Treatment of Supratentorial Anaplastic Astrocytomas (Subtotal Resection and Radiotherapy Vs Biopsy and Radiotherapy)

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Supratentroial astrocytomas are the most common brain tumors. Judging the benefits of treatment for brain tumors is difficult because crude survival rates are unsatisfactory and the quality as well as the length of survival needs to be examined critically. Opinions vary as to the extent of resection in these tumors. The present study proves the usefulness of subtotal excision over open minimal biopsy by comparing the post operative quality of life enjoyed by patients undergoing these procedures. This study has shown that the patients undergoing subtotal excision enjoy a better quality of life in the late post-operative period than those who underwent open minimal biopsy.
Key Words: Supratentorial anaplastic Astrocytoma, resection.

The most common brain tumors are those of glial origin, hence it is not surprising that the surgical treatment of gliomas is virtually coextensive with the historical development of neurological surgery as a specialty. The Gliomas (astrocytoma, oligodendroglioma and ependymoma) constitute about half of all the intracranial tumors. They are all, to greater or lesser degree, malignant.

Gliomas spread by infiltration, making their boundaries impossible to define. The forepart of the brain is most often involved, the frontal and temporal lobes being equally affected. The occipital lobe is a less common site. Central areas of the brain may be infiltrated with the tumor extending into the basal ganglia or to the opposite hemisphere. Cure by surgical excision is therefore impossible. Areas of necrosis and cystic degeneration are common. Extensive edema in the surrounding brain accompanies rapid tumor growth, aggravating the symptoms and signs of hemisphere disturbance.

Opinions vary as to the extent of surgery in the treatment of malignant gliomas. A surgeon's natural reaction is to remove whole of the tumor but such an ideal solution is not always possible in brain. A more general view is that, where appropriate, formal excision of tumor, although always incomplete will help to lengthen survival time by reducing the total tumor burden and by relieving intracranial pressure and brain displacement.

Internal decompression may certainly result in dramatic improvement in the condition of the patient. Relief will be short lived, however, unless additional treatment follows to delay residual growth. This is usually a course of radiation therapy.

In selecting patients for excisional surgery there are two major considerations. Firstly, the tumor removal should be as complete as possible, consistent with maintaining function. Limited resections are of no value. A second consideration must be the expected quality of life in post-operative period.

In a recent report[1] the authors have reviewed studies over the last 50 years addressing the association between long term survival and type of surgical management in adults with supratentorial intermediate or high grade astrocytomas. According to their analysis, the overwhelming majority of studies that addressed the role of surgery relied solely on the surgeon's impression of the degree of resection accomplished. The imprecision of such estimates has been amply demonstrated and may be expected, given the infiltrative nature of the neoplasm.

In many studies, patients who had tumor resection, regardless of the degree of resection, were considered as a single group and their period of survival was compared with that of the patients who underwent a biopsy only. In other studies, surgical groups were identified and survival data were evaluated as a function of the extent of tumor resection. Several studies grouped patients not treated surgically with those on whom a biopsy was performed. Regardless of the groupings used, however, there is no general consensus concerning the effect of cytoreductive surgery on survival.

Material and Methodology

This study has been carried out at the Department of Neurosurgery, Lahore General Hospital, Lahore . All patients suspected of having Supratentorial Gliomas as diagnosed on CT scan were entered into the study. Subtotal excision of the tumor was carried out whenever it was possible without undue increase in post-operative morbidity. Minimal biopsy was performed in cases, which were thought to be inaccessible. Both groups were subjected to a standardized dose of radiotherapy. One hundred cases of histopathologically proven Anaplastic astrocytomas including 80 cases of subtotal excision and 20 cases of biopsy were followed up for 1 year. In the follow-up, patients were assessed according to the Glasgow Outcome Score after 1, 3, 6 months and 1 year. Results have been analyzed statistically.

Results

Clinical Presentation

The age incidence ranged from 7-66 years. Sixty patients were female and forty were female. The majority of patients presented with headache, vomiting and

papilloedema of varying duration. Other features are shown in Table 1.

Table 1. Clinical Presentation

Symptoms	n=
Headache	88
Vomiting	58
Papilloedema	82
Focal deficit	54
Fits	36
Behavior change	20
Drowsiness	20
Aphasia	16
Memory loss	2
Optic atrophy	6
7th Nerve palsy	4
6th Nerve palsy	6

Follow Up

Subtotal Resection

Eighty patients underwent subtotal resection. Twelve patients died within 1 month of surgery giving a peri-operative mortality rate of 15%. These included massive brain edema (6 patients), wound infection (2 patients), meningitis (2 patients), and sudden death of unknown cause (2 patients). Remaining 68 patients were followed up at 1 month, 3 month, 6 months and 1 year after surgery. In the follow up, quality of life, which these patients were enjoying after surgery, was assessed according to Glasgow Outcome Scale. The data obtained is shown in Table 2.

Table 2. Glasgow Outcome Score (Subtotal resection group

GOS	No.(%)			
	1 mth	3 mth	6 mth	1 yr
Grade I	12 (17.64)	2 (3.03)	0	0
Grade II	6 (8.82)	2 (3.03)	2 (3.03)	4 (6.06)
Grade III	24 (35.29)	18(27.27)	14(21.21)	16(24.24)
Grade IV	10(14.7)	14(21.21)	16(24.24)	14(21.21)
Grade V	28(41.17)	32(48.48)	34(51.51)	32(48.48)

Table 3. Glasgow Outcome Score (Biopsy Group)

GOS	n= (%)			
	1 mth	3 mth	6 mth	1 yr
Grade I	4 (25)	0	0	0
Grade II	0	0	0	0
Grade III	8 (50)	10 (62.5)	10(62.5)	12(75)
Grade IV	8 (50)	6(37.5)	6 (37.5)	4 (25)
Grade V	0	0	0	0

Biopsy group

A total number of 20 patients who underwent minimal biopsy only and proved to be anaplastic astrocytomas were followed up at 1 month, 3 month, 6 month and 1 year after surgery. Four patients died within 1 month of surgery giving a peri-operative mortality of 20 %. Three of these were in poor neurological status prior to surgery. One patient died due to sudden death. Thus 16 patients of the biopsy group (80 %) were alive at the end of the 1st year of surgery. Glasgow outcome scores of remaining patients are given in table 3 to analyze the quality of life these patients were enjoying.

Discussion

The worldwide incidence of gliomas has increased over the last few years, most noticeably in the elderly[2]. This could be an absolute increase in these tumors particularly when the life expectancy has increased. It could also be due to newer imaging methods, which are available nowadays. According to Jannus[3] both of these factors are responsible for increased number of patients diagnosed every year.

Patients with supratentorial gliomas are generally treated by surgery followed by radiation therapy and chemotherapy[4]. A thoughtfully administered combined modality treatment results in a better and prolonged survival[5]. The overall median survival of these patients is far from satisfactory[6]. The 24 month mean survival for anaplastic astrocytomas is 38 to 50 %[7].

The role of surgery in the management of supratentorial astrocytomas remains undisputed[8]. It yields tissue for diagnosis, thus providing the basis for subsequent management decisions; it also achieves decompression, relieving signs and symptoms of increased intracranial pressure. Studies on the effectiveness of radical tumor resection have produced divergent results[9]. The issue that remains unresolved, therefore, is not the advisability of surgery, but rather the extent of the resection. The current study has tried to answer this question.

In a review of international literature, Nazzaro and Newelt[1] found that despite extensive studies over 50 years the role of cytoreductive surgery as related to survival remain unclear. There is agreement that extensive resection is preferable for frontal, temporal and occipital polar lesions, but there is disagreement regarding the extent of resection in other areas[10]. Ciric and Ammirati[11] and Salcman et al[12] have demonstrated that gross total resection of malignant glioma is associated with a low morbidity and mortality and with prolongation of life and a better quality of survival. This view is not shared, however, by a number of neurosurgeons who prefer a minimal decompression fearing that an extensive resection increases the danger of post-operative neurological deficit and hemorrhage[13]. Those who advocate an extensive resection believe that it allows adjuvant therapy to be more effective, prolonging survival and improving the quality of life[4].

In the present study, in the subtotal resection group, 66 patients (82.5%) were alive at the end of the 1st year of surgery. Out of these, 32 patients (48%) were in GOS Grade V i.e. good recovery with only minimal sequel. Fourteen patients (21%) were in Grade IV of GOS i.e. they were moderately disabled (independent but disabled). Sixteen patients (24%) were in GOS Grade III i.e. they were severely disabled (conscious but dependent). Four