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A Clinical Profile of Supratentorial Gliomas at a Tertiary Care Hospital in North-East India

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Abstract: ***Background:*** Central nervous system tumours account for a smaller percentage of cases but the burden of illness on patient lives is markedly greater. Amongst primary malignant brain tumours, gliomas constitute the majority. ***Objectives:*** To study the clinical spectrum of supratentorial gliomas in patients presenting at a tertiary care hospital in North-East India. ***Methods:*** Our hospital based cross-sectional observational study was conducted in the Department of General Surgery and Neurosurgery, Assam Medical College & Hospital, Dibrugarh over a period of one year. It included 25 patients of glioma that were diagnosed on computed tomography (CT) and/or contrast enhanced magnetic resonance imaging (CEMRI). ***Results:*** Most cases belonged to the age group of 41 to 50 years. Males were more affected than females. Most had complaints of headache followed by seizures on presentation. The frontal lobe was most commonly affected amongst lobes. High-grade gliomas and astrocytomas were highest in number amongst subtypes. CEMRI proved to be a better investigation than CT as a tool for diagnosis. ***Conclusion:*** Improved recognition of how the disease presents clinically facilitates earlier identification and refined treatment planning. Observations across different geographical areas indicate that neuroimaging capabilities and overall healthcare resources in developing countries like ours can be adapted for better neuro-oncological management.

Keywords: Gliomas, brain tumours, astrocytoma, neurosurgery

INTRODUCTION

Central nervous system (CNS) tumours account for less than 2% of all malignancies but they are a significant burden to the existing healthcare system.[1] Gliomas are intra-cranial tumours that arise from the glial tissue which is the supportive tissue surrounding the neurons. They are the most common primary malignant brain tumour while meningiomas are most common amongst benign. Gliomas in adults are mostly supratentorial in location, lying above the tentorium cerbelli. Amongst gliomas, the most malignant ones are glioblastomas.[2] For most histology types, the 5-year survival rates keep decreasing with age. High grade gliomas are aggressive in nature, affecting the quality of life and have a poor prognosis. These tumours can occur sporadically or can be in association with genetic syndromes like neurofibromatosis, Cowden's syndrome, hereditary non-polyposis colorectal cancer and others.[3] Most patients clinically present with headaches, seizures and vomiting which are the effects of raised intracranial pressure. Focal neurological deficits, alteration in cognition and personality changes can also be present. CT and advanced MRI techniques demonstrate these pathologies radiologically and help in diagnosis. MR spectroscopy, functional MRI[4], diffuse tensor imaging (DTI) and several other methods have improved the accuracy of detecting

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these tumours with imaging modalities. Tissue diagnosis remains the tool for confirming diagnosis and classification. The WHO classification of brain tumours is based upon the cell of origin and light microscopy findings and grades them from 1 to 4. Recent changes now include molecular subtypes due to the genetic predilection of these tumours.

While a lot of research focuses on the histopathology and the management aspects, it is important to study the clinical manifestations of these disease processes. Our study focuses on the clinical presentation and demographic profile of patients in this part of the country with glioma for earlier suspicion and targeted approach in management.

MATERIALS AND METHODS

Study Design and Setting: This hospital based cross-sectional observational study was conducted in the Department of General Surgery and Neurosurgery of Assam Medical College Hospital, Dibrugarh. The duration of study was 1 year (from December 2023 to November 2024).

Inclusion Criteria: All radiologically established cases of supratentorial gliomas aged >12 years presenting in AMCH.

Exclusion Criteria:

- Patients with associated pathology such as infections or stroke
- Recurrent cases/ previously operated
- Cases of metastasis

Data Collection and Analysis: A pre-designed and pre-tested proforma was utilized to document the demographic profile, detailed history of presenting complaints, clinical examination findings, laboratory investigations (complete blood count, random glucose levels, coagulation profile, serum electrolytes) and reports of radiological imaging (CT and CEMRI).

RESULTS

Table 1: Age Distribution

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Age Group *(in years)*	Number *(n)*	Percentage *(%)*
<20	0	0%
21-30	6	24%
31-40	0	0%
41-50	11	44%
51-60	6	24%
<60	2	8%
Total	25	100%
Mean ± S.D.	44.7 ± 12.3	

Figure 1: Gender Distribution

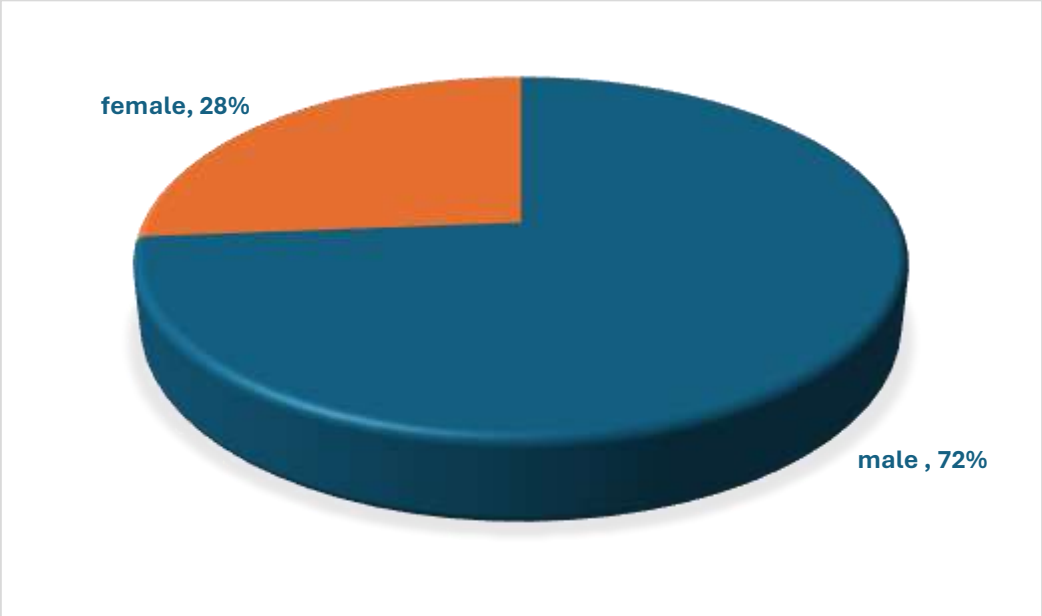

Table 2: Clinical Presentation

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Clinical Features	Number *(n)*	Percentage *(%)*
Headache	18	72%
Seizure	15	60%
Vomiting	5	20%
Confusion	3	12%
Visual disturbance	0	0%
Difficulty in speech	4	16%
Limb weakness/ Difficulty in walking	5	20%
Motor deficits	7	28%
Sensory deficits	5	20%
Cranial nerve involvement	0	0%

Figure 2: Distribution of lobe involved

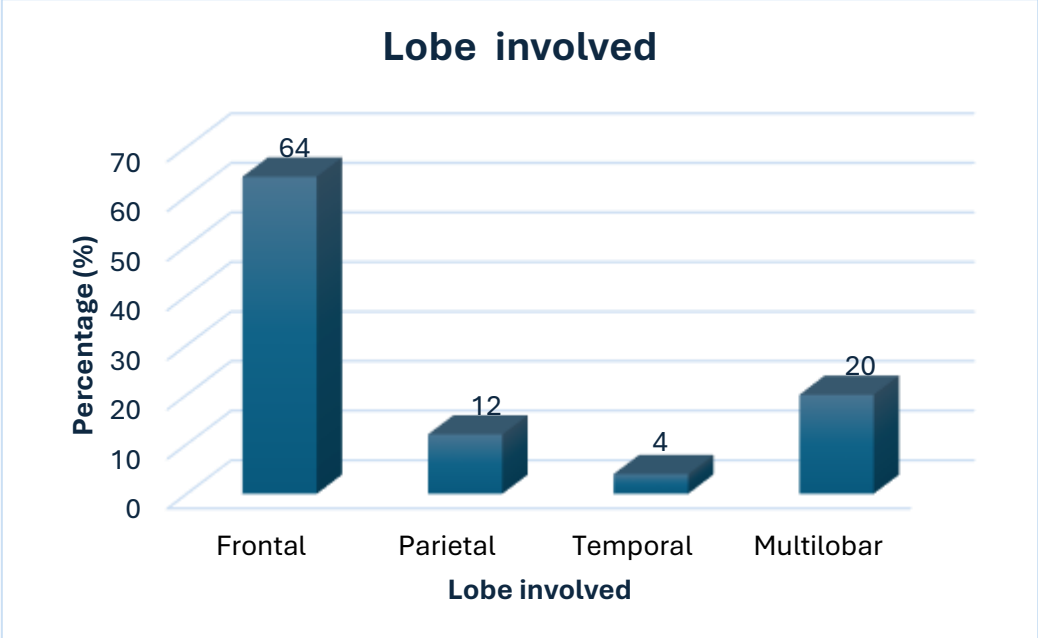

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Table 3: Subtypes of Glioma

Subtypes of Glioma	Number *(n)*	Percentage *(%)*
High grade glioma	7	28%
Low grade glioma	5	20%
Astrocytoma	7	28%
Oligodendroglioma	2	8%
Glioblastoma multiforme	4	16%
Total	25	100%

Table 4: Radiological Investigations

Investigation	Diagnostic	Significant (%)	Not Diagnostic	Not significant (%)
CT	21	84%	4	16%
CEMRI	25	100%	0	0%

DISCUSSION

In our hospital based observational cross-sectional study of 25 patients, glioma was observed to be most prevalent in the age group of 41-50 years, constituting 44% of all cases. It was followed by the age group of (51-60) years and (21-30) yrs, each accounting for 24% of the study population. The mean age was 44.7 ± 12.3. This indicates that the middle age group are mostly vulnerable. The findings are consistent with other studies like that of Jayanandhini M

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et al[5] and Mukundan et al[6] who also found the same age group to be affected mostly with glioma. The mean age for high grade glioma cases was 54.8 years while for astrocytoma cases was 37 years.

Our evaluation showed that males constituted 18 of the total cases (72%), whereas remaining 7 cases (28%) were females, yielding a 2.57:1 male-female ratio. These findings are in consistency with existing neuro-oncological research that report higher incidence of gliomas among male populations across several histopathological types, not just in India (Mukundan et al[6], Paul et al[7]) but also worldwide (Ostrom et al[8], Jiang et al[9]).Studies suggest that males are prone due to androgen exposure while estrogen provides protection in female glioma patients.[9] The male preponderance in our population reflects probable genetic patterns specific to region, less healthcare availability or lack of awareness in society for female individuals.

Since our institution caters mostly to population of Upper Assam, patients belonged from the districts (in descending order)- Jorhat (7), Tinsukia (5), Dibrugarh (4), Charaideo (3), Dibrugarh (3), Lakhimpur (2) and Golaghat (1). 92% of the study population belonged from rural areas. Most of the study population belonged to the lower socioeconomic group.

The present study demonstrates that headache constitutes the most prevalent presenting symptom (72%, n=18), a finding consistent with the established pathophysiology of intracranial mass lesions causing both direct mechanical effects and elevated intracranial pressure.[10] Seizure activity was observed in 60% (n=15) of cases, reflecting the well-characterized epileptogenic nature of cerebral gliomas.[2] Additional neurological manifestations included vomiting (20%), limb weakness or gait disturbance (20%), speech difficulties (16%), and confusion (12%). On examination, motor deficits were found in 28% and sensory deficits were present in 20%. The findings highlight the imperative for comprehensive neurological evaluation coupled with advanced diagnostic modalities in patients presenting with persistent headaches or new-onset seizures. Specifically, this should include electroencephalographic assessment and neuroimaging for seizure disorders, detailed evaluation of higher mental functions and language capabilities.

Our findings demonstrate a distinct distribution of gliomas, with frontal lobe involvement predominating (64% of single-lobe cases). Multilobe extension was observed in 20% of cases, while isolated parietal and temporal lobe involvement occurred less frequently (12% and 4% respectively). This lobar distribution pattern aligns with works of Chakrabarti et al[11], Larjavaara et al[12] and Ravishankar et al[13] which highlight the susceptibility of the frontal lobe to gliomas.

Out of 25 cases of gliomas, high grade gliomas and astrocytoma were 28% each. 20% cases were of low-grade glioma, 16% were glioblastoma multiforme and 2% were oligodendroglioma. Kumar et al[14], Krishnatreya et al[15] and Singh et al[16] had similar findings with astrocytoma constituting majority of their study population amongst gliomas. Existing literature also shows an almost equal predominance of glioblastoma multiforme in certain geographical locations.[17] The high frequency of astrocytic tumours, along with a considerable number of high-grade cases, reflects the continued challenges in controlling these highly malignant growths.

Our findings demonstrate that CT scans revealed significant abnormalities consistent with brain neoplasms in 84% of cases, while the remaining 16% exhibited non-specific features. In contrast, contrast-enhanced MRI (CEMRI) achieved a 100% yield in diagnosis. These results are similar to the findings of studies by Raikwar and Rao et al[18] and Chang et al.[19]

CONCLUSION

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In resource-limited developing countries like ours, efficiently utilizing existing assets is paramount to improve healthcare. Implementing nationwide hospital registries to systematically collect data on disease patterns is a crucial step. This data allows for strategic resource allocation, enabling authorities to prioritize regions most in need of enhanced neuroimaging facilities and targeted health interventions. Further research on a larger scale is required to shed light on the etiology by studying the dietary and lifestyle habits of the indigenous people living in this part of our country.

However, our research underscores a critical clinical finding: middle-aged men presenting with persistent headaches or new-onset seizures constitute a high-risk group. Considering the prognosis of aggressive high grade gliomas, dismissing these symptoms as minor can have devastating consequences. Prompt and thorough evaluation, including appropriate neuroimaging, is essential to diagnose potentially serious underlying conditions.

Healthcare professionals, especially surgeons, need to be aware of the clinical patterns to make informed decisions regarding investigations and treatment. Sustained public awareness campaigns are equally vital to educate the population about the significance of these symptoms and the severe risks associated with delaying medical consultation. Only through this dual approach can outcomes improve within our constraints.

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