International Journal of Clinical and Diagnostic Pathology

ISSN (P): 2617-7226
ISSN (E): 2617-7234
www.patholjournal.com
2020; 3(3): 79-82
Received: 05-05-2020
Accepted: 06-06-2020

Dr. Vaibhavi Panchal
Third Year Resident, Department, B.J. Medical College and civil Hospital, Ahmedabad, Gujarat, India

Dr. HP Barot
Assistant Professor, Department, B.J. Medical College and civil Hospital, Ahmedabad, Gujarat, India

Dr. Sanjay Dhotre
Associate Professor, Department, B.J. Medical College and civil Hospital, Ahmedabad, Gujarat, India

Dr. Hansa Goswami
Professor and Head of Department, B.J. Medical College and civil Hospital, Ahmedabad, Gujarat, India

Corresponding Author:
Dr. HP Barot
Assistant Professor, Department, B.J. Medical College and civil Hospital, Ahmedabad, Gujarat, India

Histomorphological spectrum and who grading of glioma in paediatric population

Dr. Vaibhavi Panchal, Dr. HP Barot, Dr. Sanjay Dhotre and Dr. Hansa Goswami

DOI: https://doi.org/10.33545/pathol.2020.v3.i3b.261

Abstract
In this study of glial tumor, we present epidemiologic data on incidence, demographics, clinical characteristics and symptoms, and the grade of glioma. This study was a retrospective medical record- based observational study of 50 cases carried out during June 2017 to June 2020 (3 years) in Department of Pathology B.J.M.C. and Civil Hospital, Ahmedabad. All patients <18 years of age with confirmed histopathological diagnosis of glioma were included in the study. Low-grade gliomas were present in 86% and High-grade glioma in 14%.The overall male: female ratio was 1.17:1. 52% of all glioma were located in infratentorial region. Among the glioma located in spinal cord, majority were ependymoma. Astrocytoma was the most common brain tumor (60%) followed by ependymoma (36%). Oligodendroglial and Glioblastoma comprised of only 4% each. Time interval between onset of symptom and seeking medical attention was <3 weeks in 48% patients. Presenting complains commonly included headache (56%) followed by focal deficit and altered sensorium. Conclusion after comparing our data with study results of major institutes across India is that Astrocytoma is the most common histological subtype among all glioma. But according to WHO grading and histological type Ependymoma Grade II (30%) is the most common subtype encountered in our study which differed from other reference studies.

Keywords: Glioma, histopathological, WHO grade, astrocytoma

Introduction
Tumors of the nervous system are the second most common childhood tumor after leukemia, [1] constituting approximately 35% of all childhood malignancies and remain the leading cause of cancer-related deaths in children [2]. Even though there are enough data about the epidemiology of pediatric brain tumors in western population [3], there are only a few reports from developing countries like India. A glioma is a kind of brain tumor that originates from glial cells, which support and nourish neurons in the brain. Gliomas are divided into four grades, depending on the tumor cells' appearance under a microscope; the higher a tumor's grade number, the more severe it is. Grades 1 and 2 are considered low-grade gliomas and account for about two-thirds of all pediatric tumors. Grades 3 and 4 are considered high-grade gliomas [4, 5]. Gliomas can also be classified based on their location and by the kind of glial cell-astrocytes, oligodendrocytes, or ependymal cells-from which they arise [6]. Gliomas can be found in any part of the brain or spinal cord. About 60% of brain tumors in children occur in the infratentorial brain. They can also occur in the supratentorial brain. In recent years, molecular information is increasingly used and newly included in the revised WHO classification 2016 of Tumors of the Central Nervous System [7].

Aims and objectives
1. To study incidence of various glial tumor in children <18 years of age
2. To study the clinical presentation, location, histopathological diagnosis and grading of glial tumors according to WHO grading system.

Materials and methods
This study was a retrospective medical record- based observational study of 50 cases carried out during June 2017 to June 2020 (3 years) in Department of Pathology B.J.M.C. and Civil Hospital, Ahmedabad.

The data on patients were anonymized before inclusion to the study analysis. All patients diagnosed for glial tumors under 18 years of age who were operated and treated in our hospital in the study duration were included in the study. The hospital records of all the patients fulfilling the inclusion criteria were analyzed, and descriptive epidemiological records were created for the patient by age, sex, site of tumor on MRI, onset symptoms and histological variables. Onset symptoms encompassed focal deficit, epileptic seizure, cognitive change and headache, vomiting and symptoms most frequently progressing over weeks or months. Focal deficit comprised motor paresis, motor control deficiency, paresthesia, visual disturbances, and/or speech disturbance. Cognitive change comprised cognitive deterioration or change in personality or behavior. The histological tumor types were grouped according to standard age at diagnosis (0–5, 6–10, and 11–18 years age group). The histopathological variables tabulated were type and grade of tumor which were done according to the WHO grading of tumors [7].

Results

Out of the 50 cases of pediatric glial tumors diagnosed at our institute from June 2017 to June 2020, 26 (52%) were in the age group of 11-18 years. Lowest prevalence was in 0-5 years which was 8 cases (16%).There were 27 (54%) boys and 23 (46%) girls. The overall male/female ratio was 1.17:1.

Table 1: age and gender wise incidence of glial tumor

Age range	Male	Female	Total
0-5 years	5	3	8
6-10 years	7	9	16
11-18 years	15	11	26

As shown in table 2 out of the 50 tumors, 16 (32%) were supratentorial, and 26 (52%) were infratentorial. There were 8(16%) primary tumors localized to the spine in our study. Diffuse astrocytoma were more located in supratentorial while pilocytic Astrocytoma and ependymoma arised more from infratentorial region.

Table 2: Location wise distribution of case in study

Location	DA	Non-DA	Ependymoma	No. of cases (%)
Supratentorial	10	4	2	16(32%)
Infratentorial	5	11	10	26(52%)
Spinal cord	1	1	6	8(16%)

DA: diffuse astrocytoma, non-DA: non diffuse astrocytoma

Average time from symptom onset to seeking medical attention was <3 weeks in about 48% [24] as shown in Table 3.Majoriy of patients always presented with more than one symptom. The most common clinical presentation noted in our study was headache 28 (56%) followed by focal deficit 14 (28%) and altered sensorium 13 (26%) as shown in Table 4. In focal deficit we included symptom of hemiplegia, paraplegia. One case of glioblastoma presented with partial vision and hearing loss, included in focal deficit.

Table 3: Time to presentation at hospital following onset of symptoms

Duration of symptoms	Number (%)
<3 weeks	24(48%)
3-6 weeks	10(20%)
6-24 weeks	8(16%)
>24 weeks	8(16%)

Table 4: Presenting complains of paediatrics glial tumors

Symptom	No. of cases	Percentage
Headache	28	56%
Focal deficit	14	28%
Altered sensorium	13	26%
Vomiting	11	22%
Seizure	4	8%
Back pain	4	8%

Among the astrocytomas [Table 5], WHO Grade I tumors (pilocytic astrocytomas and subependymal giant cell astroytoma (SEGA) were the most common (30%). Grade IV astrocytomas (glioblastoma multiforme (GBM) comprised only 2 cases (4%). In ependymal tumors, ependymoma (Grade II) was the most common and comprised 30% of total glial tumors. Oligodendrogliomas were very less in the pediatric age group (4%). All cases are diagnosed on basis of histopathology only, no immunohistochemistry is done.

Table 5: classification of glial tumor according to Histomorphology and WHO grade-2016 classification

WHO Grade	Histological type	Age group			Total no. (%)
Astrocytic and Oligodendroglial tumors (Non-diffuse, diffuse)		0-5 year	6-10 year	11-18 year	
I	Pilocytic astrocytoma	2	7	5	14(28%)
	Subependymal giant cell astrocytoma	0	0	1	1(2%)
					15(30%)
II	Diffuse astrocytoma	0	2	7	9(18%)
	Oligodendroglioma	0	1	0	1(2%)
	Pleomorphic xanthoastrocytoma	0	1	0	1(2%)
					11(22%)
III	Anaplastic astrocytoma	0	0	3	3(6%)
	Anaplastic oligodendroglioma	0	1	0	1(2%)
					4(8%)
IV	Glioblastoma	0	0	2	2(4%)
Ependymal Tumors					
I	Myxopapillary ependymoma	2	0	0	2(4%)
II	Ependymoma	3	4	8	15(30%)
III	Anaplastic ependymoma	1	0	0	1(2%)

Discussion

The male: female ratio in our study is 1.17:1 which is almost comparable to the study by Shirazi *et al.* [8] that is 1.5:1.Highest incidence of glial tumor was in 11-18 year age group which is comparable to Shirazi *et al.* [8] and Madhvan *et al.* [9] [table 6]. Average time from symptom onset to seeking medical attention is <3 weeks in about 48% which is comparable to 40.3% in suresh *et al.* [10] as shown in Table 7. Common presenting symptom of glial tumor in our study is headache 56% and focal deficit with altered sensorium 54% which is consistent with Madhvan *et al.* [9] in which headache and focal deficit comprise 61.2% and 51% respectively. Whereas in suresh *et al.* [10] vomiting (62%) is the most common complain followed by focal deficit (55%) and headache (37%). The majority of glioma patients with headache had clustering of several other additional onset symptoms, which is in agreement with previous studies [11, 12, 13].

Table 6: Age wise comparision of cases.

Age range	Shirazi *et al.* [8]	Madhvan *et al.* [9]	Present study
0-5 years	14%	14.3%	16%
6-10 years	40%	39.7%	32%
11-18 years	46%	46.5%	52%

Table 7: Comparison of duration of symptoms

Duration of symptoms	Suresh at al[10]	Present study (%)
<3 weeks	40.3%	48%
3-6 weeks	28.8%	20%
6-24 weeks	19.2%	16%
>24 weeks	11.5%	16%

Table 8: Percentage breakup of various subtypes of glioma

Tumor	Aiims	Gb pant	Tmh	Present study
Astrocytoma Grade I (SEGA+pilocytic)	53.6	51.8	35.4	30
Astrocytoma Grade II (diffuse+PXA)	6.2	3	15.7	20
Astrocytoma Grade III	5.6	0	2.8	6
Astrocytoma Grade IV	13	4.9	4.3	4
Total astrocytic tumors	78.4	59.7	58.2	60
Oligodendroglioma Grade II	0.6	3.5	2.8	2
Anaplastic Oligodendroglioma Grade III	0.5	4.3	0	2
Oligoastrocytoma Grade II	0.5	0	0	0
Anaplastic Oligoastrocytoma Grade III	0	0	0	0
Total Oligodendroglial tumors	1.6	7.8	2.8	4
Myxopapillary ependymoma Grade I	0.5	0	0	4
Ependymoma Grade II	8.8	30.4	29.8	30
Anaplastic ependymoma Grade III	10.7	2.1	9.2	2
Total Ependymal tumors	20	32.5	39	36

SEGA- Subependymal giant cell Astrocytoma; PXA- Pleomorphic Xanthoastrocytoma; AIIMS- All India Institute of Medical Science, New Delhi; GB PANT– Govind vallabh pant hospital, New Delhi; TMH- Tata Memorial Hospital, Mumbai.

In our study, the most common glial tumor in the pediatric age group is astrocytoma Grade I and ependymoma Grade II with equal incidence which is well correlated with study results of GB Pant and TMH. But in study results of AIIMS astrocytoma Grade IV and anaplastic ependymoma III are the 2nd and 3rd most common tumors respectively after astrocytoma Grade I [14]. According to who grading and histological type Ependymoma Grade II (30%) is the most common subtype encountered in our study which differed from other reference studies. So, distribution of gliomas according to subtypes and grade is almost consistent with previous population-based studies.

Conclusion

The present study provides the profile of the spectrum of glial tumors in children. The present study only includes histologically verified cases of only single institute, and the real incidence may therefore be even higher. So in developing countries like India, one central body can be formed to maintain data about CNS neoplasms their followup and prognosis in children. Hence children present with such common symptoms diagnosis is missed. Also there are very few specific studies on peadiatric glial tumors, more studies should be encouraged.

Financial support and sponsorship
Nil

Conflicts of interest
There are no conflicts of interest.

References

1. Rosemberg S, Fujiwara D. Epidemiology of pediatric tumors of the nervous system according to the WHO 2000 classification: A report of 1,195 cases from a single institution. Childs Nerv Syst. 2005; 21:940-4.
2. Jemal A, Siegel R, Ward E, Murray T, Xu J, Smigal C *et al.* Cancer statistics, CA Cancer J Clin. 2006; 56:106-30.
3. Rickert CH, Paulus W. Epidemiology of central nervous system tumors in childhood and adolescence based on the new WHO classification. Childs Nerv Syst. 2001; 17:503-11.
4. Kleihues P, Cavenee WK, editors. Pathology and Genetics of Tumors of the Nervous System. Lyon, France: International Agency for Research on Cancer, 2000, 314.
5. Louis DN, Ohgaki H, Wiestler OD, Cavenee WK, Burger PC, Jouvet A *et al.* The WHO classification of tumours of the central nervous system. Acta Neuropathol. 2007; 114:97- 109.
6. The International Classification of Diseases-Oncology, version 3(ICD-O-3), 2016.

7. Louis DN, Perry A, Reifenberger G *et al.* The World Health Organization classification of tumors of the central nervous system: a summary. Acta Neuropathol. 2016; 131:803-820.
8. Shirazi N, Gupta M, Bhat NK, Kalra BP, Kumar R, Saini M. Profile of primary pediatric brain and spinal cord tumors from North India. Indian J Med Paediatr Oncol. 2017; 38:10-4.
9. Madhavan R, Kannabiran B, Nithya A, Kani J, Balasubramaniam P, Shanmugakumar S. Pediatric brain tumors: An analysis of 5 years of data from a tertiary cancer care center, India. Indian J Cancer. 2016; 53:562-5.
10. Suresh SG, Srinivasan A, Scott JX, Rao SM, Chidambaram B, Chandrasekar S. Profile and outcome of pediatric brain tumors – Experience from a tertiary care pediatric oncology unit in South India. J Pediatr Neurosci. 2017; 12:237-44.
11. Valentinis L, Tuniz F, Valent *et al.* Headache attributed to intracranial tumors: a prospective cohort study. Cephalalgia. 2010; 30(4):389-398.
12. Schankin CJ, Ferrari U, Reinish VM *et al.* Characteristics of brain tumor-associated headache. Cephalalgia. 2007; 27:904-91134.
13. Kahn K, Finkel A. It IS a tumor-current review of headache and brain tumor. Curr Pain Headache Rep. 2014; 18:421.
14. Jain A, Sharma MC, Suri V, Kale SS, Mahapatra AK, Tatke M *et al.* Spectrum of pediatric brain tumors in India: A multi-institutional study. Neurol India. 2011; 59:208-11.