International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Pathologic Panorama of Glial Tumours in Atertiary Care Centre - Three Years Institutional Study

Dr. K. Vani[1], Dr. K. Rama[2]

[1]Senior Resident, Institute of Pathology, Madras Madical College, India
[2]Profesor of Neuropathology, Institute of Neurosurgery, RGGGH/Madras Medical College, India
Corresponding Author: Dr. K. Vani
Dr. K. VANI, Senior Resident, Institute Of Pathology, Madras Madical College, India
Email: vanikaliappan@gmail.com
Mobile No: 9940577665

Abstract: ***Background: Gliomas are type of tumours which arise from brain and spinal cord. Three types of glial cells produce these tumours. Glioma is the most frequent primary brain tumour of adults that has presumably glial origin. Astrocytomas express glial fibrillary acidic protein, an intermediate filament found in astrocytes that is routinely used as an aid in classifying a glioma as an astrocytoma. Methods: This is a retrospective study conducted at The Department of neuropathology, Institute of neurosurgery MMC/RGGGH from January 2015 to December 2017.A total of 341 cases of Glial tumors were reviewed during this period and classified histopathologically based upon the World Health Organisation 2016 classification of CNS tumors. Data on clinical presentation and radiological features of all cases were collected from patient's records. In all cases gross features were recorded during grossing of the resected tumors. The tissue sections were processed and stained as per standard protocols. IHC markers were done in deserving cases. Age predilection, Sex Predilection, Tumor location and Histological grade of glial tumors studied. Results: Out of 1572 cases evaluated Glial tumours comprised 21.6%.Out of 341 cases 57 (16.7%) were GRADE I, 132 (38.7%) GRADE II, 51 (14.9%) GRADE III, 101 (29.6%) GRADE IV. Glial tumours show a slightly higher male predilection. The peak incidences of glial tumors are at fifth and sixth decade. Conclusion: Glial tumours exhibit a broad range of histologic patterns and thorough histologic examination is needed to classify and grade gliomas for proper management. In our study we have emphasised that an accurate histopathological interpretation and use of markers are essential for predicting the prognosis, aggressiveness and recurrence.***

Keywords: Astrocytoma, Glial Tumours, IDH, Oligodendroglioma, Sega

1. Introduction

Glial tumours are most frequent primary brain tumour of adults[1].Gliomas are diverse group of primary cns tumours which has a distinct biology, treatment and prognosis[2].The annual, global, age standardized incidence of primary malignant intracranial tumours is approximately 3.7 per 100, 000 for males and 2.6 per 100, 000 for females[3]. Gliomas are common tumours in adults and paediatric age group. In the adult population, Anaplastic Astrocytoma and Glioblastoma Multiforme are the most common glial tumours with an annual incidence of 3 to 4 per 100, 000 populations[4]

Classified according to the World Health Organisation 2016 classification of CNS tumors into GRADES I, II, III and IV

GRADE I-Lesions with low proliferative potential. eg: pilocytic astrocytoma

GRADE II –Lesions are infiltrative in nature and often recur. eg: Diffuse astrocytoma, oligodendroglioma, ependymoma, oligoastrocytoma.

GRADE III –Lesions with clear histologic evidence of malignancy including Atypia, brisk mitotic activity. eg; Anaplastic astrocytoma, Anaplastic oligodendroglioma, Anaplastic oligo astrocytoma

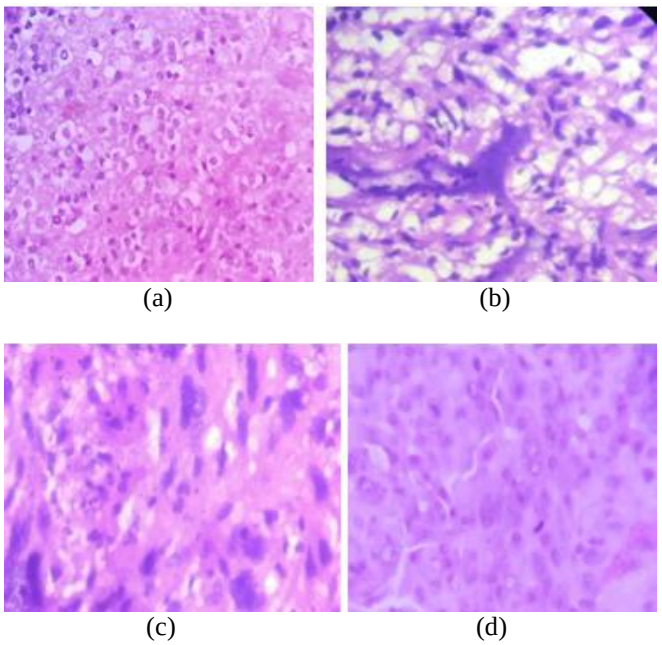
GRADE IV –Lesions are cytologically malignant, mitotically active, necrosis Fatal outcome. eg; Glioblastoma

Genetic Mutations

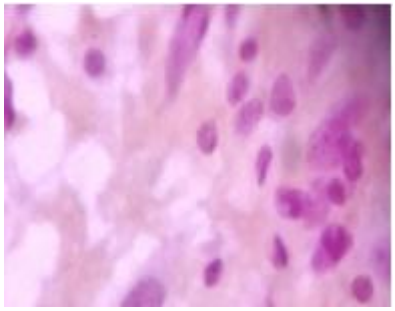
Astrocytomas show mutation in either IDH1or IDH2, presence of ATRX and P53 mutation[5].oligodendroglial tumours show IDH mutant and 1p/19q codeletion.BRAF and KIAA1549 mutation in pilocytic astrocytoma[6].

Cases with less than 1% incidence in Our Institute

1) Subependymal Giant Cell Astrocytoma (0.06%)
2) Anaplastic Oligodendroglioma (0.24%)
3) Pleomorphic Xanthoastrocytoma (0.06%)
4) Oligoastrocytoma (0.06%)
5) Giant Cell Glioblastoma (0.12%)



(a) (b) (c) (d)



(e)

a) H&E 40 X Anaplastic Oligodendroglioma
b) H&E 40 X Pleomorphic Xanthoastrocytoma
c) H&E 40 X Anaplastic Pleomorphic Xanthoastrocytoma
d) H&E 40 X Subependymal Giant Cell Astrocytoma
e) H&E 40 X Giant Cell Glioblastoma

2. Aim of Study

Our aim of the study was to assess the age wise incidence, various histomorphological variants; rare cases review in our institute and compare it with national and international literature.

3. Materials and Methods

It is a retrospective study for duration of three years from January 2015 to December 2017 received in our department of neuropathology, Institute of neurosurgery Madras Medical College

Inclusion criteria: Of all CNS tumors, only cases of glial tumors during the period 2015 – 2017 were included. Glial tumors in all age groups, sites and both the sexes were included.

Exclusion criteria: Other CNS tumors were excluded.

Sample size: 341 cases of Glial tumors

Methodology: Based on Histological, IHC features and WHO 2016 classification Glial tumors were classified. various parameters were studied and compared with national and international data.

Specimens were received from the Institute of neurosurgery, fixed in 10% formalin and processed as per specified guidelines. The clinical features, imaging and per operative findings were analysed. Histological subtyping was done as per WHO classification 2016.

4. Results

Overall incidence

Out of 1572 cases evaluated Glial tumours comprised 21.6%.Out of 341 cases 57 (16.7%) were GRADE I, 132 (38.7%) GRADE II, 51 (14.9%) GRADE III, 101 (29.6%) GRADE IV. Glial tumours show a slightly higher male predilection. The peak incidences of glial tumors are at fifth and sixth decade

Table 1: Histologic Types and Incidence: (Yearwise)

GLIOMA	% of no. of Cases				% of Gliomas Among Total CNS Tumours			
	2015	2016	2017	AVG	2015	2016	2017	AVG
Diffused Astrocytoma	18.20%	20.33%	28.70%	**22.41%**	4.18%	4.69%	5.56%	**4.81%**
Gemistocytic Astrocytoma	0.86%	6.77%	0.00%	**2.54%**	0.19%	1.56%	0.00%	**0.58%**
Anaplastic Astrocytoma	8.69%	10.16%	23.10%	**13.98%**	1.99%	2.34%	4.48%	**2.94%**
Glioblastoma	44.30%	22.88%	21.20%	**29.46%**	10.16%	5.27%	4.12%	**6.52%**
Oligodendroglioma	7.82%	22.00%	8.30%	**12.71%**	1.79%	5.07%	1.61%	**2.82%**
Anaplastic Oligodendroglioma	0.00%	0.00%	3.70%	**1.23%**	0.00%	0.00%	0.72%	**0.24%**
Oligoastrocytoma	0.86%	0.00%	0.00%	**0.29%**	0.19%	0.00%	0.00%	**0.06%**
subependymal giant cell astrocytoma	0.00%	0.00%	0.93%	**0.31%**	0.00%	0.00%	0.18%	**0.06%**
Pleomorphic xanthoastrocytoma	0.00%	0.84%	0.00%	**0.28%**	0.00%	0.19%	0.00%	**0.06%**
Pilocytic astrocytoma	19.10%	16.90%	12.30%	**16.10%**	4.38%	3.91%	2.33%	**3.54%**
Giant cell glioblastoma	0.00%	0.00%	1.85%	**0.62%**	0.00%	0.00%	0.36%	**0.12%**

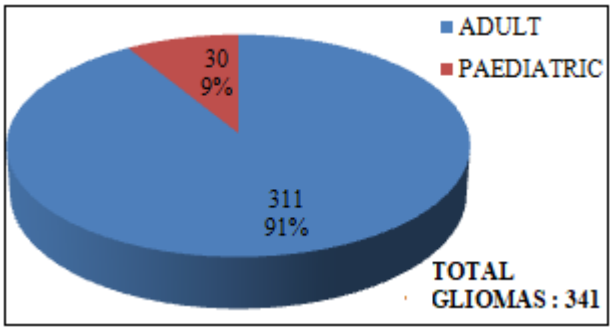


Figure 1: Incidence among Adult & Paediatric Population

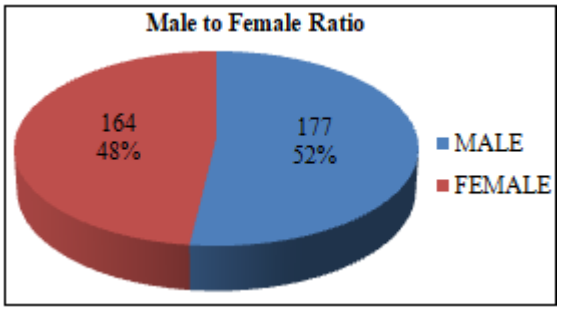


Figure 2: Male to Female Ratio
Glial tumours show a slightly higher male predilection

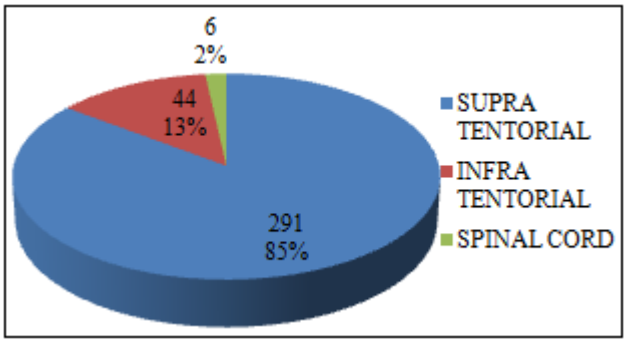


Figure 3: Distribution based on Location

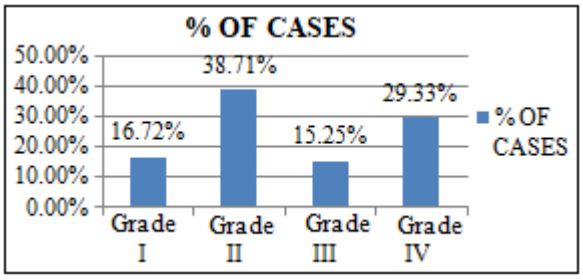


Figure 4: Grades of gliomas and their Incidence

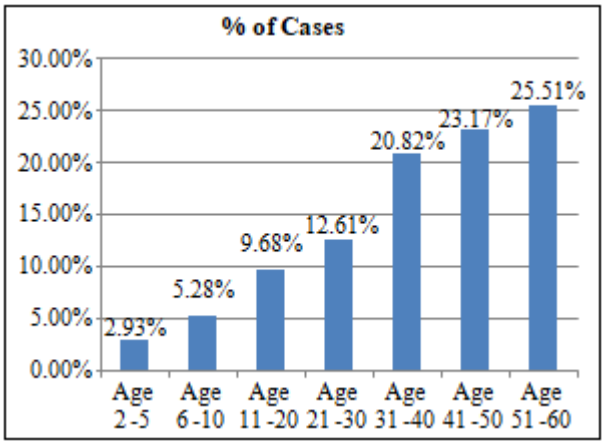


Figure 5: Agewise Incidence of Glial Tumours

The mean age at the time of diagnosis was 60 years increasing consistently with higher grade (39, 46, 56, and 60 years), for grade I, II, III, and IV, respectively

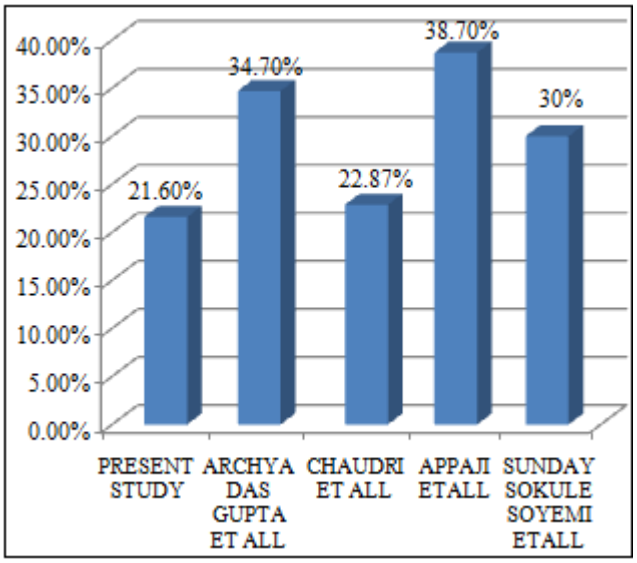


Figure 6: Comparison with Other Studies

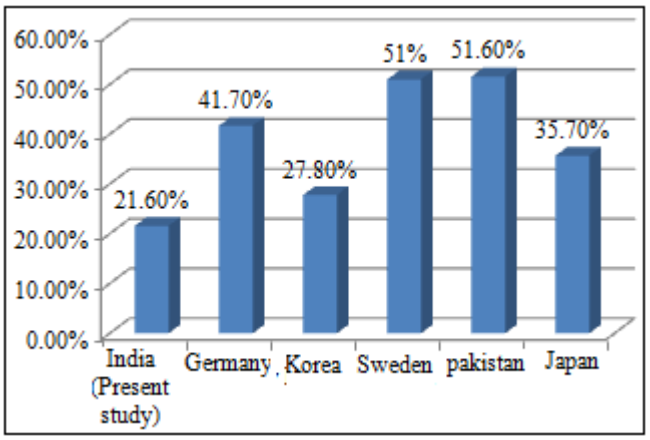


Figure 7: Comparison with Different Countries

Tables 2 & 3 compares the frequency of glial tumors in various hospitals of India and also among different developing and developed countries.

5. Discussion

Gliomas are the most common primary tumours of the central nervous system (CNS) in adults[7]. They comprise a clinically, histologically and genetically heterogeneous brain tumour category[8]. Until recently, glioma classification was largely based on microscopic examination of histological sections of tumour specimens[9] by expert pathologists, distinguishing tumours according to their microscopic similarities to different types of glial cells into astrocytomas, oligodendroglioma or ependymomas, . The current 2016 World Health Organization (WHO) Classification of Tumours of the CNS for the first time integrates molecular biomarkers together with classic histological features to define distinct glioma entities[10]. This paradigm shift in glioma diagnostics reflects the major progress in our understanding of the molecular biology of brain tumours

6. Conclusion

Gliomas are most frequent tumours arising from glial cells accounting for 25% of all CNS neoplasms with a wide variety of histological patterns.

In our present study, 341 glial tumours were analysed and the overall incidence of gliomas among CNS tumors was found to be 21.6%.The most common age group is 51-60 which is parallel with other studies. The male to female ratio is which is parallel with CBTRUS statistical report and other studies. There is higher incidence of GRADE II gliomas (38.7%) followed by GRADE IV gliomas (29.61%).The most common tumours are glioblastomas and diffuse astrocytoma. A case of oligoastrocytoma was reported in 2015.The slides were again reviewed and reclassified according to WHO 2016 update as anaplastic oligodendroglioma.

Our study also suggest that WHO grading based on the histopathological features alone has certain limitations.. Hence, the use of immunohistochemical markers aids in diagnosis. The latest WHO UPDATES OF CNS TUMOURS 2016 takes into account genetic testing along with histology. Continued analysis of multicenter studies, will potentially

lead to further understanding of the interactions of genes and environment in the development of gliomas.

References

[1] Parkin DM, Bray F, Ferlay J, Pisani P et al. Global cancer statistics
[2] Jancić E, Cvitanović H, Miholović V, Kralj D, Hranilović B et al. Epidemiology of central nervous system tumors in Karlovac area (Croatia
[3] Kim YH, Song SW, Lee JY, Kim JW, Kim YH, Phi JH et al Surgically treated brain tumors
[4] Aryal G. et al Histopathological pattern of central nervous system tumor
[5] Wrensch M, Rice T, Miike R, McMillan A, Lamborn KR, Aldape K, Prados MD et al. Diagnostic, treatment, and demographicfactors influencing survival in a population-based study of adult glioma patients
[6] Louis DN. Molecular pathology of malignant gliomas. Annu Rev Pathol Mech Dis et al.
[7] Mason WP, Cairncross JG et al. The expanding impact of molecular biology on the diagnosis and treatment of gliomas. Neurology.
[8] Rao RD, Uhm JH, Krishnan S, James CD et al. Genetic and signalling pathway alterations in glioblastoma: relevance to novel targeted therapies.
[9] Sathornsumetee S, Rich JN et al. Designer therapies for glioblastoma multiforme.
[10] Wen PY, Kesari et al S. Malignant gliomas in adults. N Engl J Med.