COMPARISON OF SURVIVAL OF POST-OPERATIVE IRRADIATION BETWEEN LOW-GRADE GLIOMA, ANAPLASTIC GLIOMA AND GLIOBLASTOMA MULTIFORME

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ABSTRACT

One hundred twenty-five patients with glioma were treated with post-operative irradiation between 1983 and 1993. Nineteen patients were excluded from evaluation because of incomplete irradiation schedule. Twenty-eight patients lost to follow up. Only seventy-eight patients (about 62.4 %) were evaluable for survival. Twenty-three patients (about 29.5%) were low-grade gliomas, the median survival of this group was 41 months. Twenty-eight patients were anaplastic gliomas (about 35.9%), the median survival was 19 months. Twenty-seven patients (about 34.6%) were Glioblastomas multiforme, the median survival was 7.6 months. The study showed that histologic grading of glioma was the one significant prognostic factor on survival.

Key Words: Glioma, Histological Grading, Survival, Radiation Therapy.

INTRODUCTION

Glioma is the most common primary tumors in adults, and high grade glioma comprises over 50% of the cases.[1] The outcome in treatment of glioma depend on many factors, such as histological grading, patients status, type of neurosurgical procedures, radiotherapy etc. But the most important factors are age and histological grading.[2] Patients with low grade gliomas have a 5 year survival rate of 28-76% following surgery with post-operative radiation therapy.[3,4,5,6,7] Patients with high grade gliomas had bad prognosis, among the high-grade ones, the presence of tumor necrosis (which had been called glioblastoma multiforme) had the worst prognosis and when compare to another which had absence of tumor necrosis (Astrocytoma with anaplastic foci). Following surgery alone, more than 50% of patients with high grade were dead within 6 months and almost 100% within 2 years.[2,8,9]

The objective of this study was to compare the survival rate of post-operative radiation therapy between low grade glioma, anaplastic glioma, glioblastoma multiforme.

MATERIALS AND METHODS

Gliomatous patients who were refered to this hospital for post-operative irradiaation from January 1983 to December 1993 were included.

ELIGIBILITY

- Eligible patients must have biopsy-proven Gliomas.
- Patients with low grade Gliomas who have complete tumor resection were excluded.
- Age: lesser than 70 years. Older than 18 years. (between 18-70 years.)

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- Patients must have adequate renal, bone marrow, pulmonary, cardiac and hepatic function.
- Kasnosfy's performance more than 70.
- Only patients who had completed course of radiation therapy were eligible.
- Feasibility for follow up.

TREATMENT SCHEDULE

Patients with low grade glioma were treated with Co-60 Teletherapy or Linear accelerator 6 MV, localized port technic through lateral parallel fields or wedge fields, both fields each day, 5 days per week, daily dose 180-200 cGy, total tumor dose 5,000-5,500 cGy.

Patients with Anaplastic glioma, or Glioblastoma multiforme were treated with the same machines as above, whole brain irradiation through lateral parallel fields, both fields each day, 5 days per week, daily dose 180-200 cGy, total dose 4,500-5,000 cGy. The tumor bearing areas were boosted with additional 1,500-2,000 cGy.

Symptomatic medications, such as Corticosteroids, anticonvulsants, antiemetics were used depending on patients' symptoms.

Patients were evaluated for neurological signs and performance status weekly during radiotherapy, every 2 months in the first year and every 3 months thereafter.

RESULTS

Between January 1983 and December 1993, 125 patients with Gliomas were refered to Radiation therapy Department for post-operation irradiation. 19/125 patients had not completed radiation courses, 9/19 patients developed uncontrolled increased intracranial pressure, 10/19 had performance status less than 70. Only 106 patients had complete the radiation treatment schedule. 28/106 patients lost to follow up after complete radiation treatment, only 78/106 patients (73.6%) were evaluable for survival. Table 1 shows sex distribution of patient, male: female = 1.2: 1.

Table 1 Sex distribution of patients

		Male	Female
Total Cases	125	68	57
Incomplete XRT	19	11	8
No follow up	28	15	13
Evaluable	78	42	36

High grade gliomas were found more frequent than low grade, about 72.8% of cases.

Table 2 Histological suptypes

	No. of patient		Total	percentage
	Male	Female		
Low grade gliomas	19	15	34	27.2
Anaplastic glioma	21	21	42	33.6
Glioblastoma multiforme	28	21	49	39.2
Total	68	57	125	100.00

In this study, we found that the age distribution of patients was relatively correlated with pathological grading. Patients with younger ages had lower grade of tumor, while the patients with older ages had the more malignant grade. The mean age of patients with low grade was 34.4 years. While the mean age of patients with Glioblastoma Multiforme was 48.5 years.

Table 3 Age distribution

	Age (years)	Mean age (years)
Low grade glioma	22 - 52	34.4
Anaplastic glioma	23 - 51	38.5
Glioblastoma multiforme	35 - 58	48.5

In low grade glioma, only 23 of 34 patients (67.6%) were evaluated for survival, 3 patients developed recurrent tumor at the previous sites, 12 months after complete irradiation. Only 2 of these had re-surgery and the histology of the tumor turned to be malignant glioma. One patient developed severe pulmonary infection and was dead after 8 months of complete radiation. The median survival in this group was 41 months.

In anaplastic gliomas, 28 of 42 patients (59.6%) were evaluated for survival. 8 of 28 patients developed recurrent tumor within 12 months after complete radiation. 6 of 8 patients had histological proven of recurrent tumor by surgery. 2 of 8 cases were presumed by neurosigns and CT scans of brain. Only 4 of 28 patients lived more than 36 months. The median survival of this group was 19 months.

In glioblastoma multiforme, 27 patients of 49 patients (55.1%) were evaluated for survival. Only one patient lived more than 24 months, they developed rapid deterioration of conscious and was dead within few days. 2 of 27 patients had surgical proven of recurrent tumor at 7th and 9th month after irradiation. 13 of 27 patients (about 50%) were dead within 6 months without definite improvement of performance status. Median survival in this group was 7.6 months (Table 4, Fig. 1).

Without autopsy data, late complications were undetected in this study.

Table 4 Survival by pathology

	No. of patient evaluated	Median survival (months)
Low grade glioma	23	41
Anaplastic glioma	28	19
Glioblastoma multiforme	27	7.6

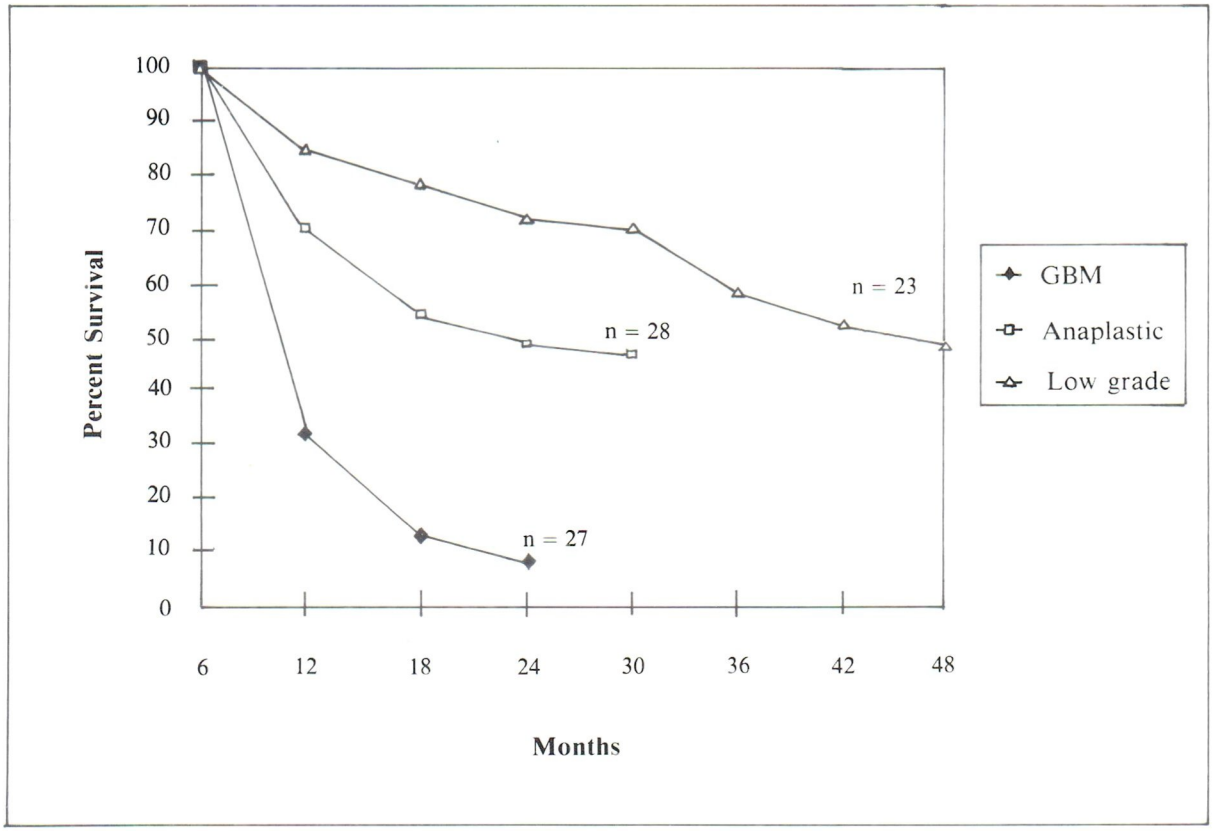

Fig. 1 Survival by pathology

DISCUSSION

The results from our study showed that malignant glioma, both anaplastic glioma and glioblastoma multiforme had bad prognosis with short survival after surgery and radiation, median survival for anaplastic glioma was 19 months, for glioblastoma multiforme was 7.6 months. But only 59.6% of patients with anaplastic gliomas and 55.1% of patients with glioblastoma multiforme were evaluable, so the results for survival may be over estimated, because the patients who dropped out for evaluation may died from tumors. The age distribution in our study was correlated with pathological grade. These results were comparable to tht previous study from RTOG and ECOG. Anaplastic gliomas provided better prognosis than glioblastoma multiforme. Patients with anaplastic gliomas had median survival 27 months and median survival for patients with glioblastoma multiforme was 8 months.[2]

Patients with low grade gliomas developed fewer recurrent tumors with longer disease free interval than malignant gliomas. Anaplastic gliomas developed recurrent tumors more than glioblastoma multiforme, 8 of 28 patients of anaplastic gliomas compare to 2 of 27 patients of glioblastoma multiforme, this may result from the longer survival of anaplastic gliomas than glioblastoma multiforme, who died before development of recurrent tumors.

CONCLUSION

Malignant gliomas, both anaplastic glioms and glioblastoma multiforme, had short survival when treated with post-operative irradiation. Other adjuvant treatment including systemic chemotherapy, heavy particle beam radiation, hyperbaric oxygenation and chemical radiosensitizers, immonotherapy etc, may need to improve survival.

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