresponding RPA groups, changes of frequencies during the analysed period and the frequencies of treatment characteristics.

3. Results

When comparing the groups of the patients younger than 70 with those older, the difference in median survival between groups was statistically significant at $p < 0.001$.

Table 1: Patient's and treatment characteristics

Age (median)	72 years
SD	3.6 year
Gender	
Female	92
Male	108
Surgery	
No	5 (2.5%)
Biopsy	66 (33.3%)
Reduction	93 (46.4%)
Gross total resection	36 (17.9%)

Table 2: 20-Plus-Year Survival Cases.

Authors	Age and Sex	Survival Time and Status
ELVIDGE, BARONE	30yrs W	22yrs alive
JOHNSON et al	32yrs M	22yrs alive
BUCY et al	30yrs M	25yrs alive
SALFORD et al	8yrs M	23yrs alive
CARUSO et al	44yrs M	22yrs alive

M = man, W = woman, yrs. = years

Glioblastoma is linked to age, with better rates for those below 65 years of age, but also to aggressive and complete surgical excision, a good Karnofsky index score before surgery and the application of radiotherapy after surgery.

4. Discussion

The Glioblastoma is a highly vascularised neoplasm and are known to have extensive invasive capacity.

In the last ten years neuronavigation techniques associated also with functional NMR,⁴ as well as the use of substances like 5-Aminolevulinic acid hydrochloride,⁵ which mark and thus make tumoral tissue easier to identify during an operation, have improved surgery for cerebral gliomas; in fact they allow for a more thorough excision and they also lower the risk of causing functional damage during surgery.

Therapy for gliomas has also evolved, as indicated by the introduction of monoclonal chemotherapy⁶ and temozolomide treatment combined with radiotherapy. The dose used was daily temozolomide (75 mg/m² day, all seven days of the week from the first to the last day of radiotherapy), followed by six cycles of adjuvant temozolomide (150-200 mg/m² for 5 days during each 28-day cycle). This resulted in prolongation of median survival time from 12 month with radiation alone to 14.6 month when temozolomide was added.

Together with the traditional fractionated external beam RT (EBRT), nowadays there are new radiotherapy techniques like the intensity-modulated RT (IMRT) and

stereotactic radiosurgery.⁷

Despite the advancements, median survival, especially for Grade 4 gliomas and for glioblastomas doesn't exceed 12–18 months from diagnosis.⁸ A very small percentage of cases showed >3 years survival, in other words long-survival. There have been exceptional cases of long-survival spanning 10 years or more, without tumor recurrence, so as to deem those affected 'cured'. The possibility of a complete recovery from glioblastoma was suggested by the Yamada et al. case⁹: after dying of skull trauma, an autopsy limited to the brain was performed on a patient who had undergone surgery for a glioblastoma multiforme 6.5 years before; the team carefully searched for the presence of cancer without success, despite collecting numerous histological samples.^{10–13}

5. Conclusion

The prognosis of the glioblastoma remains poor despite research, recent advances and improved therapies, today a glioblastoma diagnosis equates to a death sentence. However the fact that there are extremely rare cases of long-term survival and even zero recurrence of the pathology should serve as a stimulus to continue the research effort and not give up the fight against this tumor on a day-to-day basis.^{14,15}

A recent study showed that, although the tumors are being diagnosed earlier as compared to three decades ago and that the peri-operative mortality and morbidity have come down, there was no difference in the post-operative survival time in high- grade gliomas over the decades. The less consistent predictors are sex (females carry better prognosis), extent of surgical resection, pre-operative seizure as a symptom, imaging variables, histological grade, proliferation index and molecular markers.^{16–18}

Microsurgery is safe and effective in order to improve or preserve short-term quality of life in glioblastoma patients. Total tumor resection is not associated with a significantly greater risk for neurological deterioration, either in patients with preoperative functional impairment, or in functionally independent patients. For glioblastoma the survival also depends on person's age, type of tumor, and overall health play a role as treatments improve people newly diagnosed with these aggressive brain tumors may have a better outcome.

6. Source of Funding

None.

7. Conflict of Interest

None.

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