RESEARCH ARTICLE

RETROSPECTIVE HISTOLOGICAL ANALYSIS OF CNS TUMOURS – A 5 YEAR STUDY

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ABSTRACT
Background: Cancers of the central nervous system (CNS) are considered to be among the most notorious of all cancers. The brain and spinal cord are complex & delicate organs that control the higher functions, the peripheral nervous system, and many of the voluntary and involuntary systems of the body. It has been found that about 1/3 of all cancers metastasize to the brain. Low-grade tumors have been found over time to progress to high grade tumors.
Aims & Objectives: The objective of this article is to provide a current overview of the descriptive epidemiology of central nervous system tumors in our hospital set up. Our target was to study incidence of various lesion in light of WHO classification (2007) & study relevant statistics.
Materials and Methods: A total of 65 cases of CNS tumors were retrieved from the archives of the Department of Pathology, M.G.M. Medical College, Indore from May 2009 to May 2014. The diagnoses in all the cases were made on hematoxylin & eosin stained slides of processed tissue.
Results: In our study, meningioma was the most common lesion followed by astrocytoma. Out of total 65 cases, we came across 27 cases of meningioma and Astrocytoma was in 16 cases. 5 cases of ependymomas were seen.
Conclusion: Males are at much higher risk of developing CNS lesion in comparison to females. WHO Grade I lesions were more common in our institutional set up. Astrocytic WHO Grade III lesion was more common in comparison to Grade I lesion indicating need for imaging & neurology consultation at grass root level.
Key Words: CNS Lesions; Histology; WHO; Statistics; Meningioma; Astrocytoma

Introduction

Cancers of the central nervous system (CNS) are considered to be among the most notorious of all cancers. The brain and spinal cord are complex & delicate organs that control the higher functions, the peripheral nervous system, and many of the voluntary and involuntary systems of the body. It has been found that about 1/3 of all cancers metastasize to the brain.

The majority of patients die within first year of diagnosis of malignant lesion and less than 3% survive more than 3 years.[1] Characterizing the different forms and range of CNS neoplasm's in different regions may provide etiological clues to some tumor types. Histological descriptions of CNS tumors, as they occur in south East Asia and particularly in Singapore, are rare.[2]

There is substantial increase in incidence of CNS tumor, mostly attributed to improvements in neuroimaging access and technology. Tumors of the CNS account for less than 2% above all malignancies.[1]

Low-grade tumors, including low-grade astrocytomas, oligodendrogliomas and mixed tumors, have been found over time to progress to high grade tumors. The time varies depending on the genetic & morphological makeup of the tumor. The same can be determined by proper examination of surgical specimen. Prognosis of high grade tumor is grave & few of the patients may not even survive 1 year after diagnosis.

As seen among children under 14 years, and in adults 70 years and older, incidence rates for brain malignancies were significantly higher from 1991 to 1995 in comparison to what was seen from 1975 to 1979.[3] Age adjusted incidence rate for cancer of brain-nervous system in Bhopal cancer registry during 1988-2003 showed that there was an increase in the incidence of CNS tumor from 0.5 to 2.4 for males and 0.5 to 1.1 for females, respectively.[1]

Although changes in diagnostic capabilities over the period provided a plausible explanation, the possibility exists that some factors might have emerged that may provide some protection against low-grade tumors.[3]

The objective of this article is to provide a current overview of the descriptive epidemiology of central nervous system tumors in our hospital set up. Our target was to study incidence of various lesions in light of WHO classification (2007)[4] & study relevant statistics.

Materials and Methods

A total of 65 cases of CNS tumors were retrieved from the archives of the Department of Pathology, M.G.M. Medical College, Indore from May 2009 to May 2014. The diagnoses in all the cases were made on histological examination of processed tissue. All the sections were processed by fixing, dehydration, and clearing followed by impregnation with wax. The wax blocks were cut in 5-6 µ sections & stained by hematoxylin and eosin stain. All cases were confirmed applying revised WHO classification (2007).[4] The relative frequency of tumors and the distribution of age & sex were analyzed.

Data was collected in the following format,

Path No.	Name	Age	Sex	Site of Lesion

Results

Total 65 cases were obtained from archives of department of pathology, M.G.M. Medical College, Indore from May 2009 to May 2014 during period of 5 years. In our study meningioma was the most common lesion followed by astrocytoma. We came across 27 cases of meningioma out of total 65 cases of CNS tumors. Astrocytoma was second most common tumor – 16 cases in all. 5 cases of ependymomas were seen.

On the basis of origin of cell type, meningeal tumors were the commonest (n=27) followed by glial cell tumors (astrocytoma+ ependymomas= 21). Only 4 cases of primitive neuroectodermal tumors (medulloblastoma) were seen. 4 cases of peripheral nerve sheath tumors (Schwannoma (Neurilemmoma) + Neurofibroma) were also seen.

Our study showed that astrocytoma was commoner in males whereas meningioma was commoner in females. Ependymoma was also common in males. Overall, glial cell tumors were common in males. Craniopharyngioma & Haemangioblastoma were seen equally in both sexes. CNS tumors showed predilection for males (n=35) in comparison to females (n=30). Male to female ratio was 1: 0.86.

Age distribution seen in our study revealed that tumors were more common in age group of 31-40 years (n=16) followed by 41-50 years (n=13). Majority of CNS lesions were seen in 31-50 years of age group, 29 out of 65 accounting to nearly 45% of cases.

Table-1: Relative frequencies of various tumors

Histological Types	N	%
Astrocytoma	16	24.61
Meningioma	27	41.54
Medullobastoma	04	6.15
Ependymomas	05	7.7
Craniopharyngioma	04	6.15
Haemangioblastoma	02	3.07
Angioma	01	1.54
Choroid plexus carcinoma	01	1.54
Schwannoma (Neurilemmoma)	04	6.15
Neurofibroma	01	1.54
Total	65	100

Table-2: Sex wise distribution of various lesions

Histological Types	Male	Female
Astrocytoma	11	05
Meningioma	08	19
Medullobastoma	3	1
Ependymomas	4	1
Craniopharyngioma	2	2
Haemangioblastoma	1	1
Angioma	1	--
Choroid plexus carcinoma	1	--
Schwannoma(Neurilemmoma)	3	1
Neurofibroma	1	

Table-3: CNS tumor according to age

Histological Types	Age Group (Years)							
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80
Meningioma	0	1	3	6	11	3	2	1
Astrocytoma	0	2	3	5	2	2	2	0
Ependymomas	1	3	1	0	0	0	0	0
Medullobastoma	2	0	0	1	0	1	0	0
Craniopharyngioma	2	0	0	1	0	1	0	0
Haemangioblastoma	0	0	1	1	0	0	0	0
Angioma	0	0	0	1	0	0	0	0
Choroid plexus carcinoma	1	0	0	0	0	0	0	0
Schwannoma (Neurilemmoma)	0	1	1	1	0	0	1	0
Neurofibroma	0	0	0	0	0	0	1	0
Total	6	07	09	16	13	7	6	1

Table-4: CNS tumor according to WHO classification[4]

Histological Types	WHO Grading				Total	
	I	II	III	IV	N	%
Meningioma	26	0	01	0	27	41.54
Astrocytoma	01	0	11	04	16	24.61
Ependymomas	02	03	0	0	05	7.7
Medullobastoma	0	0	0	04	04	6.15
Craniopharyngioma	04	0	0	0	04	6.15
Haemangioblastoma	02	0	0	0	02	3.07
Angioma	01	0	0	0	01	1.54
Choroid plexus carcinoma	0	0	0	01	01	1.54
Schwannoma (Neurilemmoma)	04	0	0	0	04	6.15
Neurofibroma	01	0	0	0	01	1.54
Total	41	03	12	09	65	100

Age group from0-10 years showed presence of 6 tumors in all, among which medullobastoma & craniopharyngioma (n=2) accounts for 4 cases. 7 lesions were seen in 11-20 years of age group and 9 lesions were seen in 21-30 years of age group. Single lesion was seen

in 71-80 years of age group. Predominantly tumors had predilection for fronto parietal / frontal region in our study. We observed that grade I lesions were the commonest (n=41), followed by grade III (n=12) grade IV (n=9) & grade II (n=3). Majority of grade III lesions were anaplastic astrocytoma.

Discussion

In our study, we noted that meningioma was the commonest tumor (41.54%). The same was found by Surawicz et al (1999)[5] in USA. Lee et al (2010)[6] in Korea also noticed that most common tumor was meningioma (31.2%).

Aryal G. et al (2011)[9] in Nepal noticed that astrocytomas were most common tumors of CNS followed by meningiomas which was contrary to our findings. According to Materljan E et al (2004)[8], neuroepithelial tumors were common CNS neoplasm. Sex distribution showed that meningioma affects females more than males, as it was noted by Surawicz et al.[5]

In our study, astrocytoma was more common in males than females – 68.75% of astrocytoma was seen in males. According to Surawicz et al (1999) gliomas affect about 40% more males than females.[5] Our study showed that male to female ratio was 1: 0.86. According to Balkishan B Yeole et al (2008) too, brain – nervous system cancer were more common in male than female.[1] But according to Lee et al (2010) 6 CNS tumors occurred in females more often than in males (female to male, 1.43: 1).

According to WHO classification, majority of lesions belonged to Grade I in comparison to grade III or IV. But in cases of astrocytoma, grade III lesion was more common in comparison to Grade I lesion.

Conclusion

Males are at higher risk of developing CNS lesion in comparison to females. WHO Grade I lesions were more common in our institutional set up. Astrocytic WHO Grade III lesion was more common in comparison to Grade I lesion indicating need for imaging & neurology consultation at primary grass root level.

A retrospective epidemiological review of brain tumors is particularly important for future research because it can demonstrate the changes in the tumor spectrum of a population.

It can reveal possible risk factors and indicating potential therapy methods. As the geographic location changes tumor pathology changes & as tumor pathology changes the scheme of management also changes. Further multi-centric studies should be conducted to have substantial data for use in future.

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