Original Research Article

Study of prevalence pattern of neoplastic intracranial tumor in the tribal area of Rajasthan, India

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ABSTRACT

Background: Prevalence estimates available for brain tumors reflect the portion of tumors that are malignant. Just as routine incidence statistics from cancer registries under represent the full spectrum of primary brain tumor cases. Prevalence rates are ideally suited to provide an overall estimate of cancer survivorship and direction for health planning.

Methods: A total of 70 cases of CNS tumors were retrieved from the archives of the Department of Pathology, Geetanjali Medical College & hospital, Udaipur from April 2014 to September 2016. The diagnoses in all the cases were made on histological examination of processed tissue.

Results: In our study astrocytoma was the most common brain tumor (34.28%), followed by meningioma (32.85%). The third common tumor was oligodendroglioma (11. 42%). However, metastatic brain tumors were seen in only 5.55 % of cases in the present study.

Conclusions: Males were at higher risk of developing CNS lesions in comparison to females. WHO Grade I lesions were more common in our institutional set up. Astrocytoma WHO grade IV lesions were more common in comparison to Grade I lesions, indicating need for imaging and neurology consultation at primary grass root level.

Keywords: Astrocytoma, Meningioma, Prevalence, WHO grading

INTRODUCTION

Cancer statistics routinely include incidence, mortality and survival rate estimates. Although useful for many reasons, these estimates do not provide a complete understanding of the burden of disease. Prevalence rate estimates can be used to supplement the description of disease by measuring the proportion of a population that is affected by disease (new patients and former patients who are survivors) at a given point in time. Prevalence estimates reflect the combined patterns of incidence, survival, and population aging.[1]

The annual incidence of tumors of the CNS ranges from 10 to 17 per 100,000 persons for intracranial tumors and 1 to 2 per 100,000 persons for intra spinal tumors; the majority of these are primary tumors, and only one fourth to one half are metastatic in nature. Tumors of the CNS account for nearly 20% of all cancers of childhood. Seventy percent of child hood CNS tumors arise in the posterior fossa; a comparable number of tumors in adults arise within the cerebral hemispheres above the tentorium.[2] Prevalence estimates available for brain tumors reflect the portion of tumors that are malignant. Just as routine incidence statistics from cancer registries underrepresent the full spectrum of primary brain tumor cases.[3] The omission of nonmalignant tumors in prevalence estimates falsely minimizes the impact of this disease in a population. This is particularly important because the benign CNS tumors with a better prognosis

contribute far more to prevalence estimates than malignant cases with a poorer prognosis.[4] Prevalence is the best indicator of cancer survivorship in the population, but few studies have focused on brain tumor prevalence because of previous data limitations.[5]

METHODS

A total of 70 cases of CNS tumors were retrieved from the archives of the Department of Pathology, Geetanjali Medical College and hospital, Udaipur, Rajasthan, India from April 2014 to September 2016. 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 4- 5μ sections and stained by hematoxylin and eosin stain. All cases were classified as per revised WHO classification (2007) of CNS tumors. The relative frequency of tumors and the distribution of age and sex were analyzed. Special stain and immunohistochemistry were done wherever required.

RESULTS

In our study astrocytoma is most common brain tumor followed by meningioma out of 70, 24 cases (34.28%) are of astrocytoma and 23 cases (32.85%) are of meningioma. The third common tumor is oligodendroglioma which is 8 out of 70 cases. In the present study astrocytoma was common in males whereas meningioma and oligodendroglioma was common in females. Overall CNS tumors showed predilection for

male (n = 36) in comparison to female (n = 34). Male Female ratio is 1:0.95.

Table 1: Histopathological diagnosis.

Brain tumor	Number	Percentage
Astrocytoma	24	34.28
Meningioma	23	32.85
Oligodendroglioma	8	11.42
Mixed glial tumor	5	7.14
Metastatic tumor	4	5.71
Pitutary adenoma	3	4.28
Medulloblastoma	2	2.85
Ependymoma	1	1.42
Total	**70**	**100**

Table 2: Sex wise distribution of brain tumors.

Brain tumor	Male	Female	Total
Astrocytoma	14	10	24
Meningioma	8	15	23
Oligodendroglioma	3	5	8
Mixed glial tumor	2	3	5
Metastatic tumor	4	0	4
Pitutaryadenoma	3	0	3
Medulloblastoma	1	1	2
Ependymoma	1	0	1
Total	**36**	**34**	**70**
Percentage	51.5%	48.5%	100

Table 3: Brain tumors according to age group.

Brain tumor	0- 10	11-20	21-30	31-40	41-50	51-60	61-70	71-80
Astrocytoma	1	3	3	5	4	4	3	1
Meningioma	0	2	2	3	6	8	1	1
Oligodendroglioma	0	0	2	2	2	0	2	0
Mixed glial tumor	0	1	1	0	3	0	0	0
Metastatic tumor	0	0	1	0	1	2	0	0
Pitutary adenoma	0	0	0	0	3	0	0	0
Medulloblastoma	1	0	0	1	0	0	0	0
Ependymoma	0	0	0	1	0	0	0	0
Total	**2**	**6**	**9**	**12**	**19**	**14**	**6**	**2**

Most of the CNS tumors in the present study were seen in the middle age group (31-60 years).We observed overall Grade 1 and Grade 2 are the commonest tumors followed by grade 4 and then Grade 3 brain tumors. Majority of primary brain tumors were of Grade 1 and2.Among

Astrocytoma Grade IV were commonest tumors in present study. In our study 4 (5.55%) cases of metastatic brain tumors were observed. All were males and their primary sites were from lung, thyroid, testis and bone marrow.

Table 4: Brain tumor according to WHO classification.

Brain tumor	Grade 1	Grade 2	Grade 3	Grade 4	No grade	Total
Astrocytoma	4	7	1	11		23
Meningioma	15	6	3	0		24
Oligodendroglioma	0	5	3	0		08
Mixed glial tumor	0	0	1	4		05
Metastatic tumor	-	-	-	-	4	04
Pitutary adenoma	-	-	-	-	3	03
Medulloblastoma	0	0	0	2		02
Ependymoma	0	1	0	0		01
Total	**19**	**19**	**8**	**17**	**7**	**70**

Table 5: Metastatic brain tumor with primary.

Meastatic brain tumor	Primary	
Meta.yolk ssac tumor	Testis	1
Plasma cell neoplasm	Bone marrow	1
Metastatic ca	Lung prostate	1
Meta.papillary adenocarcinoma	Thyroid	1
Total		**4**

DISCUSSION

Prevalence rates are ideally suited to provide an overall estimate of cancer survivorship and direction for health planning as they reflect the complex relationships between incidence, survival and population demographics and hence provide valuable information to the research and medical community.

In the present study, we calculated prevalence rates and expected numbers for all primary brain tumors. In our study we noted astrocytoma was the commonest tumor (34.28%) followed by meningioma (32. 85%). Aryal et al from Nepal also reported astrocytoma as most common tumor of CNS followed by meningioma.[6] Overall, no significant sex predilection of CNS tumors was observed in the present study. In our study astrocytomas was common in males, according to Surawicz et al gliomas affect about 40% more males than females.[7] In our study meningiomas were more common in females. Sex distribution showed that meningiomas affected females more than males as it was noted by Surawicz et al.[7] According to previous studies Surawicz et al in USA.[7] Lee et al in Korea also noticed that most common tumor was meningioma, which is contrary to our finding.[8] A higher prevalence rate of malignant brain tumors has been reported among males than among females in the United States.[9,10] These findings are consistent with our results. According to WHO classification majority of tumors belong to Grade 2, then grade 1.in cases of astrocytoma grade 4 tumors were more common.

The World Health Organization (WHO) sponsors a uniform terminology and grading system of brain tumors.

Histologic criteria of malignancy are applied by WHO to gliomas and some other tumors. Starting with the most benign as grade I, numerical grades II, III, and IV represent increasing malignancy. Some prefer using grades 1, 2, 3, and 4 because these are not affected by double vision. Numerical grades assigned by WHO are used in this publication.[11]

This hospital is situated in tribal area in south east Rajasthan and many of CNS tumors present with neuropsychiatric symptoms are treated by unqualified practitioners, medical doctors and tribal healers do not come to medical attention at all, hence the variation in incidence of various CNS tumors from other study.

CONCLUSION

Prevalence estimates available for brain tumors reflect the portion of tumors that are malignant. Just as routine incidence statistics from cancer registries under represent the full spectrum of primary brain tumor cases. 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. Astrocytoma WHO Grade IV lesion was more common in comparison to Grade I lesion indicating need for imaging and 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 multicentric studies should be conducted to have substantial data for use in future.

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