



Research Article

CHANGING INCIDENCE PATTERN OF CENTRAL NERVOUS SYSTEM TUMOR:  
A TERTIARY CENTER STUDY

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ABSTRACT

**Background:** CNS tumors comprise 1-2% of all malignancies. CNS tumors encompass a broad spectrum with regards to age, location, histology and clinical outcome. **Materials and Methods:** In the period between May 2019 - May 2021. Retrospectively analyzed data on 87 CNS biopsies were diagnosed with CNS tumors according to the World Health Organization's diagnostic criteria. Patients data were retrieved from the archives of the department of pathology, RIMS. **Results:** A total of 87 cases of CNS tumors were diagnosed during a two year periods. Age group considered between 2-70 years age group with CNS tumors that were histologically confirmed. The most common tumors was Meningioma (34.48%) with female predominance followed by Astrocytoma (22.98%) and Schwannoma (20.68%). **Conclusion:** The present study provides information regarding the spectrum and frequency of various CNS lesions in our area and concludes that histological examination of biopsies is gold standard for accurate diagnosis of various lesion of CNS when coupled with radiological and clinical data.

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INTRODUCTION

The glial tumors include astrocytoma, ependymoma, glioblastoma, oligodendroglioma and various subtypes. Non-glial tumors includes embryonal tumors, choroid plexus tumors, pineal tumors, meningeal tumors, germ cell tumors, tumors of the sellar region and tumors of hematopoietic cell origin.

An understanding of the epidemiology is required which may facilitate early detection and treatment of CNS neoplasm present clinically in a fairly characteristic manner with majority of them presenting with headache, vomiting and /or seizures. Diagnostic challenges because of atypical presentation, requires advanced neuro-radiological procedure such as Computed Tomography scans /Magnetic Resonance imaging scans, to localized it<sup>1,2,3</sup>. Earlier brain tumors in India were thought to be uncommon, but over time and with advance in neuroimaging techniques over past few decades, it has become obvious that brain tumors in our country are as common as elsewhere in the world<sup>3</sup>.

In developing countries likes india, newly diagnosed cases are not routinely registered. This causes underestimation of such cases and data. Hospital-based prevalence data is therefore the basis to estimate this diseases load.

MATERIALS AND METHODS

A total of 87 cases of CNS tumors samples were received in department of pathology, RIMS for histopathological examination from May 2019 to May 2021. Biopsies of CNS

lesions were preserved in 10% formalin, followed by fixation for 24 hours. Hematoxylin and Eosin stained sections of these CNS lesions were obtained by routine processing and paraffin embedding. Clinical history of all cases was collected in a pretested performa. All cases were reviewed by the authors and diagnosis was confirmed applying latest WHO 2016 classification and diagnostic criteria for CNS neoplasms<sup>4</sup>. The relative frequency of tumors and the distribution of age, sex and location were analyzed. The statistical analysis was done by using Statistical Package for Social Sciences (SPSS) version 17 for windows.

RESULTS

A total of 87 cases, 85 were neoplastic lesions and 2 were non-neoplastic lesions. The most frequent type of CNS tumor was meningioma (30 cases, 34.48%), followed by Astrocytoma (20 cases, 22.9 %) Schwannoma (18 case, 20.68%) and Medulloblastoma (6 cases, 6.89%). (Table no 1)

Headache, vomiting and seizures were the most frequent presenting symptoms (headache being the most common) of patients and radiological examination showed SOLS (space occupying lesions) in most of the cases.

Table No 1 Relative Frequencies of Various Tumors

Histological types	Incidence	%
Meningioma	30	34.48%
Astrocytoma	20	22.98%
Schwannoma	18	20.68%
Medulloblastoma	6	6.89%
Oligodendroglioma	5	5.74%

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Ependymoma	2	2.29%
Hemangioblastoma	2	2.29%
PNET(Primitive Neuro-Ectodermal Tumors)	1	1.14%
Central neurocytoma	1	1.14%
Total	85	

Out of Total of 87 cases, 2 cases were non-neoplastic showing Arachnoid cyst (n=2, 2.29%) The ratio of number of Male (n=48) and female (n=39) patients was (48/39) 1.23:1. (Table no 2)Female outnumbered male in meningioma (1.14:1). The youngest patient seen in 2 cases of meningioma,2 cases of medulloblastoma,1 case of astrocytoma,1 case of central neurocytoma and 1 case of Arachnoid cyst. Rest all cases were of between 18 years to 70 years. The most common sites for astrocytoma and meningioma were the fronto-parietal region and the fronto-temporal region respectively.

**Table No 2** Distribution of Lesion According To Sex

Histological types	Male	Female
Meningioma	14	16
Astrocytoma	10	10
Schwannoma	8	10
Medulloblastoma	5	1
Oligodendroglioma	5	0
Ependymoma	2	0
Hemangioblastoma	2	0
PNET	1	0
Central neurocytoma	1	0
Arachnoid cyst	0	2

**DISCUSSION**

In the present study we observed that the CNS tumor that had the highest incidence was meningioma (34.48%) with female predominance.

There have been several important reviews of CNS tumors regarding the incidence and relative percentages of these neoplasms in the United States, Europe and Asia. The most common CNS tumors were astrocytoma in united States (49.6%)<sup>5</sup>, Taiwan (32.9%)<sup>6</sup>, Mexico(33%)<sup>7</sup> and Germany (41.7%).<sup>8</sup>

In contrast to our study, the most common primary CNS tumors in Korea was meningioma (31.2%) followed by glioblastoma (30.7%).<sup>9</sup>Meningioma was the most common tumor among clinically diagnosed tumors, followed by neuroepithelial tumor, Schwannoma, and pituitary tumor among atomic bomb survivors in Hiroshima and Nagasaki, japan.<sup>10</sup>The difference in the relative frequency and the tumor distribution among populations in different countries may be due to genetic and environmental factors. In a report from USA, meningioma were the only tumors with a significant excess in female.<sup>11</sup>

Histological grading is a means of predicting the biological behavior of neoplasm. The grading factors influence the choice of therapy. The most common type of Meningioma in our study was WHO grade I type. The second most common type of primary CNS tumor in our study was Astrocytoma (WHO grade IV type).

**CONCLUSION**

The most frequent type of CNS tumors in this study was Meningioma followed by Astrocytoma, Schwannoma and Medulloblastoma.

The same study was done by Tirkey D.*et al* (2018) department of pathology RIMS Ranchi but the result was different in there study Astrocytoma was most common tumor followed by meningioma and Schwannoma. This study may provide the representative incidence of various types of CNS tumors nationwide multicenter study is necessary in the future.

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