

HISTOPATHOLOGICAL STUDY OF CENTRAL NERVOUS SYSTEM TUMORS AT TERTIARY CARE CENTRE: A TWO YEAR RETROSPECTIVE STUDY.

Histopathology

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ABSTRACT

Introduction: Tumors of Central Nervous System (CNS) are the most notorious amongst all types of cancers and account for about 1-2 % of all malignancies in cancer patients. However, their association with high morbidity and mortality makes them the most dreaded form of cancer. **Clinical Profile:** Majority of our patients presented with headache, vomiting and/or seizures and were among the age group of 30 to 40 years, with male preponderance. This retrospective histopathological analysis was carried out from January 2022 to July 2023 and total of 21 neurosurgical biopsies were received which were processed by routine histotechniques. The diagnosed CNS tumor were studied and classified according to WHO 2021 classification. **Result:** Among 21 cases, 20 were primary CNS tumors and 1 was metastatic. Among primary, tumors of meningeal origin (47%) were commonest followed by neuroepithelial origin (15.7%). Male to female ratio was 2:1 with male preponderance. Tumors were seen in all age groups but most common was 30-40 years. **Discussion:** In our study we noted meningioma was the commonest tumor same was found by Renu Thambi, Subitha Kandamuthan et al (2017). Aryal G et al (2011) noticed that astrocytoma was the most common tumor of CNS followed by meningioma which was contrary to our findings. **Conclusion:** The present study provides information regarding the burden of CNS tumors in our area. Despite the use of modern imaging techniques that help in the provisional diagnosis of disease, histological examination is the gold standard in diagnosis of variable types of CNS tumors.

KEYWORDS

CNS, Meningioma, biopsies.

INTRODUCTION

Tumors of central nervous system [CNS] are the most notorious amongst all types of cancers and account for about 1-2 % of all malignancies in cancer patients. However, their association with high morbidity and mortality makes them the most dreaded form of cancer.¹ Brain tumors are heterogeneous group of neoplasm, which include both benign and malignant cases. Brain tumors constitute only <2% of neoplasms. Clinical presentation of brain tumors depends upon the location, size of tumor and growth rate of neoplasm.² CNS tumours is known to mankind since 1774, when Louis first reported fungal tumour of the Dura mater. Previously it was stated that incidence of brain tumour in India was uncommon, but over the time with evolution of newer investigative neuroimaging techniques in India during the past two decades, it has become obvious that brain tumours are as common in this country as elsewhere in the world.³ Most of the CNS tumors are idiopathic.⁴ The etiology of primary brain tumors is likely to vary with the histologic type of the tumor and tissue origin, even though the possibility of overall etiologic factors exists. A wide range of possible etiologic factors have been evaluated, such as genetic factors and environmental determinants, encompassing physical, chemical and biologic agents. Known risk factors such as exposure to high doses of ionizing radiation to the head during childhood and hereditary factors such as neurofibromatosis and tuberous sclerosis are uncommon and explain only a small proportion of all brain tumor cases.⁴ In India, the incidence of CNS tumour is 1.9% of all tumours. According to Bhopal cancer registry in India, age adjusted incidence rate of CNS tumours during 1988-2003 showed that there was increase in incidence from 0.5 to 2.4 for male and 0.5 to 1.1 for females, respectively.⁵ According to WHO Classification 2021, Glial tumors are most common type of brain tumor and include astrocytoma, ependymoma, glioblastoma, oligodendroglioma and others.⁶ Histopathological examination forms an integral and crucial part in the management of tumors as the typing and grading of tumors play a significant prognostic and therapeutic impact.⁷

MATERIAL AND METHODS:

The present retrospective study was conducted in the Department of Pathology, Vilasrao Deshmukh Government Medical College, Latur, Maharashtra, India during study period from January 2022 to July 2023 (1.5 years). A total of 21 cases were included during this study period. All biopsies were processed according to routine histopathological techniques, stained with haematoxylin and eosin and were clinically correlated. Microscopy was done and the tumors were then classified according to WHO 2021 classification.

Aims & Objectives

Aim: To study the spectrum of CNS neoplasms histopathologically.

Objectives:

1. To study frequency of various CNS neoplasms based on histopathological findings.
2. To correlate clinicopathologically the various CNS neoplasms.

Inclusion criteria:

All the neurosurgical biopsies received in the histopathology section.

Exclusion criteria:

Inadequate biopsy, autolysed/necrosed tissue specimen, non-neoplastic lesions, neurological lesions other than lesions of the central nervous system were excluded from study.

OBSERVATION AND RESULT:

Total of 21 CNS biopsies were received in our pathology department of which 12 were male and 9 were female cases with M:F ratio of 1.3:1. The most common age group involved in the CNS lesion in present study was 31-40 years and least cases were involved from age group ranging from 11-30 years. Out of 21 cases 20 cases are of primary in origin and 1 case was of metastatic. The most common neoplastic lesion found was meningioma [9 cases (42.8%)], it was followed by pituitary macroadenoma [3 cases (14.2%)], schwannoma [3 cases (14.2%)], glioblastoma multiforme [2 cases] and 1 case each of ependymoma, craniopharyngioma, medulloblastoma and cerebral metastasis.

Table 1: Age wise distribution of CNS neoplasms in the present study.

Age [Years]	Number of cases
0-10	0
11-20	1
21-30	1
31-40	11
41-50	2
51-60	3
61-70	3
Total	21

Table 2: Distribution of CNS neoplasms based on histopathological study.

Spectrum	Number of cases	Percentage
1. Meningioma	9	42.8%

2. Pituitary macroadenoma	3	14.2%
3. Schwannoma	3	14.2%
4. Glioblastoma multiforme	2	10.0%
5. Ependymoma	1	4.7%
6. Craniopharyngioma	1	4.7%
7. Medulloblastoma	1	4.7%
8. Cerebral metastasis	1	4.7%
Total	21	100%

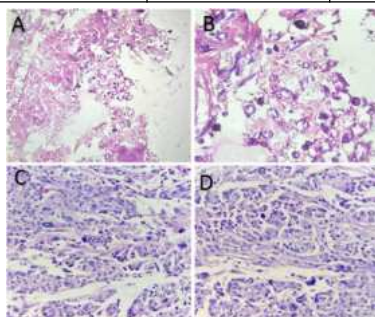


Fig.1: A, B: Meningothelial meningioma: Showing meningothelial cells arranged in whorls [H&E: A: 10X;B: 40X] C, D: Fibroblastic meningioma: Showing spindle cell neoplasm with few meningothelial whorls [H&E: A: 10X;B: 40X]

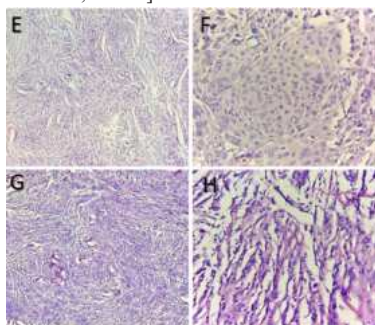


Fig.2: E, F: Psammomatous meningioma: Showing plenty of psammoma bodies [H&E: A: 10X;B: 40X] G, H: Atypical meningioma: Showing meningeal cells admixed with atypical cells with plenty of mitotic figures [H&E: A: 10X;B: 40X]

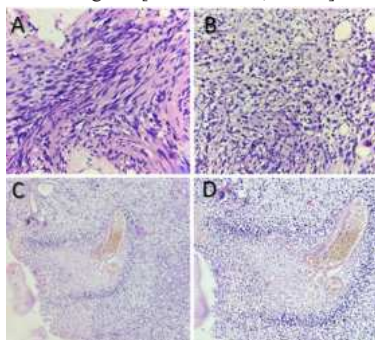


Fig.3: A,B: Ancient Schwannoma: Showing verocay bodies and bizarre cells [H&E: A: 10X;B: 40X] C,D: Glioblastoma multiforme: Showing geographical necrosis with peripheral pseudo palisading of tumor cells. [H&E: A: 10X;B: 40X]

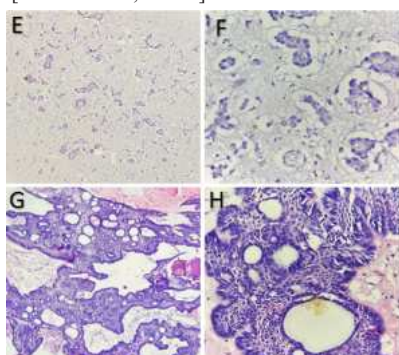


Fig.4: E,F: Cerebral metastasis from adenocarcinoma: Showing tumor cells [H&E: A: 10X;B: 40X] G,H: Craniopharyngioma: Showing trabecular squamous epithelium bordered by palisaded columnar epithelium. [H&E: A: 10X;B: 40X]

Fig: A,B: Pituitary macroadenoma: Showing monomorphic round blue cells with uniform nuclear morphology with stippled chromatin, inconspicuous nucleoli and moderately abundant cytoplasm [H&E: A: 10X;B: 40X] C: Ependymoma: Showing monomorphic round to oval cells, perivascular pseudo rosettes. [H&E: C: 40X] D: Medulloblastoma: Showing small blue round cells, Homer wright rosettes. [H&E: D: 40X]

DISCUSSION:

CNS is the host of the greatest variety of tumours, accounting for less than 2% of all malignancies and because of their location they have a guarded prognosis.^{5,8} In our study female preponderance is seen over males, which is similar to the study done by Debadrita Sen et al.⁹ In our study, we noted that meningioma (42.8%) is the most common tumour showing meningothelial cells arranged in whorls, this is similar to the study done by R. Thambi et al¹⁰, Jaiswal J et al¹¹ and Jazayeri SB¹². In our study CNS tumour seen in the third decades followed by fifth and sixth decades, this finding was in contrast to previously published studies by Chen L et al.¹³ Also we got one case of Grade IV astrocytoma (Glioblastoma Multiforme) at the age of 31 years and one case of Pituitary macroadenoma at the 58 year of age which was in contrast with previous study done by Kanthikar S N et al who found one case of Grade IV astrocytoma (Glioblastoma Multiforme) at the age of 17 years and one case of Pituitary macroadenoma at the age of 20 years.¹

CONCLUSION:

The present study provides information regarding the burden of CNS tumors in our area. Out of 21 CNS neoplasms most common was meningioma (42.8%) followed by pituitary macroadenoma (14.2%) and schwannoma (14.2%) in equal proportion. Out of total 9 meningioma cases 7 were female and 2 were male, showing female preponderance in meningioma. Despite the use of modern imaging techniques that help in the provisional diagnosis of disease, histological examination is the gold standard in diagnosis of variable types of CNS tumors. It is also important to diagnose central nervous system tumors because prognosis can vary according to diagnosis.

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