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*Research Article*

## The Study of Cognition Impairment in Patient with Brain Metastasis Post Radiotherapy.

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### Abstract

**Introduction-** Cognitive impairment is a common symptom in patients with brain metastasis (BM) The most common location of BM is in the cerebral hemispheres (70 %), but metastasis to the cerebellum (15 %) and brainstem (5 %) also occurs.

**Aim-** To determine cognition impairment in patients with brain metastasis post radiotherapy with using the Rowland Universal Dementia Assessment Scale (RUDAS).

**Method** – Thirty-six newly diagnosed BM patients were assessed after radiotherapy with the help of RUDAS. 19 - 60 years old both male and female, and newly diagnosed BM patients were assessed. A majority of patients had previously received chemotherapy, but no patients was actively receiving chemotherapy treatments at the time of study.

**Result-** The 6-item RUDAS assesses multiple cognitive domains including memory, visuospatial orientation, praxis, visuoconstrual drawing, judgment, memory recall and language all are examined.

**Conclusion-** The 6-item RUDAS of cognitive domains an overall, cognitive deficits were memory, visuospatial orientation and visuoconstrual drawing was the most common impairment.

**Keywords-** Brain metastasis, Radiotherapy, cognition impairment, memory, RUDAS scale.

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### Introduction-

Brain metastases Current estimates place the incidence of brain metastases (BM) from solid tumors in the United States at 170,000 new cases a year, and approximately 10–30 % of adult cancer patients will develop BM<sup>1</sup>. Incidence rates are, however, increasing because of an aging population and medical advances that contribute to cancer patients living longer the most common location of BM is in the cerebral hemispheres (70 %), but metastasis to the cerebellum (15 %) and brainstem (5 %) also occur<sup>2</sup>. Significant morbidity and

mortality is associated with BM with an overall median survival time of 7 months<sup>2</sup>.

Impairment was prevalent at baseline and primary impairments in memory, executive functioning, and fine motor control were noted<sup>3</sup>. In a smaller study, at least 70 % of patients exhibited impairments to verbal memory and a majority of patients were impaired in brain metastasis<sup>4</sup> Prevalence of cognitive impairment in brain metastases has been range from 50% to 75%. Breast cancer and lung cancer is a common cause of brain metastases, with 15-25% of patients breast cancer

develop BM. And In lung cancer 40-50% of people develop brain metastases<sup>4</sup>.

And 5-20% melanoma cancer affects brain metastases. The Rowland Universal Dementia Assessment Scale (RUDAS) is a cognitive screening tool used to assess individuals for dementia Rowland Universal Dementia Assessment Scale (RUDAS) is a useful screening test for detecting cognitive impairment. These 6 domains are assess with this scale. The RUDAS consists of six cognitive domains: memory, language, praxis, visuospatial skills, attention, and orientation. It includes tasks such as recall of words,

This function is more commonly impaired because of radiotherapy treatment.<sup>6</sup> (RUDAS) has an acceptable level of specificity while screening for dementia and its subtypes. The 6-item RUDAS assesses multiple cognitive domains including visuospatial orientation, praxis, visuoconstructional drawing, judgment, memory recall and language all are examined. Unlike some other dementia assessment scales, the RUDAS takes into account cultural and educational factors that can influence test performance. It aims to minimize biases associated with language and cultural differences, allowing for a more accurate evaluation of cognitive impairment.

Scores on the RUDAS range from 0 to 30, with higher scores indicating better cognitive functioning. The scale provides a quick snapshot of cognitive abilities and can be used by healthcare professionals as a screening tool for dementia.

Mini - mental status examination (MMSE) is assessed in previous study. But (RUDAS) has a similar sensitivity but more specificity than (MMSE) So (RUDAS) has an acceptable level of specificity while

screening for dementia and its subtypes. WBRT has also been shown to result in significant cognitive decline, which has been observed in up to 50% of patients following treatment. These patients can present with one or multiple cognitive domains affected, such as executive function, learning and memory, processing speed, and verbal fluency.

**Method-**

Thirty-six patients between age group 19-60 both male and female diagnosed with brain metastases post radiotherapy were assessed. A majority of patients had previously received chemotherapy, but no patients was actively receiving chemotherapy treatments at the time of study. Assessment was taken after radiotherapy complete with the (RUDAS) questionnaire and Out-patient department (OPD) bases patients are assessing for this study.

**Result-**

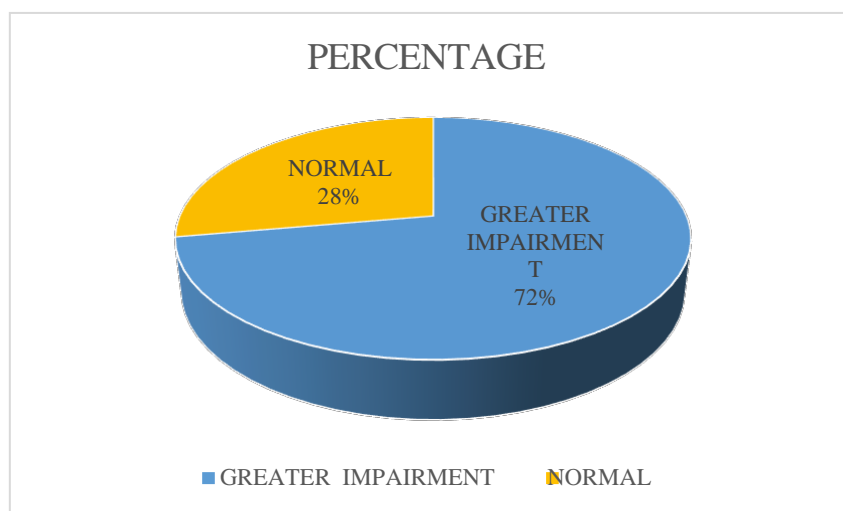
Sample demographics can be found BM patients and healthy controls did not differ significantly in age, education, gender, or ethnicity. Primary tumor locations can be found in total,

21 patients had undergone chemotherapy treatments in the past, but none were receiving chemotherapy at the time of their study assessment.

The 6-item RUDAS assesses multiple cognitive domains including memory, visuospatial orientation, praxis, visuoconstructional drawing, judgment, memory recall and language all are examined. In these cognitive domains an overall, cognitive deficits were memory, visuospatial orientation and visuoconstructional drawing was the most common impairment seen in brain metastasis patients post radiotherapy.

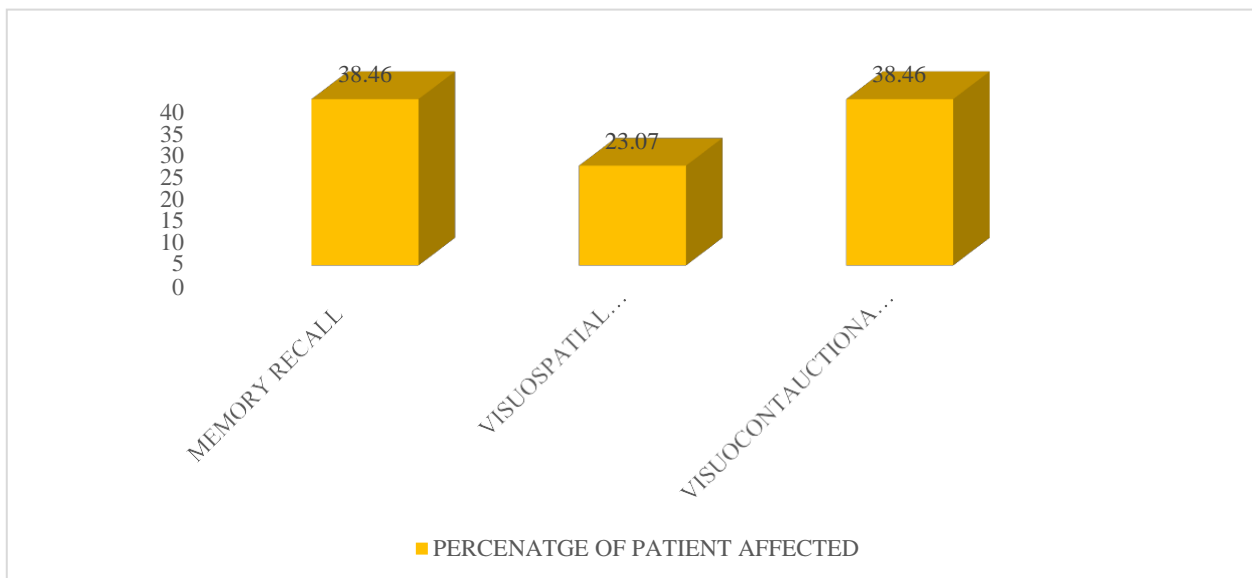
Total Number of Patient Affected Percentage

COGNITION	NUMBER OF PATINETS	PERCENTAGE OF PATINETS
GREATER -IMPAIRMENT	26	72.2%
NORMAL- IMPAIRMENT	10	27.8%



COGNITIVE DOMAIN	NUMBER OF PATIENTS AFFECTED	PERCENTAGE OF PATIENT AFFECTED
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MEMORY RECALL	10	38.46
VISUOSPATIAL ORIENTATION	6	23.07
VISUOCONSTRUCTIONAL DRAWING	10	38.46



**Discussion –**

Brain metastases are the most common intracranial tumors in adults, accounting for significantly more than one-half of brain tumors. In patients with systemic malignancies, brain metastases occur in 10 to 30 percent of adults and 6 to 10 percent of children. Brain metastases may form one tumor or many tumors in the brain. As the metastatic brain tumors grow, they create pressure on and change the function of surrounding brain tissue. This causes signs and symptoms, such as headache, personality changes, memory loss and seizures.

The purpose of this study was rate of cognition impairment in brain metastasis patients post radiotherapy. Previous studies are done on prevalence cognition impairment in older population with cancer and brain metastases during chemotherapy. Outcome of this study is mini

– mental status examination (MMSE). And their result is patient had severe cognition impairment 26.8% of impairments seen in previously study.

Our study showed patients with brain metastases who receiving radiotherapy treatment previously suffering various impaired of brain function or structured. Patients with BM were impaired in relation to across all evaluated cognitive domains including attention, memory, language, and executive functioning.72.2% of study say patients has greater impairment.

The study had a total sample size of 36 patients ranging in age from 19 to 60 years. In this study used outcome is RUDAS scale to assess cognitive impairment in the patients. The result of the study indicated that 26 out of the 36 patients (72.2%) showed greater impairment on the RUDAS scale, while the remaining 10 patients (27.8%) had normal cognitive functioning. In terms of specific cognitive domains affected, the study found that 10 patients (38.46%) experienced impairment in

memory recall.

This suggests that these individuals had difficulties with remembering and retrieving information. Also 6 patients (23.07%) exhibited deficits visuospatial orientation this means that they had difficulties in perceiving and understanding spatial relationships. such as judging distances or navigating in their surroundings. furthermore 10 Patients (38.46%) showed impairments in visuocontrational drawing. this indicates that they had difficulties in accurately for vision.

These findings impairments experienced by patients with brain metastasis post radiotherapy. The high prevalence of cognitive impairments (72.2%) highlights the significant impact of brain metastasis and the potential adverse effects of radiotherapy on cognitive functioning.

**Conclusion –**

In this study 72.2% cognition impairment seen in brain metastasis patient have received radiotherapy. The use of the RUDAS Scale highlights the prevalence of cognition deficits, particularly in the domains of memory, orientation and visuocontractonal drawing.

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