



Assessment of quality of life in brain tumor patients post craniotomy

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Abstract

QOL (Quality of Life) assessment in surgical practice can serve multiple purposes, including measuring whether a procedure improved the patient's QOL. Surgery and perioperative injuries may cause neurological deficits and focal cognitive deficits as a result of damage to normal surrounding tissue. Postoperative QOL studies can serve as a guide to identify who may need additional interventions to support a successful recovery. A Retrospective study was conducted for six month in the department of neurosurgery in two hospitals in Warangal region. The data of brain tumor patients was obtained from registry of the hospital and was used for estimation of QOL after resection of tumor through follow up. The QOL study was carried out in 100 patients who visited for follow up. Older age, female sex and high grade tumors are the predictors of low QOL.

Key Words: Brain tumors, Meningioma, Quality of Life.

Introduction:

Brain tumors refer to mixed group of neoplasms arising from meninges and intracranial tissues which may be benign or malignant. ⁽¹⁾ Among different treatment modalities, surgical tumor removal has been gold standard for brain tumor management. However, this treatment option often resulted in various degrees of postoperative complications, leading to the deterioration of physical, emotional, and social functions. ⁽²⁾ Early Complications of brain tumor surgery include bleeding / hematoma, CSF leak, seizures, cerebral infarct, pneumocephalus. Late complications include surgical site infections. ⁽³⁾

Quality of life (QOL) is a concept that encompasses the multidimensional well-being of a person and reflects an individual's overall satisfaction with life. QOL is a broad term that involves several dimensions, including physical or functional status, emotional well-being, and social well-being. Quality of life is an important area of clinical neurooncology that is increasingly relevant as it increases survivorship after treating patients with various modes of treatment. Patients with primary brain tumors face serious challenges to their QOL. They have difficulties with general symptoms such as headache, anorexia, nausea, seizures, and insomnia. These patients also face symptoms secondary to focal neurologic deterioration, including motor deficits, personality changes, cognitive deficits, aphasia, or visual field defects.



The difference in QOL may be less dependent on the grade of tumor and more dependent on whether the tumor is stable or progressive.

Factors influencing QOL score:

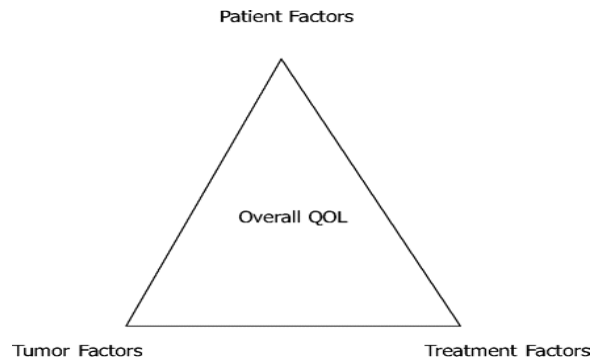


Fig-1: Factors effecting Quality of Life

Factors affecting QOL in CNS tumor patients

Patient factors include gender differences, co morbidities and different socioeconomic and cultural factors play a role in QOL domain scores. Tumor- related factors influencing QOL scores are tumor site, laterality, size, hypothalamic involvement, hormonal deficiencies, and epilepsy. Treatment includes use of anticonvulsants, corticosteroids, higher dose of radiation therapy, chemotherapy and all these have detrimental effects on QOL scores. Complete surgical resection, radiation therapy in HGGs, or low dose per fraction radiation therapy in LGGs with loco-regional control will improve or maintain QOL domain scores.

QOL Evaluation Tools

There are various QOL and neurocognitive function assessment tools being used in clinical trials and clinical practice. Functional evaluations are broad, either with objective assessment (eg, clinical examination by physician or nurse) or subjective assessment through questionnaire-based evaluation of well-being and QOL. Commonly used objective evaluation tools are Karnofsky Performance Score (KPS), Neurological Performance Score (NPS), Barthel's activity of daily living, and others. Subjective questionnaire-based QOL evaluation tools are mainly European Organization for Research and Treatment of Cancer (EORTC) Core Quality of Life Questionnaire (QLQ-C30) and Functional Assessment of Cancer Therapy (FACT) cancer-specific scales.⁽⁴⁾

Methodology:

A clinical data of 120 brain tumor cases were collected retrospectively and Patients were interrogated subjectively using QOL questionnaires for brain tumors. All brain tumor patients who undergone craniotomy are included in the study. QOL was estimated only in 100 patients due to loss of follow up.

The QOL evaluation tool employed in this study was FACT- BR “Functional Assessment of Cancer Therapy-Brain (FACT-Br).” This reflects the symptoms or problems associated with brain tumors or malignancies across 5 scales. The measure yields information about total QOL, as well as



information about the dimensions of physical well being, social / family well being, emotional well being, functional well being and disease specific concerns.

FACT-Br instrument consists of 37 items, with each item using a 5 point score. These 37 items are distributed in to 5 domains which include:

- Physical well being- 7 items
- Social/family well being-7 items
- Emotional well being-6 items
- Functional well being- 7 items
- Additional concerns- 10 items

A score was given to each item in a domain. The sum of the score in each domain is the QOL score of the patient and is further classified as better QOL, good QOL and reduced QOL.

Results:

Out of 120 brain tumor cases, 67 were male and 53 were female. Brain tumors are highly prevalent in older adults i.e. first in the age group of 40-49 years (26.6 %) followed by 50-59 age group (22.5%) The male to female ratio of 53 meningioma cases was approximately 1:2. The number of glioma cases are 38 and male to female ratio was 6:1. Among 120 brain tumor patients, meningiomas (44.2%) were the most common type followed by gliomas (23.3%). GBM accounts for 10 % and astrocytoma account for 4.2 % of brain tumor cases.

Majority of the meningioma cases were diagnosed in early stages. Gliomas were diagnosed at grade II and grade III stages. GBM cases were diagnosed in late stage i.e. grade IV. Hemangioblastomas and oligodendrogliomas were diagnosed in grade I and grade III respectively.

In our study the clinical manifestations of brain tumors observed are Headache (66 %), Hemiparesis (51.7 %), Facial palsy (34.2 %), Weakness of limbs (30 %), Seizures (24 %). Slurred speech (14 %), Gait disturbances (12.5 %) and altered sensorium (7.5 %) are observed moderately. The least observed symptoms include deviation of mouth (5 %), Tremors (2.5%), Blurred vision (1.6 %).

In majority of the patients, symptoms were subsided after surgery, whereas symptoms worsened in 13 patients. Among 100 patients, after brain tumor resection surgery i.e. craniotomy, 58 patients experienced headache. Mood disturbances like anxiety and depression was experienced by 31 patients. Most of the female patients experienced psychiatric symptoms, usually depression. Sleep disturbances like trouble in initiation and maintenance of sleep was experienced by 42 patients. Seizures were experienced by 31 patients. Cognitive impairment was experienced by 28 patients. Least experienced surgical outcomes include hearing impairment, visual impairment and facial palsy by 8, 6 and 3 patients respectively.

QOL was divided as four domains namely Emotional, Functional, Physical and Social domains. Despite good overall QOL, 22 % of brain tumor survivors expressed negative feelings such as depression, loss of hope and worry about death. 13 % patients had poor functional wellbeing and 17 % patient showed decreased physical well being. In the assessment of social relationships, 13 patients were not satisfied with their personal relationships. They were also dissatisfied to some



extent with the social support from their friends and family. Emotional function was aggravated over time due to significant depression and cognitive impairment. The physical and functional health domain of QOL showed that patients had a significant impairment in quality of sleep, fatigue, lack of energy to perform daily activities and unable to concentrate in their work . Older adult brain tumor patients have reported lower functional well-being and poor neurocognitive functioning than younger adults. Patients reported a variety of work-related problems including loss of job and diminished work capacity that have worsened their financial burden.

Table- 1: Gender wise distribution of brain tumors

S. No	Tumour type	Male	Percentage	Female	Percentage	Total
1	Meningioma	18	33.9	35	66.03	53
2	Glioma	24	85.7	4	14.13	28
3	GBM	7	58.3	5	41.6	12
4	Hemangioblastoma	4	100	0	0	4
5	Astrocytoma	2	40	3	60	5
6	Schwanoma	1	33.3	2	66.6	3
7	Pituitary adenoma	3	75	1	25	4
8	Adenocarcinoma	0	0	1	100	1
9	Oligodendroglioma	1	100	0	0	1
10	Pineal tumour	0	0	1	100	1
11	Metastatic tumour	4	50	4	50	8

Table 2: Distribution of type of brain tumor in various age groups

Type of BT	Age in years					
	<30	30-39	40-49	50-59	60-69	>70
Meningioma	4	10	18	12	8	1
Glioma	2	10	6	5	1	4
GBM	1	1	2	7	1	0
Astrocytoma	1	2	1	0	1	0
Hemangioblastoma	1	1	2	0	0	0
Schwanoma	0	0	2	1	0	0
Oligodendroglioma	1	0	0	0	0	0
Metastatic tumor	0	0	1	1	4	2
Pituitary adenoma	1	1	0	1	0	1
Adenocarcinoma	0	1	0	0	0	0
Pineal tumor	0	0	0	0	1	0
Total	11	26	32	27	16	8



Table- 3: Grade wise distribution of Brain tumors

S. No	Tumor type	Grade – I	Grade –II	Grade – III	Grade - IV	No grade
1	Meningioma	28	19	3	0	0
2	Glioma	4	10	8	6	0
3	Astrocytoma	0	3	2	0	0
4	GBM	0	0	0	12	0
5	Oligodendroglioma	0	0	1	0	0
6	Hemangioblastoma	4	0	0	0	0
7	Metastatic tumors	0	0	0	0	8
8	Pituitary adenoma	0	0	0	0	4
9	Adenocarcinoma	0	0	0	0	1
10	Pineal tumors	0	0	0	0	1
11	Schwanoma	0	0	0	0	3

Table- 4: Distribution based on symptoms of brain tumors

S. No	Symptoms	Number	%
1	Headache	80	66
2	Hemi paresis	62	51.7
3	Facial palsy	41	34.2
4	Weakness of limbs	36	30
5	Seizures	29	24
6	Slurred speech	17	14
7	Gait disturbances	15	12.5
8	Altered sensorium	9	7.5
9	Deviation of mouth	6	5
10	Tremors	3	2.5
11	Blurred vision	2	1.6



Table-5: Neurological outcome after Brain tumor resection (based on GCS)

S. No	Neurological outcome	Number
1	Improved	56
2	No change	31
3	Worsened	13

Table-6: Clinical outcomes after tumor resection

S. No	Outcome	Number
1	Headache	58
2	Mood disturbance	31
3	Sleep disturbance	42
4	Fatigue	40
5	Seizures	31
6	Cognitive impairment	28
7	Giddiness	18
8	Hearing impairment	8
9	Visual impairment	6
10	Facial palsy	3
11	Others	28

Table-7: QOL after brain tumor resection

S. No	Domains	Better QOL	Good QOL	Reduced QOL
1	Emotional	69	9	22
2	Functional	59	28	13
3	Physical	44	39	17
4	Social	55	32	13



Discussion:

Type of tumor: In our study we observed that the commonest form of Brain tumor was meningioma (44.2 %) followed by glioma (23.3 %). This is similar to the study conducted by Gigi Neishvilli *et al*, 2014.⁽⁵⁾

Age and Gender: In our study, female outnumbered male in case of meningioma. The male to female ratio was 1:2 approximately. Jain *et al*, 2017 also reported that meningiomas affected female more than male. This can be explained by increased expression of estrogen and progesterone receptors in brain and changes in tumor size during luteal phase of menstrual cycle.⁽⁶⁾ The male preponderance was most striking in glioma i.e. of the 28 patients with glioma 24 (85.7%) were male, according to Surawicz *et al*, 1999 glioma affected 40 % more male than female. The reason for such occurrence is increased expression of certain type of oncogenes in mesenchymal, proneural and neural subtypes of glioma, however in classical subtype there is no such gender difference.⁽⁷⁾ Most of the brain tumors in the present study are seen in the middle age group (31-60 years) similar to observation by Jain *et al*, 2017.⁽⁸⁾⁽⁹⁾

Tumor grade: Grading of tumor was done by WHO based on histological criteria of malignancy. Most benign was considered as grade I and grade II, III, IV represent increasing malignancy. In our hospital set up, majority of the tumors belong to grade II. Majority of the meningiomas were grade I and all the GBM tumors were grade IV. Where as in a study conducted by Jain C *et al*, 2017 grade I Tumors were common.⁽⁸⁾

Symptoms: 66 % of the study population presented with headache and 24 % had seizures. In a study conducted by Strong MJ *et al*, they found that 77 % of the patients reported headache and 50 % experienced seizures. This can be explained as the seizure occurrence depends on age, tumor location and histology. Higher age, deeper location of tumor tumor type like gliomas have increased predisposition of seizure occurrence. Tumors of superficial layers of brain had headache as main symptom.⁽¹⁰⁾

QOL: Development of brain tumor itself can result in significant physical disabilities, predominantly associated with the specific tumor locations, impairment of cognitive skills and memory. A reduction of the tumor mass may alleviate neurological symptoms and cognitive deficits thereby improving quality of life. On the other hand, surgery and perioperative injuries may cause neurological deficits and focal cognitive deficits as a result of damage to normal surrounding tissue. Although these deficits are often transient, they may result in a lower quality of life.

Aliasagar V Moiyadi *et al*, 2012 reported that 33 patients had neurological worsening. In our study, 31 patients had no change in their neurological status and 13 patients experienced postoperative worsening. Headache and pain were improved by 22 % after surgery. CW. Kim *et al*, in 2016 also reported the same. This may be due to decreased mass effect.^{(11), (12)}

The social fabric and culture in India assure a good amount of social support to the patients with medical illness. Our study reported that 13 % of patients were dissatisfied with the social support from their friends and family and 22 % patients had reduced emotional function. Chirag Solanki *et al*, 2017 reported that 7 patients were not satisfied with their personal relationships and Five



patients (55.56 %) expressed mild to moderate degree of negative feelings such as depression, anxiety, despair, or blue mood.⁽¹³⁾

Conclusion:

Brain tumors are the commonest form of CNS tumors and among them, meningiomas are more prevalent. Headache and seizures were the common symptoms observed in brain tumors. Surgery is the main strategy for treating brain tumors and its main complications include seizures. Neurological deficits after surgery can lower the QOL. The QOL is considerably affected due to impaired personal and social relationships, older age, high grade tumors and female sex. Additional factors like fatigue, poor quality of sleep, inability to concentrate, depression and financial burden also affected QOL. Thus it becomes significant to address these issues that may improve the survival status with better QOL in such patients. A multidisciplinary approach including effective medical care, psychological and social support, patient- medical personnel interaction can improve the QOL of brain tumor patients

Abbreviations:

CSF: Cerebro Spinal Fluid

FACT-BR: Functional Assessment of Cancer Therapy- Brain

EORTC: European Organisation for Research and Treatment of Cancer

GBM: Glioblastoma Multiforme

HGG: High Grade Glioma

KPS: Karnofsky Performance Scale

NPS: Neurological Performance Score

WHO: World Health Organisation

QLQ-C30: Quality of Life Questionnaire Core30

QOL: Quality of Life

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