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HISTOPATHOLOGICAL SPECTRUM OF CNS TUMOURS IN A TERTIARY CARE CENTRE

Pathology

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ABSTRACT

Background: CNS tumours are one of the most dreaded types of cancers. They constitute a total of 2% of all tumours. These tumours show a high rate of mortality and morbidity. **Materials And Methodology:** This study was carried out in the Department of Pathology, AMCH from January 2021 to January 2022. A total of 22 Neurosurgical biopsies were received, which were processed and stained with H&E stain. The histopathological spectrum of the CNS tumours was observed and studied according to WHO classifications. **Results:** Out of the 22 cases, 14 were meningioma, 2 were Glioblastoma, 1 was Choroid Plexus Papilloma, 1 was Oligodendroglioma, 1 was Ependymoma and 2 were astrocytoma and 1 was Medulloblastoma. **Conclusion:** The information obtained from the study is useful in determining the disease burden. Despite the use of modern imaging techniques that helps in provisional diagnosis, histopathological diagnosis is the gold standard in the diagnosis of the varied types.

KEYWORDS

INTRODUCTION

Tumours of the Central Nervous System (CNS) are a diverse group of neoplasms. These tumours account for less than 2% of all malignancies.[1] These tumours are one of the most dreaded types of cancer as they are usually associated with high mortality and morbidity.[2] In India, CNS tumours account for about <1.9 % of tumours.[3] The majority of brain tumours are sporadic lesions. The risk factors include heritable genetic syndromes and prior ionizing radiation exposures such as computed tomography scans and X-rays accounting for <10% of all brain tumours. Recently, the International Agency for Research on Cancer also classified overexposure to low-frequency, non-ionizing electromagnetic waves through mobile phones as possibly carcinogenic to human beings and a potential risk factor for brain tumours such as glioma meningioma and acoustic neuromas.[4]

The clinical picture of these intracranial tumours depends on the size of the tumour, its location and the growth rate of the tumour. The age of the presentation is usually bimodal, with one peak in childhood and one in the middle age group. These tumours are dreaded due to their aggressiveness.

In these recent years, an overall increase in these tumours has been observed throughout the world, especially in less developed countries.[5] This study attempts to identify the age groups, and gender distribution and study the histopathology of the CNS tumours in the population attending our hospital. Pathological classification of brain tumours is the cornerstone of the management plan and treatment strategy.[6]

MATERIALS AND METHODS

The present study was a retrospective study conducted in the Department of Pathology, Assam Medical College and Hospital, Dibrugarh for a duration of one year from January 2021 to January 2022 on the neurosurgical biopsies received in the department. A total of 22 neurosurgical biopsies were received in the duration of 1 year. The patient's relevant clinical data such as age, sex, radiological investigations were obtained. The specimens were processed and stained with H&E stain. These slides were studied and a diagnosis was made. The tumours were classified and graded according to WHO 2021 classification.

The study included all neurosurgical biopsy specimens of primary and metastatic tumours of CNS. Non-neoplastic and inflammatory lesions were excluded. Final results were analyzed, and data was prepared to study histological patterns of CNS tumours with age and sex distribution in our area.

We have limited resources and could not expect all the standard diagnostic procedures, including molecular studies, at our centre.

RESULTS

A total of 22 cases were analysed in a duration of one year.

These tumours were primary tumours and no metastatic tumour was found in our study.

The most common age group that was affected in our study is 21 – 40 years comprising 59.09%, followed by 41 – 60 years comprising 18.18%, this was followed by the age groups 61 – 80 years and 0 – 20 years accounting for 9.09% in each age group and lastly, in the age group >80 years 4.55% was noted.

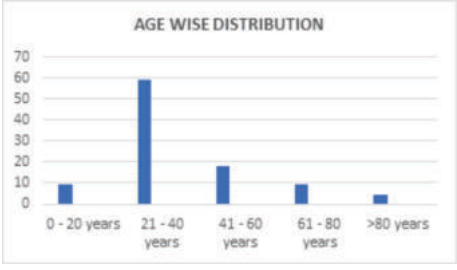

Figure 1: Age-wise Distribution Of CNS Tumours In Bar Diagram.

In our study, we found that males were more commonly affected than females with the ratio of M: F = 1.75:1

However, Meningioma was most commonly found in females, with an M: F = 1:2.5

The most common histological subtype was Meningioma accounting for 63.64%. This was followed by Astrocytoma and Glioblastoma accounting for 9.10% each. These were followed by Choroid Plexus papilloma, Oligodendroglioma, myxopapillary ependymoma, and Medulloblastoma accounting for 4.54% each.

These tumours were then classified according to the WHO Classification of CNS tumours 2021.

Table 1: Relative Frequencies Of Different Types Of Cns Tumours According To WHO 2021

Histological Types	Number Of Cases	Percentage
Gliomas, Glioneuronal types and Neuronal Tumours		27.28%
- Adult Type Diffuse Glioma		
Astrocytoma	1	
Oligodendroglioma	1	
Glioblastoma	2	
- Paediatric Type Diffuse, Low Grade Glioma		
Diffuse Astrocytoma	1	

- Ependymal Tumours		
Myxopapillary Ependymoma	1	
Choroid Plexus Tumours		4.54%
- Choroid Plexus Papilloma	1	
Embryonal Tumours		4.54%
- Medulloblastoma	1	
Meningioma	14	63.64%

The most common histological subtype of CNS tumours is Meningioma. Meningiomas also show a wide range of histological patterns. In our study, the most common subtype of meningioma was Fibrous meningioma (6/14) followed by Meningothelial Meningioma (4/14). This was followed by atypical meningioma (2/14), Transitional, and Psammomatous Meningioma (1/14) each.

Table 2: Histological Types Of Meningioma

Histological Subtype Of Meningioma	Number Of Cases	Percentage
Fibrous Meningioma	6	
Meningothelial Meningioma	4	
Atypical Meningioma	2	
Transitional Meningioma	1	
Psammomatous Meningioma	1	

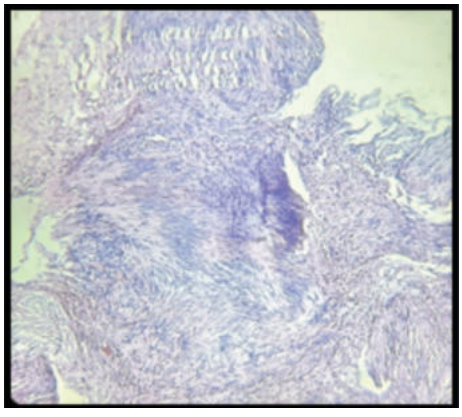

Image 1: Fibrous Meningioma (lp)

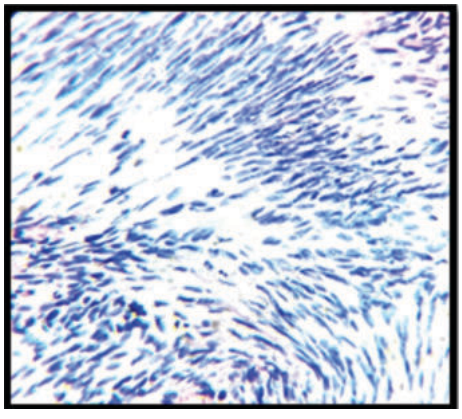

Image 2: Fibrous Meningioma (hp)

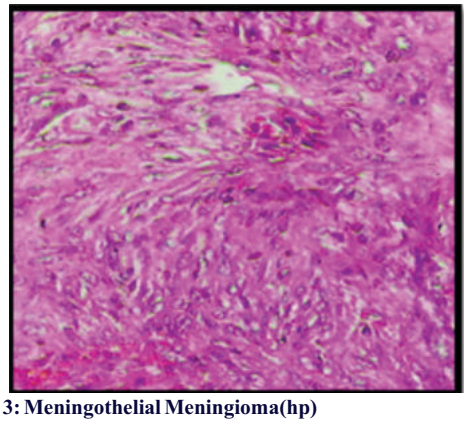

Image 3: Meningothelial Meningioma(hp)

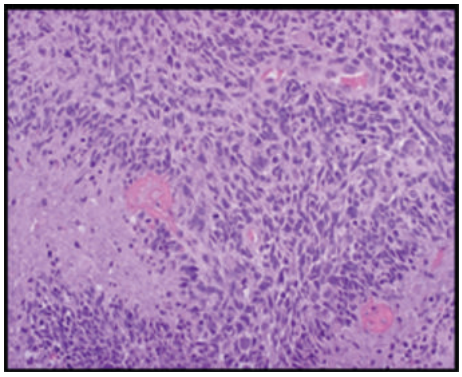

Image 4: Glioblastoma (hp)

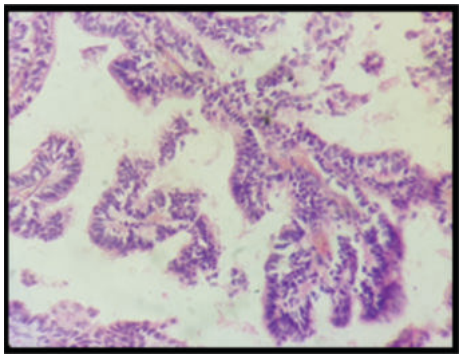

Image 5: Choroid Plexus Papilloma

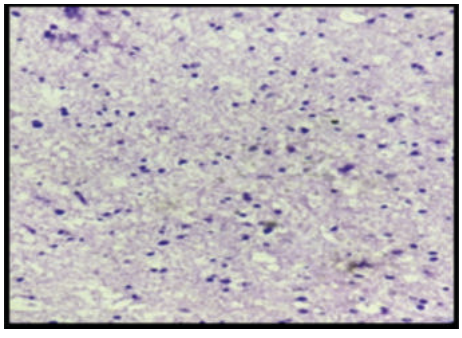

Image 6: Diffuse Astrocytoma (hp)

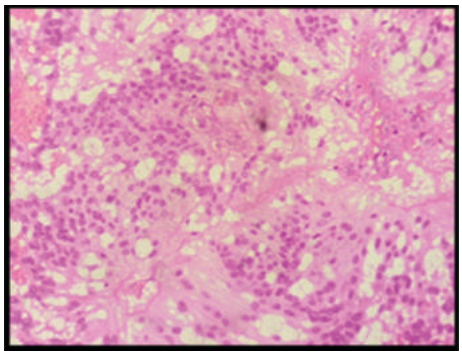

Image 7: Myxopapillary Ependymoma (hp)

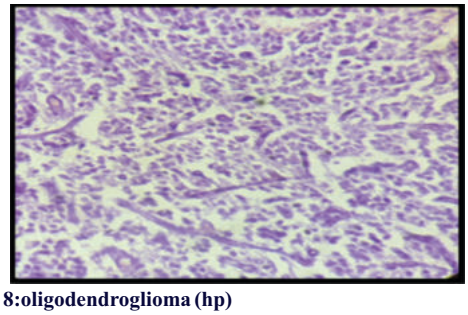

Image 8:oligodendroglioma (hp)

DISCUSSION

The present study comprised of 22 cases of CNS tumours, irrespective of age groups from a single centre and were categorised according to WHO 2021 classification.

Distribution Of CNS Tumours By Age And Sex.

The most common age group with CNS tumours in our study was 21 – 40 years. This finding was similar to studies like Kakshapati T et al[7] and Debadrita Sen et al[8].

In our study, male to female ratio was M:F = 1.75: 1, showing male preponderance. This finding was similar to the studies by Debadrita Sen et al[8] and Nibhoria S et al [9]. However, Meningioma was more common among females. This finding was similar to the findings of Yeole[10] and Ghanghoria et al[11].

Patterns Of Common CNS Tumours.

In our study we found meningiomas were the most common CNS tumour. This finding was comparable to the worldwide findings of studies like Debadrita Sen et al[8], Ghanghoria et al[11] from India, Surawicz et al [12] in the USA and Lee et al[13] in Korea and Jazayeri et al[14] in Iran.

The second most common tumour in the study belonged to the Gliomas, Glioneuronal types and Neuronal tumours in which Glioblastoma and Astrocytomas were equally found.

Studies like Debadrita Sen et al[8] as noted that Glioblastoma was the second most common tumour. And in studies like Thambi R et al[15], it was found that Astrocytic tumours were the second most common tumours.

However, studies like Arya G et al[16] noticed that the most common tumour was Astrocytoma which was followed by Meningioma.

Pattern Of Distribution Of CNS Tumours In Children

The CNS tumours in children and teenagers showed variable histologic diversity. The age groups 0 – 10 years and 11- 20 years showed the presence of different tumours. In our study we found, a case of Medulloblastoma in an 8-year-old male and a 17-year-old with diffuse astrocytoma. The earlier age group showed presence of embryonal tumours whereas the older age showed the presence of an astrocytic tumour. This similar variance in the distribution of tumours in children was also noticed by Lee CH et al[13].

However, it should also be kept in mind that it is difficult to compare these studies as there is lack of uniformity in the number of cases and study methods.

CONCLUSION

This study showed that the most common CNS tumour is Meningioma followed by Gliomas, Glioneuronal types and Neuronal tumour according to WHO 2021. The most common age group affected was 21- 40 years. The younger age group showed the presence of Medulloblastoma and Diffuse Astrocytoma.

This study, thus provides us an insight to the disease burden in our population. Even with the advanced techniques and modern ancillary studies which aid in finding the provisional diagnosis, histopathology still remains the gold standard in the diagnosis of the different types of CNS tumours. However, with the new emergence of Molecular studies a totally different spectrum of these CNS tumours and guidance in better management can we expected in the coming years.

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