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Distribution of various CNS tumors in a tertiary care hospital: Ten year retrospective study

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Abstract
Background: CNS tumors, though not the leading cause of cancer cases, causes significant number of cancer deaths. Five years survival in most of patients with CNS tumors is less than 20%. With the advent of newer diagnostic modalities even in developing countries like India many new cases were diagnosed every year. Due to incomplete registration of cases in India exact frequency is difficult to estimate. Hospital based study can be a good resource to estimate the disease burden.
Objectives: To study the frequency with age and sex distribution of various CNS tumors.
Materials and Methods: It was a ten year retrospective study conducted in the Department of Pathology, Gajra Raja Medical College, Gwalior (M.P.) from January 2007 to December 2016. 1620 cases of CNS neoplasms were collected. Diagnosis were done on the basis of histopathology. Categorisation according to various types with their age and sex distribution was done from these datas.
Result: In adults most common tumors were Astrocytomas (39.27%) followed by Meningiomas (22.72%), Schwannomas, Neurofibromas. In Children most common tumors are Astrocytomas (24.74%) followed by Medulloblastomas (20.10%), Neurofibromas. Except for Meningiomas which showed female preponderance all other tumors are more common in males.
Conclusion: Present study shows similarities with some variations from other studies. Registration of all the cases and molecular profiling will provide better assessment of CNS tumors spectrum and tailoring treatment modalities.

Keywords: CNS neoplasm, frequency, distribution

Introduction

CNS tumors, though not the leading cause of cancer cases, causes significant number of cancer deaths. There is also significant morbidity both from the disease and from the treatment required, with varying degrees of physical, cognitive, neurological, endocrinological, and other deficits in survivors resulting in significant handicap and diminished quality of life[1] Five years survival in most of patients with CNS tumors is less than 20% [2]. After the Benign Brain Tumor Cancer Registries Amendment Act both benign and malignant tumor cases are registered for data collection of primary CNS tumors [4]. The Benign Brain Tumor Cancer Registries Amendment Act refers to CNS tumors as "brain-related tumors." The term `brain-related tumor' includes listed primary tumor (whether malignant or benign) occurring in any of the following sites: the brain, meninges, spinal cord, cauda equine, a cranial nerve or nerves, or any other part of the central nervous system; the pituitary gland, pineal gland, or craniopharyngeal duct [4, 5].

Most of the data related with incidence and prevalence of brain tumors are from western literatures [6]. From the various studies conducted the overall incidence rate of brain tumors found to be 10.82 per 100000 person years [7] With the advent of diagnostic modalities even in developing countries like India many new cases were diagnosed every year. Very few studies were conducted in India on frequency of brain tumors which shows within brain tumors proportion of different types were heterogenous and varied according to age. In adults predominant brain tumors type were Glial neoplasms, meningiomas and metastases while the most common pediatric brain tumors were astrocytic tumors (34.7) followed by medulloblastomas and supratentorial PNET (22.4%) [8] Due to incomplete registration of cases in India exact frequency is difficult to estimate. Hospital based study can be a good resource to estimate the disease burden [9]

Objectives

To study the frequency with age and sex distribution of various CNS tumors.

Materials and Methods

It was a ten year retrospective study conducted in the Department of Pathology, Gajra Raja Medical College, Gwalior (M.P.) from January 2007 to December 2016. 1620 cases of CNS neoplasms were collected. Diagnosis were done on the basis of histopathology. The tissues were processed by routine processing techniques with 10% formaline, xylene, graded alcohol solutions, embedded in paraffin wax and stained by Hematoxylin and Eosin. Neoplasms were classified on the basis of WHO classification of CNS neoplasms 2007. Grading was done according to WHO grading system. Categorisation according to various types with their age and sex distribution are done from these datas.

Result

- In adults most common tumors were Astrocytomas (39.27%) followed by Meningiomas (22.72%), Schwannomas, Neurofibromas and Pituitary Adenomas (Table 1).
- In pediatric age group most common tumors were Astrocytomas (24.74%) followed by Medulloblastomas (20.10%), Neurofibromas, Mesenchymal tumors, and Craniopharyngiomas (Table 1).

Table 1: Frequency of various CNS neoplasms with their age distribution

S. No.	CNS Neoplasm	Pediatrics	Adults			
		0-18 years (Total 194) No. %	19-40 years	40-60 years	>60 years	Total adult cases (1426) No. %
	Tumors of Neuroepithelial tissue					
1	Astrocytoma	48 24.74	225	273	62	560 39.26
2	Oligodendroglioma	10 5.15	31	11	01	43 3.02
3	Ependymoma	11 5.67	13	08	01	22 1.54
4	Choroid Plexus Papilloma	03 1.55	01	02	-	03 0.21
5	Mixed Glial Tumor	01 0.51	08	13	02	23 1.61
6	Pineal Tumor	-	-	01	01	02 0.14
7	Medulloblastoma	39 20.10	03	-	-	03 0.21
8	PNET	02 1.03	08	07	-	15 1.05
	Tumors of Cranial and Paraspinal nerves					
9	Schwannoma	13 6.70	87	53	09	149 10.45
10	Neurofibroma	22 11.34	44	33	07	84 5.89
11	Malignant Peripheral Nerve Sheath Tumor	02 1.03	-	-	-	-
	Tumors of the Meninges					
12	Meningioma	06 3.09	92	173	59	324 22.72
13	Mesenchymal/ Non Meningeal	18 9.27	24	17	04	45 3.16
	Tumors of the Sellar region					
14	Craniopharyngioma	14 7.22	06	09	-	15 1.05
15	Pituitary Adenoma	03 1.55	20	51	14	85 5.96
	Metastatic tumors					
16	Metastasis	02 1.03	06	35	12	53 3.72

Except for Meningiomas which showed female preponderance all other tumors are more common in males (Table 2).

Table 2: Sex distribution of various CNS neoplasms.

S. No.	CNS Neoplasm	Male % (No. of Cases)	Female % (No. of Cases)
	Tumors of Neuroepithelial tissue		
1	Astrocytoma	67.43 (410)	32.56(198)
2	Oligodendroglioma	69.81 (37)	30.19 (16)
3	Ependymoma	60.60 (20)	39.40 (13)
4	Choroid Plexus Papilloma	66.7 (04)	33.3 (02)
5	Mixed Glial Tumor	70.8 (17)	29.2 (07)
6	Pineal Tumor	50 (01)	50 (01)
7	Medulloblastoma	69.04 (29)	30.96 (13)
8	PNET	64.7 (11)	35.3 (06)
	Tumors of Cranial and Paraspinal nerves		
9	Schwannoma	59.26 (96)	40.74 (66)
10	Neurofibroma	53.77 (57)	46.23 (49)
11	Malignant Peripheral Nerve Sheath Tumor	50 (01)	50 (01)
	Tumors of the Meninges		
12	Meningioma	43.03 (142)	56.97 (188)
13	Mesenchymal/Non Meningeal	57.14 (36)	42.86 (27)
	Tumors of the Sellar region		
14	Craniopharyngioma	75.86 (22)	24.14 (07)
15	Pituitary Adenoma	63.63 (56)	36.37 (32)
	Metastatic tumors		
16	Metastasis	70.9 (39)	29.1 (16)

In astrocytomas, most cases belong to WHO Grade II and III groups both in adults and pediatric age group. In adults 44 cases belong to Astrocytoma WHO grade I, 208 cases and 200 cases belong to WHO grade II and III respectively while 108 cases belong to Glioblastoma (WHO grade IV). In pediatric age group 21 cases, 09 cases and 11 cases belong to WHO grade I, II and III respectively while 07 cases belong to Glioblastoma (WHO grade IV). In oligodendroglioma, ependymoma and meningioma less than 10% cases belong to higher grade i.e. grade III.

Discussion

Most of the data for evidence-based practice in oncology and neuro-oncology come from western data, which include clinical and basic science research work. There have been studies that suggested there are differences in epidemiological variables, clinical presentation, prognostic factors, and occasional behavior to therapy, when western patients are compared to their Indian counterparts [6] The epidemiology of CNS tumors has been characterized for children and adults of all ages separately in recognition of the differences in pathology and etiology [1] Several factors frustrate systematic study of epidemiology of tumors of the central nervous system. Firstly several distinct clinicopathological entities are grouped under this general heading. Secondly, even benign lesions may have dramatic consequences for the patients.[10] WHO classification of CNS tumors 2016 incorporated molecular parameters in classification for the first time which provided some more objective and more precisely defined entities [11]

- According to study conducted by Nibhoria *et al.* [12] in Faridkot, Punjab most common brain tumors were Astrocytoma (39.3), Meningioma (34.8), Metastatic, Neurofibroma, and Oligodendroglioma. While from study conducted by Zalata *et al.* [13] in delta region, Egypt, first two common brain tumors were similar while third, fourth and fifth common were Pituitary tumors, Nerve sheath tumors and Metastatic tumors. Present study also showed most common CNS tumors in adults were Astrocytomas followed by Meningiomas, while the next are Schwannomas, Neurofibromas and Pituitary adenomas.
- From a multi-institutional study conducted by Jain *et al.* [8] and study conducted in a tertiary care hospital in South India [14] most common pediatric brain tumors were Astrocytic tumors followed by Medulloblastomas and Supratentorial PNET, Craniopharyngiomas and Ependymal tumors. While in our study most common CNS tumors in Pediatric age group are Astrocytomas followed by Medulloblastomas; Neurofibromas and Mesenchymal tumors having higher frequency than Craniopharyngiomas.
- Similar to studies conducted by Chen Liang *et al*. [15] in Huashan in China, Robles Paula de *et al.* [7] and by Balkrishna b. Yeole [10] from various registries in India, our study also shows male predominance in all CNS tumors and female predominance in Meningiomas.
- Similar to study of Zalata *et al.* [13] and Jalali *et al.* [16] among the tissue submitted for histopathology primary CNS neoplasms were more common than metastatic lesions.

Epidemiology of any disease is essential to prepare cost-effective strategies of management based on local logistics and infrastructure. As it is hospital based study not all the cases of the region were included in the study. As a single-center retrospective series, the data in this study could not represent the national epidemiology of CNS tumors. The pathological diagnoses included in this study were only from patients under surgery or biopsy. Furthermore, surgical treatments were not commonly used in some advanced malignant tumors. In brief, various biases were unavoidable in this study, which means that the conclusions should be evaluated with caution. These may be the causes of variation from other studies. Despite these limitations, our hospital being biggest tertiary care hospital of the region with good neurosurgical facilities, study closely reflect the tumor burden of the region and this study will serve an important purpose to profile brain tumors in India.

Conclusion

Present study shows similarities with some variations from other studies. This information will provide a reference for future studies nationally and internationally and make comparisons relevant and meaningful. Registration of all the cases and molecular profiling will provide better assessment of CNS tumors spectrum and tailoring treatment modalities.

Reference

1. Arora RS, Alston RD. Age–incidence patterns of primary CNS tumors in children, adolescents, and adults in England, Neuro Oncol. 2009; 11(4): 403–413.
2. www.braintumourresearch.org/statistics in UK.
3. Globocan Cancer Incidence and Mortality Worldwide: IARC Cancer Base No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer, 2014, 2012, 1(1).
4. Data Collection of Primary Central nervous system Tumors; National Program of Cancer Registries Training Materials 2004
5. Benign Brain Tumor Cancer Registries Amendment Act; National Program of Cancer Registries Training Materials, 2004
6. Munshi Anusheel, Central nervous system tumors: Spotlight on India, South Asian J Cancer. 2016; 5(3):146-147.
7. Robles Paula de, Fiest KM. The worldwide incidence and prevalence of primary brain tumors: a systematic review and meta-analysis, Neuro Oncol. 2015; 17(6):776-783.
8. Jain A, Sharma MC, Suri V. Spectrum of pediatric brain tumors in India: A multi-institutional study. Neurol India. 2011; 59:208-11
9. Murthy NS, Nandakumar BS. Cancer Registration: Its relevance for health care planning in India, Indian J Prev. Soc. Med. 2010; 41:1-2.
10. Yeole Balkrishna B, Trends in the Brain Cancer Incidence in India; Asian Pacific Journal of Cancer Prevention. 2008; 9:267-270.
11. Louis DN, Ohgaki H. WHO Classification of Tumours of the Central Nervous System, IARC, 2016.
12. Nibhoria S, Tiwana Kanwardeep Kaur. Histopathological Spectrum of Central Nervous System Tumors: A Single Centre Study of 100 Cases; International Journal of Scientific Study. 2015; 3(6):130-134.
13. Zalata Khaled R, El-Tantawy Dina A. Frequency of central nervous system tumors in delta region, Egypt;

Indian Journal of Pathology and Microbiology. 2011; 54(2):299-306.
14. Dasgupta A, Gupta T, Jalali R. Indian data on central nervous tumors: A summary of published work. South Asian J Cancer 2016; 5:147-53.
15. Chen Liang. Central nervous system tumors: a single center pathology review of 34,140 cases over 60 years; BMC Clinical Pathology. 2013; 13:14.
16. Jalali R, Datta D. Prospective analysis of frequency of central nervous tumors presenting in a tertiary cancer hospital from India. J Neurooncol. 2008; 87:111-4.