



“HISTOPATHOLOGICAL SPECTRUM OF CNS TUMOURS IN A TERTIARY CARE CENTRE- RETROSPECTIVE STUDY FOR A PERIOD OF 1 YEAR”

Pathology

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ABSTRACT

Background: The annual incidence of CNS tumours range from 10-17 per 1,00,000 persons for intracranial tumors. Gliomas are the most common primary intracranial tumours and are of 3 types: Astrocytoma, ependymoma and oligodendroglioma. Glioblastoma, most frequently occurs in older age group whereas in children, pilocytic astrocytoma is most frequently found. The aim of this study is to analyse the age, sex and location wise distribution of CNS tumours and to study the histomorphological findings of these tumours. **Methodology:** This is a retrospective study done in a tertiary care hospital of north east India for a period of 1 year (2020-2021). All total of 52 cases were studied and analysed by histopathological examination. **Results:** The mean age of the patient presented with CNS tumours was 32.77 years. Out of 52 cases, 11 cases were found in children and 41 cases were of adult population. The overall male to female ratio was 1.4:1. In this study, Astrocytomas were found to be more common in males in both paediatric and adult population, whereas Meningioma was more common in females in case of adult population. Intracranial location was the most common location (96.2%) for the CNS tumours observed in this study. **Conclusion:** This study gives the current scenario of histopathological aspects of different CNS tumours as encountered in a tertiary care hospital of North east India.

KEYWORDS

Astrocytoma, CNS tumour, glioblastoma, histopathology, meningioma

INTRODUCTION:

The Central Nervous System (CNS) is made up of brain and spinal cord. Primary CNS tumours represent a heterogeneous group of benign and malignant tumours arising mainly from the brain and less frequently from the spinal cord. The incidence of CNS tumours in India ranges from 5 to 10 per 100,000 population with trend of rising and accounts for 2% of all malignancies^(1,2).

The age distribution of CNS tumours is bimodal, one peak in children and another in 45 to 70 years of age⁽³⁾. Primary malignant brain tumours occurs mainly in males whereas females have higher rates of non-malignant tumours, primarily the meningiomas⁽⁴⁾. The knowledge of location and size of CNS tumours along with their histological types and grades are important for patient management.

AIMS AND OBJECTIVES

1. To study the histomorphological findings of CNS tumours.
2. To analyse the age, sex and location wise distribution of CNS tumours.

MATERIALS AND METHODS:

This is a retrospective study undertaken in the department of pathology at Gauhati Medical College and Hospital for a period of 1 year (2020-2021). Tumours occurring in all age groups and both genders were included in the study. A total of 52 cases were studied. Detailed clinical and radiological information of the patients were collected at the time of receiving the specimens. Multiple random sections were studied under microscope after proper processing and staining with Haematoxyline and Eosin stain.

RESULTS AND OBSERVATIONS:

Table 1: Distribution of CNS tumors by age

Age group	Number of cases	Percentage of cases
0-10	4	7.7%
11-20	10	19.2%
21-30	11	21.2%
31-40	9	17.3%
41-50	12	23.1%
51-60	4	7.7%
61-70	2	3.8%
Total cases=52		100%

In our study, patients are in the age group of 0-70 years. The youngest patient was of 2 years, whereas the eldest patient was of 70 years. The mean age of the patient presented with CNS tumours was 32.77 years.

Table 2: Distribution of adult and paediatric & adolescent CNS tumors

Age	Number of cases	Percentage
Paediatric & adolescent (≤ 18 years)	11	21.2%
Adult (>18 years)	41	78.8%
Total cases	52	100%

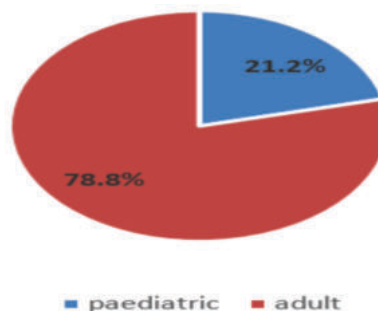


Table 3: Sex specific distribution of adult and paediatric CNS tumour

AGE	MALE		FEMALE		TOTAL	M:F RATIO
	No of cases	Percentage (%)	No of cases	Percentage (%)		
Paediatric & adolescent (≤ 18 years)	7	63.6	4	36.4	11	1.8:1
Adults (> 18 years)	23	56.1	18	43.9	41	1.3:1
TOTAL	30	57.7	22	42.3	52	1.4:1

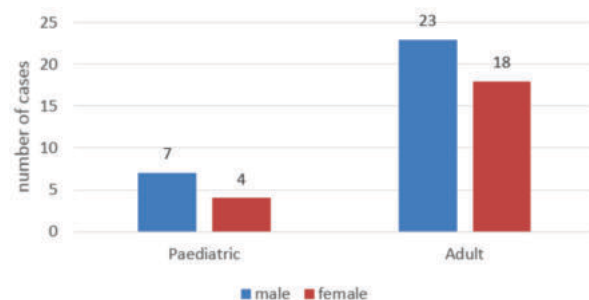
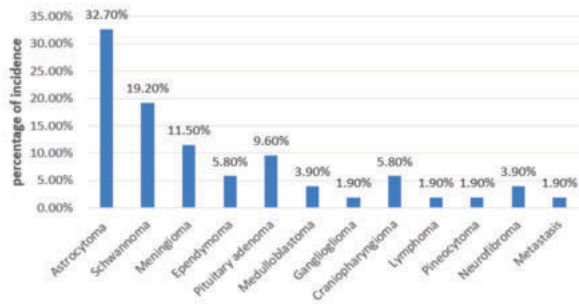


Table 4: Overall distribution of CNS tumors by specific histology

CNS tumors	Number of cases	Percentage
Astrocytoma	17	32.7%
Schwannoma	10	19.2%
Meningioma	6	11.5%
Ependymoma	3	5.8%
Pituitary adenoma	5	9.6%
Medulloblastoma	2	3.9%
Ganglioglioma	1	1.9%
Craniopharyngioma	3	5.8%
Lymphoma	1	1.9%
Pineocytoma	1	1.9%
Neurofibroma	2	3.9%
Metastasis	1	1.9%
Total	52	100%



In this study conducted on 52 specimens of CNS tumours, Astrocytoma(32.7%) was found to be the most common CNS tumour followed by Schwannoma (19.2%) and meningioma (11.5%).

Table 5: Gender specific distribution of specific histology of CNS tumors in adults

CNS tumors	Male	Female
Astrocytoma	9	3
Schwannoma	5	5
Meningioma	2	4
Ependymoma	2	1
Pituitary adenoma	3	1
Ganglioglioma	0	1
Craniopharyngioma	1	0
Lymphoma	1	0
Neurofibroma	0	2
Metastasis	0	1
Total number of cases	23	18

In our study, Astrocytoma, Ependymoma and Pituitary adenoma were found to be more common in males, whereas Meningioma was more common in females in case of adult population.

Table 6: Gender specific distribution of specific histology of CNS tumors in paediatric & adolescent population

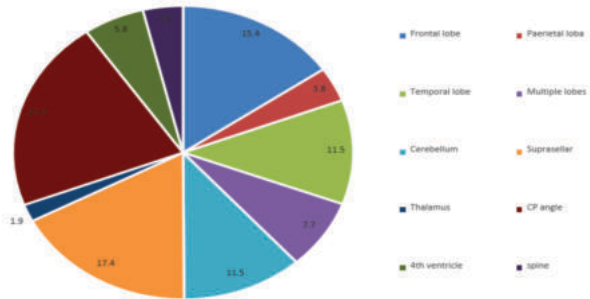
CNS tumors	Male	Female
Astrocytoma	4	1
Pituitary adenoma	1	0
Craniopharyngioma	1	1
Medulloblastoma	1	1
Pineocytoma	0	1
TOTAL	7	4

In paediatric & adolescent population, Astrocytoma was more common in males than females.

Table 7: Distribution of CNS tumors according to their location

location	Number of cases	Percentage
Frontal lobe	8	15.4%
Parietal lobe	2	3.8%
Temporal lobe	6	11.5%
Multiple lobes	4	7.7%
Cerebellum	6	11.5%
Suprasellar	9	17.4%
Thalamus	1	1.9%
CP angle	11	21.2%

4th Ventricle	3	5.8%
Spine	2	3.8%
TOTAL	52	100%



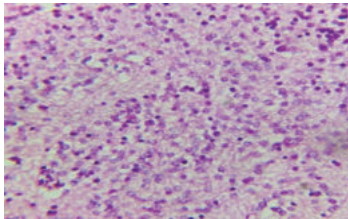
In our study, intracranial location was the most common location (96.2%) for the CNS tumours. Cerebrum (frontal, parietal, temporal, multiple lobes) was the most common site involved, where fronto-temporal location was the most frequent site involved in the cerebrum.

Table 8: Histology specific location of CNS tumors

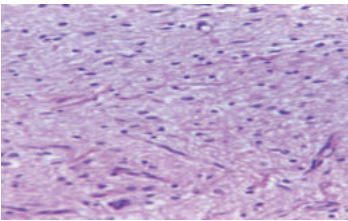
CNS TUMORS	LOCATION	No. OF CASES
ASTROCYTOMA	FRONTAL LOBE	4
	TEMPORAL LOBE	5
	PARIETAL LOBE	2
	MULTIPLE LOBES	2
	CEREBELLUM	1
	SUPRASELLAR	1
	THALAMUS	1
	4THVENTRICLE	1
SCHWANNOMA	CP ANGLE	8
	SPINE	2
MENINGIOMA	FRONTAL LOBE	3
	TEMPORAL LOBE	1
	MULTIPLE LOBES	1
	CEREBELLUM	1
EPENDYMOMA	4THVENTRICLE	2
	CEREBELLUM	1
PITUITARY ADENOMA	SUPRASELLAR	5
MEDULLOBLASTOMA	CEREBELLUM	2
GANGLIOGLIOMA	MULTIPLE LOBES	1
CRANIOPHARYNGIOMA	SUPRASELLAR	3
LYMPHOMA	CP ANGLE	1
PINEOCYTOMA	CEREBELLUM	1
NEUROFIBROMA	CP ANGLE	2
METASTASIS	FRONTAL LOBE	1

In our study, the most common location of astrocytoma was found to be fronto-temporal lobe. Schwannoma was most commonly found in the CP angle.

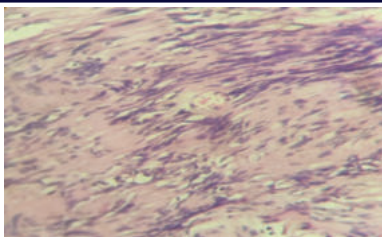
Case Photographs



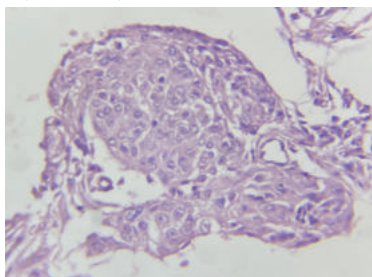
HPE OF CNS WHO GRADE 2 ASTROCYTOMA (H&E 40X)



HPE OF PILOCYTIC ASTROCYTOMA SHOWING ROSENTHAL FIBRES (H&E 40X)



HPE OF SCHWANNOMA SHOWING AREAS OF COMPACT, ELONGATED CELLS WITH OCCASIONAL NUCLEAR PALISADING (H&E 40X)



HPE OF MENINGOTHELIAL MENINGIOMA SHOWING SYNCYTIUM-LIKE APPEARANCE DUE TO POORLY DEFINED CELL BORDERS (H&E 40X)

DISCUSSION:

In our study, the incidence of astrocytoma (32.7%) is highest followed by schwannoma (19.2%) and meningioma (11.6%) (table 4). Kailash et al found that the most frequent type of CNS tumors was astrocytoma (52.5%), followed by meningioma (22%)⁽⁵⁾. A study by Janhvi Jaiswal et al found that, within the pediatric population astrocytomas (25.1%) were most common followed by embryonal (20.6%) tumours, the largest proportion of tumors in the adult population were noted to be meningiomas (23.2%), followed by glioblastomas (15.5%)⁽⁶⁾. Thakur et al also found the most common entity of CNS tumors were tumours of neuroepithelial tissue (47.2%) followed by tumors of meninges (22%) and nerve sheath tumours (15.6%)⁽⁷⁾. However a study done by Albasri Abdulkader Mohammed et al found meningiomas were the most common tumours followed by astrocytic tumors⁽⁸⁾. In the present study, out of 52 cases, 41 cases (78.8%) belonged to adult age group (>18 years) and 11 cases (21.2%) belonged to paediatric and adolescent age group (≤ 18 years) (table 2). The age group in this study ranged from 2 to 70 years. The mean age was 32.77 years. Most of the patients having CNS tumours are in the age group of 41-50 years (23.1%), followed by the age group of 21-30 years (21.2%) (table 1). The observations of the present study were consistent with the study conducted by Thakur et al⁽⁷⁾. In our present study, out of 52 cases, 30 were male and 22 were female. The overall male and female ratio was 1.4:1 (table 3); reflecting a male predominance. In adult and paediatric & adolescent population, male female ratio were 1.3:1 and 1.8:1 respectively. Jain et al found a male female ratio of 1.6:1 and Ghosal et al gave a ratio of 1.5:1, suggest that CNS tumours are more common in males than females⁽⁹⁾. In this study, out of 52 cases, 50 cases (96.2%) were located intracranially and 2 cases (3.8%) were located in the spine. Intracranially, cerebrum (38.5%) was most commonly involved, among which the involvement of the frontal lobe (40%) was maximum (table 7). Other studies done by Kailash et al⁽⁵⁾, Kumarguru et al⁽¹⁰⁾ also found the same.

CONCLUSION:

In this retrospective study of 52 central nervous system tumours, the following conclusions are made-

- The most common age group of brain tumours was in between 4th to 5th decade with slight male predominance.
- The most common location for CNS tumours was intracranial (50 out of 52) with most common site was cerebrum (20 out of 52)
- The most common tumour found in Central Nervous System was Astrocytoma (17 out of 52)

Recently it has been noticed that primary brain tumour incidence is increasing. This apparent is most likely caused by factors such as better diagnostic procedures and improved access to medical care.

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