Case Study

Glioblastoma Multiforme from Diagnosis to Rehabilitation: A Prospective, Hospital- Based, Case Study of Inpatient Reported Symptoms, Physiotherapy and Functional Improvement

Parvez Inamdar ¹, Sameer Shaikh ², Darshita Fatnani ³, Sejal Sathe ⁴, Bharat Ranka ⁵, Sanobar Shaikh ⁶, Arifa Rokad ⁷.

¹MD, Inamdar Multispeciality Hospital, Pune, India. 411040.

²Medical Administrator, Inamdar Multispeciality Hospital, Pune, India. 411040.

³Physiotherapy department Incharge, Inamdar Multispeciality Hospital, Pune , India. 411040.

⁴Physiotherapist , Inamdar Multispeciality Hospital, Pune, India. 411040.

⁵Physiotherapist , Inamdar Multispeciality Hospital, Pune, India. 411040.

⁶Physiotherapist , Inamdar Multispeciality Hospital, Pune, India. 411040.

⁷Physiotherapist , Inamdar Multispeciality Hospital, Pune, India. 411040.

ABSTRACT

A physiotherapist treats patients with Glioblastoma multiforme. Glioblastoma multiforme treatment includes chemotherapy, radiotherapy, and surgery, which are being continuously developed and thus increase the survival of patients with a cancer diagnosis. More specifically, 5-year survival rates increase with a cancer diagnosis. Patients with Glioblastoma multiforme have many problems including muscle weakness, pulmonary dysfunction, fatigue, and pain. In the end, patients with cancer tend to have a decline in activities of daily living (ADL) and quality of life (QOL). Additionally, patients often have progressive disease, depression, and anxiety. Physiotherapy often helps patients regain strength and physical function and improve their QOL and independence of daily living that they may have lost due to its treatment. Physiotherapy has an important role in increasing the physical function of Glioblastoma multiforme patients. In the future, physiotherapy may be progressively needed for the management of Glioblastoma multiforme patients.

KEYWORDS: Glioblastoma multiforme, Activities of daily living, Quality of Life, Physiotherapy.

Address for correspondence: Dr. Darshita Fatnani. PT., Physiotherapy department Incharge, Inamdar Multispeciality Hospital, Pune, India. 411040. **E-Mail:** darshitafatnani@gmail.com

Access this Article online	Journal Information
Quick Response code DOI: 10.16965/ijpr.2021.102	International Journal of Physiotherapy and Research ISSN (E) 2321-1822 ISSN (P) 2321-8975 https://www.ijmhr.org/ijpr.html DOI-Prefix: https://dx.doi.org/10.16965/ijpr
	Article Information
	Received: 06 Jan 2021 Peer Review: 06 Jan 2021 Revised: None
	Accepted: 02 Feb 2021 Published (O): 11 Mar 2021 Published (P): 11 Apr 2021

INTRODUCTION

Glioblastoma multiforme is a fast-growing glioma that develops from star-shaped glial cells (astrocytes and oligodendrocytes) that support the health of the nerve cells within the brain. GBM is often referred to as a grade IV astrocytoma. These are the most invasive

type of glial tumors, rapidly growing and commonly spreading into nearby brain tissue [1]. GBM has an incidence of two to three per 100,000 adults per year. These tumors tend to occur in adults between the ages of 45 and 70 [2,3]. Symptoms vary depending on the location of the brain tumor, ex. Persistent

headaches, Double or blurred vision, Vomiting, Loss of appetite, Changes in mood and personality, Changes inability to think and learn, New onset of seizures, Speech difficulty of gradual onset [2].

Glioblastoma multiforme patients can improve their ability to function at home and in vocational and leisure pursuits and enjoy an improved level of independence and quality of life given the right support. Physiotherapy has the potential to reduce the morbidity associated with this disease and to maximize the patient's ability to function [3].

History: Patient was alright 1 month back when he complained of right-sided weakness, had to walk with support, complain of forgetfulness, slurring of speech, unable to recognize family members. Complaints started worsening in the next 10 -15 days. A CT brain was then done in Yemen on 27/08/2019 which revealed a left temporal mass lesion (45 mm) with an enhanced irregular thick wall and central solid component surrounded by massive vasogenic oedema and extent a mass effect, highly suggestive of high-grade brain tumor (Glioblastoma multiforme) solitary brain metastatic lesion. The complaint worsens further, the patient was unable to walk, was bedridden, remained drowsy and aphasic hence shifted to Inamdar multi-speciality Hospital for further treatment and management on 18/09/2019. After which on 19/09/2019 he underwent Decompression

Craniotomy for the left temporal lobe. The procedure for which was after administration of general anaesthesia, the patient was taken supine, a curvilinear incision was made, skin and muscle flap was raised. Left temporal decompression was done.

General Examination: The patient was observed in a supine position with a nasal cannula, urinary catheter, and an IV drip. The patient was unconscious/drowsy. The slight motor response was observed in the finger and the bending of the knee was seen, also the patient's speech was incomprehensible. Slight initiation of movement on command.

Wasting of biceps, triceps, and quadriceps bilaterally, adductor and hamstring on the right side.

a. Neurological Examination: Bilaterally Touch and proprioception intact.

Table 1: Deep Reflex

	Deep Reflex	Right Side	Left side
1	Bicep jerk	2	2
2	Triceps jerk	Could not be assessed	
3	Knee jerk	2	2
4	Ankle jerk	2	2

Table 2: Superficial Reflex

	Superficial Reflex	Right Side	Left Side
1	Corneal	2	2
2	conjunctival	2	2
3	Abdominal	Absent	
4	Plantar	Could not be assessed	

b. Motor Examination

· Upper limb - grade 2

i. Voluntary control

· Hand - grade 2

· Lower Limb- grade 2

Table 3: Glasgow Coma Scale.

Feature	Response	Score	Admission	Discharge
Eye Opening Response	Spontaneous--open with blinking at baseline	4		
	To verbal stimuli, command, speech	3		
	To pain only (not applied to face)	2	2	4
	No response	1		
Verbal Response	Oriented	5		
	Confused conversation, but able to answer questions	4		
	Inappropriate words	3	3	4
	Incomprehensible speech	2		
	No response	1		
Motor Response	Obeys commands for movement	6		
	Purposeful movement to painful stimulus	5		
	Withdraws in response to pain	4		
	Flexion in response to pain	3	4	5
	Extension response in response to pain	2		
	No response	1		
Total score		15	9	13

Table 4: Functional independence measure (FIM).

	Feature	Admission	Discharge
Self care			
A	Eating	1	1
B	Grooming	1	1
C	Bathing	1	1
D	Dressing - Upper Body	1	1
E	Dressing - Lower Body	1	1
F	Toileting	1	1
Sphincter Control			
G	Bladder Management	1	1
H	Bowel Management	1	1
Transfers			
I	Bed, Chair, Wheelchair	1	2
J	Toilet	1	2
K	Tub, Shower	1	2
Locomotion			
L	Walk/Wheelchair	1	1
M	Stairs	1	1
Motor Subtotal Score		13	16
Communication			
N	Comprehension	3	4
O	Expression	3	4
Social Cognition			
P	Social Interaction	1	4
Q	Problem Solving	1	1
R	Memory	1	3
Cognitive Subtotal Score		9	16
TOTAL FIM Score		22/126	32/126

Rehabilitation of multifactorial motor symptoms: One of the roles of a physiotherapist is to determine causes of motor symptoms that may then be targeted for specific rehabilitation treatments. Glioblastoma multiforme patient has balance dysfunction, Fatigue, and poor endurance or exercise, Cognitive deficits.

According to the need of the patient following treatment given.

Fig. 1: Functional Activity.

- Passive range of motion exercise initially then we progress towards active-assisted to active range of motion exercise.
- Proprioceptive Neuromuscular Facilitation stretching.
- Strengthening with 500-gram weights for all four limbs.
- When a patient's vitals were stable then we started giving him tilt table exercises and wheelchair ambulation.
- Parallel bar walking and sit to stand exercise
- Static cycle.
- Functional activity improved according to the FIM scale.
- Balance & coordination training.

Fig. 2: Static Cycle.

Fig. 3: Standing Frame Activity

DISCUSSION

There is general agreement that rehabilitation is beneficial for motor functional recovery and the prevention of complications in patients with low-grade or benign brain tumors [7];

however, there is continued controversy regarding the benefits of rehabilitation for patients with high-grade malignant tumors and a relatively short life expectancy.

This controversy stems from a paucity of randomized controlled studies that demonstrate improved functional outcomes, survival, or cost benefits [8]. Two recent studies, one randomized controlled studies, and one clinical controlled trials, have demonstrated that rehabilitation benefits glioblastoma patients [9], Increasing survival rates for malignant glioma patients have been reported [10], which highlights an increasing need for rehabilitation in this population to improve motor function and quality of life while preventing the complications of immobility such as venous-thromboembolism Malignant brain tumor patients are at a high risk of developing venous-thromboembolism [11] and this risk may be reduced as much as 6-fold by rehabilitation interventions to improve mobility in combination with recommended American College of Chest Physicians guidelines [12]. The lack of randomized controlled studies and clinical controlled trials do not suggest the ineffectiveness of multidisciplinary rehabilitation services but rather highlights the need for well-designed studies in primary brain tumor patients to clarify best practices, optimal settings, type, intensity, duration of therapy, and cost-effectiveness.

CONCLUSION

Successful rehabilitation of patients with glioblastoma multiforme tumor requires understanding the behaviour of tumor pathology, flexibility in determining functional goals and timelines for achievement of goals, and awareness of the complications of the tumor and its treatments, which negatively impact patient function. The ultimate goals of rehabilitation interventions are to maximize Rehabilitation function, promote adaptive and compensatory strategies when a full function cannot be restored, and enhance the quality of life for glioblastoma multiforme tumor patients.

Conflicts of interest: None

REFERENCES

- [1]. Holland EC. Glioblastoma multiforme: the terminator. Proceedings of the National Academy of Sciences. 2000 Jun 6;97(12):6242-4.
- [2]. Roth JG, Elvidge AR. Glioblastoma multiforme: a clinical survey. Journal of neurosurgery. 1960 Jul 1;17(4):736-50.
- [3]. Sheleg SV, Korotkevich EA, Zhavrid EA, Muravskaya GV, Smeyanovich AF, Shanko YG, Yurkshtovich TL, Bychkovsky PB, Belyaev SA. Local chemotherapy with cisplatin-depot for glioblastoma multiforme. Journal of neuro-oncology. 2002 Oct 1;60(1):53-9.
- [4]. Ching W, Luhmann M. Neuro-oncologic physical therapy for the older person. Topics in geriatric rehabilitation. 2011 Jul 1;27(3):184.
- [5]. Rowley G, Fielding K. Reliability and accuracy of the Glasgow Coma Scale with experienced and inexperienced users. The Lancet. 1991 Mar 2;337(8740):535-8.
- [6]. Manschot S, Van Passel L, Buskens E, Algra A, Van Gijn J. Mayo and NINDS scales for assessment of tendon reflexes: between observer agreement and implications for communication. Journal of Neurology, Neurosurgery & Psychiatry. 1998 Feb 1;64(2):253-5.
- [7]. O'Dell MW, Barr K, Spanier D, Warnick RE. Functional outcome of inpatient rehabilitation in persons with brain tumors. Arch Phys Med Rehabil. 1998;79(12):1530-1534.
- [8]. Khan F, Amatya B, Ng L, Drummond K, Oliver J. Multidisciplinary rehabilitation after primary brain tumour treatment. Cochrane Database Syst Rev. 2013;1:CD009509.
- [9]. Khan F, Amatya B, Drummond K, Galea M. Effectiveness of integrated multidisciplinary rehabilitation in primary brain cancer survivors in an Australian community cohort: A controlled clinical trial. J Rehabil Med. 2014;46(8):754-760.
- [10]. Davis FG, Freels S, Grutsch J, Barlas S, Brem S. Survival rates in patients with primary malignant brain tumors stratified by patient age and tumor histological type: an analysis based on Surveillance, Epidemiology, and End Results (SEER) data, 1973-1991. J Neurosurg. 1998;88(1):1-10.
- [11]. Smith TR, Nanney AD 3rd, Lall RR, Graham RB, McClendon J Jr, Lall RR, Adel JG, Zakarija A, Cote DJ, Chandler JP. Development of venous thromboembolism (VTE) in patients undergoing surgery for brain tumors: results from a single center over a 10 year period. J Clin Neurosci. 2015;22(3):519-525.
- [12]. Cassidy MR, Rosenkranz P, McAneny D. Reducing postoperative venous thromboembolism complications with a standardized risk-stratified prophylaxis protocol and mobilization program. J Am Coll Surg. 2014;218(6):1095-1104.