Impact of Surgery on the Quality of Life in Patients with Primary Brain Tumors (A Review of 170 Patients at a Tertiary Care Hospital)

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Abstract

Background: The traditional approach to the brain tumor or space occupying lesions has always been surgery, aiming for complete excision, often resulting in deterioration of physical, emotional, and social functions with poor quality of life.

Objective: to analyze the impact of surgery on the quality of life in terms of Barthel index, especially in patients with high grade tumors

Study Design: Descriptive Prospective Study

Setting: Neurosurgery Department of Shifa International Hospital Islamabad, Pakistan

Materials and methods: All patients presenting to the OPD with the diagnosis brain tumor, planned to undergo excision were included in the study after informed consent. The Modified Barthel Index was calculated at admission and at 3 month follow up.

Results: Out of 170 patients 94 (55.3%) were males and 76 (44.7%) were females, with mean age of 42.55 years (SD $\pm$14.72). MBI for GBM was seen to be poorer as compared to meningioma.

Conclusion: Patients with aggressive tumors have poor quality of life, lower Barthel index.

Keywords: Quality of life, Meningioma, GBM, modified Barthel index, Primary brain tumor

Introduction:

Primary brain tumors affect although a smaller percentage of population worldwide, up to 2% of entire cancer load, they are associated with high morbidity and mortality. The malignant and high grade lesions are associated with poor prognosis and high morbidity and therefore almost always have devastating effect on the patients and their families[1]. Even with the best treatment options available, aggressive chemotherapy and radiation the median survival for patients with grade 4 glioma is less than 12 months. Various authors have commented that the poor quality of life and poor outcome of treatment in these patients is also associated with increased neuropsychiatric disturbance and increased risk of major depression[2, 3].

Patients presenting with primary brain tumors or space occupying lesion often face serious challenges in terms of the quality of life, including difficulties with overall symptoms such as headache, anorexia, seizures and insomnia along with symptoms secondary to focal neurologic deficits, personality changes, and cognitive dysfunction[2, 4]. The traditional approach to the tumor treatment has always been surgery, aiming for complete excision, often leading to various degrees of postoperative complications, resulting in deterioration of physical, emotional, and social functions, thus affecting the quality of life. Although the overall survival, progression-free and disease-free survival rates have been the clinical outcome measures used in evaluating the efficacy of tumor treatment in various clinical trials, these endpoints do not really assess the prime quality of life these patients have after undergoing the treatment. Although over the years there has been advancement in the tumor surgery with introduction of high resolution microscopes and gamma knives, improving the precision of the resection, it still is associated with unavoidable damage to the normal brain tissue and architecture. However over past few decades there has been a paradigm shift where good health does not only mean disease free survival but also better quality of life[5].

The concept of quality of life revolves around the multidimensional well-being of a person reflecting an overall satisfaction with life. It includes physical, emotional and social well-being. Over the past few decades a lot of different questionnaires have been devised and validated assessing the quality of life of patients undergoing various surgical procedures for brain lesions especially tumors[6]. There is lot of work being done on the importance of better care leading to improved neuropsychiatric symptoms and better quality of life. However there is no local data is available to comment on the quality of life of patients undergoing brain tumor surgeries. The purpose of this article is to assess the quality of life following resection of brain tumors using the Modified Barthel Index. This would guide our counseling of the patients and family likewise in what to expect after the surgery.

Materials and Methods:

The study was conducted at Shifa international hospital under the department of neurosurgery after approval from the ethics committee. All patients presenting to the OPD with the diagnosis of space occupying lesion or tumor of the brain who were planned to undergo craniotomy for excision of the lesion were included in the study after informed consent. Baseline activity and functional status was assessed before the surgery by Barthel index at admission, patients were then followed up for a period of 3 months and Modified Barthel Index (MBI) was calculated. The emotional and social well-being was assessed using a self-designed performa which was translated into easy language for better understanding of the patients, in which pain, depression, emotional instability were assessed. The MBI was categorized as follows:

- >15 independent, no disability
- 15 or <15 – usually represents moderate disability
- <10 – usually represents severe disability

The results were computed and analyzed using SPSS software version 20 and statistical tests (chi square) were applied.

Study Design: Descriptive Prospective Study

Sampling Technique: Convenience sampling- all consecutive patients with space occupying lesion or tumors of the brain undergoing resection will be included in the study after taking informed consent.

Inclusion Criteria: All patients presenting with space occupying lesion or tumors of the brain undergoing resection will be included in the study.

Exclusion Criteria: patients who are

- above the age of 60 years, less than 10 years
- already bed ridden, due to any other physical disability,
- Arthritis, Neurodegenerative diseases, spinal cord disease
- Aneurysms, AVM, Intracranial bleeds
- Brain abscess/infection/Tuberculosis

RESULTS:

A descriptive prospective study was conducted at Shifa international hospital Islamabad. 207 patients underwent surgery for excision of brain tumor or SOL form January 2015 to November 2016, out of which only 190 patients met the inclusion criteria but 20 were lost to follow up and could not be contacted.

Out of 170 patients 94 (55.3%) were males and 76 (44.7%) were females, with mean age being 40.55 years (SD ±12.72). The main presenting symptom was headache (49%) followed by seizures (23%), visual disturbances (12%), low GCS (10%) and personality changes (6%). The graph (Figure 1) shows the frequencies of tumors observed, most common tumor seen was meningioma (28.8%) followed by GBM (27%), astrocytoma (10%) and oligodendroglioma (5.9%). Metastatic lesions accounted for 7.1% whereas 5.9% specimens were positive for fungal growth. The modified Barthel Index for these patients at 3 months after the surgery was calculated. Chi square test was applied and the p value was found to be significant when MBI for GBM was compared pre and post-surgery. It was seen to be poorer in GBM as compared to meningioma (Table 1.) where most patients with GBM had index score less than 15 while those meningioma had score more than 15. Other tumors such as low grade astrocytoma or oligodendroglioma had relatively better outcome at 3 months. There were 10 out of 170 (5.8%) cases where histopathology reported fungal infection or caseating granulomas and these were later excluded from the study. Pain score was calculated at 3 months after surgery (Table.2). All those patients who had Modified Barthel Index less than 15 were then reviewed for the presence of depression, fatigue (56 patients out of 170) as shown in the Figure 2, most common problem after surgery in dependent individuals was emotional detachment (36%) followed by anger management issues (22%) and totally refusing to communicate i.e. mute (18%).

DISCUSSION:

Traumatic brain injury and resection of space occupying lesions is associated with high mortality and equally high morbidity. Brain lesions can be primary, consisting of the neural tissue or secondary from metastasis. It has been observed that high grade GBM and astrocytomas are associated with poor prognosis and therefore poor quality of life, following radiotherapy or chemotherapy QOL seems to decline even further[1, 7]. With better treatment, the survivorship for even malignant tumors has increased; so patients survive longer to face the comorbidities associated with the disease[8, 9]. The main aim of this study was to assess the quality of life in terms of activities of daily living and frequency of depression and other symptoms. This is the first study conducted in the area which assessed the quality of life in the patients suffering from primary brain tumors who underwent excision. We used the Modified Barthel Index to assess the quality of life in our patients and the results were quite similar to what other authors

have found in their retrospective as well as prospective studies. It was found that there was a significant drop in MBI (p value <0.05) and a higher percentage of depressive symptoms in patients who were diagnosed with malignant glioma as compared to meningioma.

Neuropsychiatric symptoms can arise because of the tumor itself or secondary to the damage caused by chemotherapy or radiation[10]. Many patients find it extremely difficult to cope with the diagnosis thereby going into major depression, which is later on worsened due to the treatment effects. Over time researchers have found strong association between major depressive disorder and poor quality of life. The fact that these patients suffer psychologically more due to their physical disability as their baseline QOL was better, highlights the need for a better patient support system in the hospitals as well as at home[5, 8]. We saw in our study that low grade lesions and benign tumors such as meningioma had better prognosis but those cases of suprasellar lesions where vision was already affected and did not improve after surgery, patients had poor response. In the present study we found that individuals with malignant lesions such as high grade GBM and metastatic disease had significant drop in Barthel index post diagnosis and were found to be more depressed and down as compared to those who had low Index prior to the diagnosis or surgery. These findings are consistent with Pelletier et al. observed in their sample population the strong association between depression and poor quality of life of patients with primary brain tumor[2].

Barthel Index has been found to be very efficient in determining the functional status. In a prospective study of patients with high grade glioma, De Wit et al. found the BI to be very helpful in predicting the outcome in terms of long term prognosis in patients who were being discharged from the hospital after treatment[11]. Even with the most radical excision of tumor, aggressive chemo radiation the outcome of high grade tumors is very poor, associated with high morbidity, poor functional status, as found in the present study and existing data[12]. Therefore the decision on whether such aggressive treatment protocol should be followed for these patients or not needs to be taken very cautiously and patients and family should be onboard while making any decisions[13]. Meningioma and low grade gliomas have relatively better prognosis, as compared to high grade lesions. Meningiomas are extra axial lesions which explain the better outcome, and better quality of life[14]. This necessitates the patient education at the time of diagnosis and further treatment as unrealistic expectations in patient with high grade lesion will lead to neuropsychiatric problems later on. Because there could be multiple potential contributing etiologies, better research models are needed to understand their effect on the QOL and develop targeted interventions to improve patients' QOL.

CONCLUSION:

Evidence shows that high grade tumors are associated with poor prognosis and poor Quality of life, therefore the decision regarding aggressive treatment should be made very carefully as in most cases the outcome is poor, and treatment prolongs survival but not the quality of life. However the benign conditions like meningioma even though they may be recurrent, have better outcome, therefore better quality of life.

DIAGNOSIS	Pre OP MBI			Total	MBI (post op) at 3 months			P value
	10 or <10	15 or <15	>15		10 or <10	15 or <15	>15	
GBM	**2(4%)**	**13(28%)**	**31(67.4%)**	**46**	**20(43.3%)**	**22(48%)**	**4(8.7%)**	**0.004**
PNET/ Neusrocytoma	0	2(66.7%)	1(33.3%)	3	0	1(33.3%)	2(66.7%)	>0.05
Pituatry adenoma /craniophryngioma	0	0	7(100%)	7	0	0	7(100%)	>0.05
teratoma	0	0	4(100%)	4	0	0	4(100%)	>0.05
schwannoma/ epidermoid cyst	0	0	6(100%)	6	0	0	6(100%)	>0.05
Meningioma	**0**	**1 (2%)**	**48**(98%)	**49**	**0**	**2(4%)**	**47(96%)**	**0.06**
Astrocytoma	0	1(6%)	16(94%)	17	1(6%)	0	16(94%)	>0.05
fungal/TB/Clot	0	0	10(100%)	10	0	0	10(100%)	>0.05
Metastatic lesion	**0**	**4 (33.3%)**	**8(66.7%)**	**12**	**3(25%)**	**4(33.3%)**	**5(41.7%)**	**0.04**
Lymphoma	0	1(33.3%)	2(66.7%)	3	1(33.3%)	0	2(66.7%)	>0.05
Oligodendroglioma	1(10%)	1(10%)	8(80%)	10	1(10%)	0	9(90%)	>0.05
Medulloblastoma	0	0	1(100%)	1	1(100%)	0	0	0.001
Reactive Gliosis	0	1(50%)	1(50%)	2	0	0	2(100%)	>0.05
Total	3	24	143	170	27	29	114	

Table 1 Modified Barthel Index PRE OP and at 3 MONTHS AFTER SURGERY

Diagnosis	Pain				Total
	no pain	mild	moderate	severe	
GBM	**14(8.2%)**	**14(8.2%)**	**13(7.6%)**	**5(2.9%)**	46(26.9%)
PNET/Neusrocytoma	2(1.2%)	1(0.6%)	0	0	3(1.8%)
pituatry adenoma/craniophryngioma	7(7.1%)	0	0	0	7(7.1%)
teratoma/epnedymoma	4(2.3%)	0	0	0	4(2.3%)
schwannoma/epidermoid cyst	6(3.5%)	0	0	0	6(3.5%)
Meningioma	**48(28.2%)**	**1(0.6%)**	**0**	**0**	**49(28.8%)**
Astrocytoma	16(9.4%)	0	1**(0.6%)**	0	17(10%)
fungal/TB/Clot	10(5.8%)	0	0	0	10(5.8%)
metastatic lesion	**7(4.1%)**	**1(0.6%)**	**4(2.4%)**	**0**	**12(7.1%)**
Lymphoma	2(1.2%)	0	0	1**(0.6%)**	3(1.8%)
Oligodendroglioma	9(5.3%)	0	1**(0.6%)**	0	10(5.9%)
Medulloblastoma	0	0	1**(0.6%)**	0	1(0.6%)
reactive gliosis	2(1.2%)	0	0	0	2(1.2%)
Total	127(74.7%)	17(10%)	20(11.8%)	6(3.5%)	170

Table 2 Pain as perceived by patients at 3 months after surgery

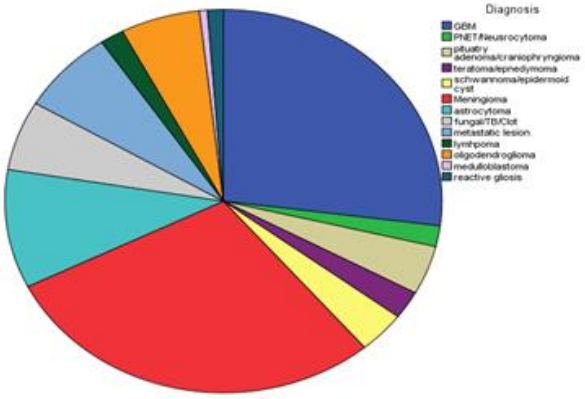

Figure 1 Frequency of various tumors/lesions based on histopathology

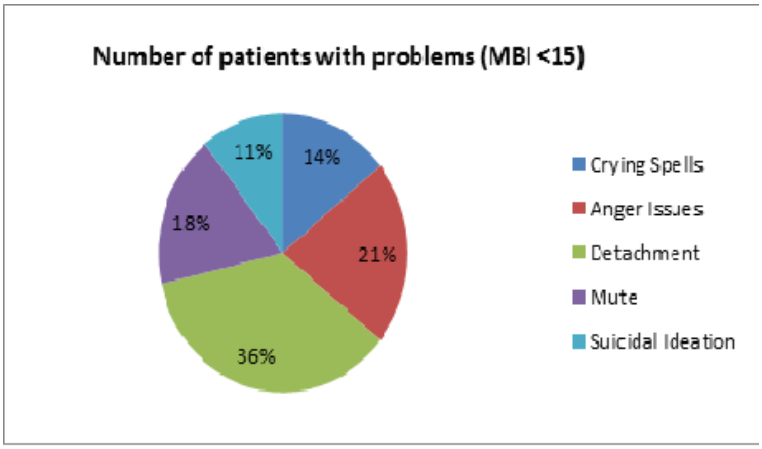

Figure 2 Symptoms in Patients with MBI <15

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