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An audit of primary central nervous system tumor patient's in a tertiary care hospital of north India

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ABSTRACT

Background

Central nervous system tumors are heterogeneous group of neoplasm having difference in prevalence according to age groups and sex. There are very few epidemiological studies about Primary central nervous system from northern India.

Aim

To study epidemiological patterns of Primary Central nervous system tumors.

Material and Methods

Retrospective Study conducted in a tertiary care Centre of North India from January 2011 to December 2016. Data regarding age, sex, histology, symptoms, imaging, location, surgery, radiotherapy, chemotherapy, recurrence if any and salvage treatment for recurrence were collected and analyzed.

Results

We analyzed 214 cases. Age ranged from 4years to 72 years. Males (71.9%) outnumbered females (28.03%). M: F ratio was 3.85:1.5. Neuroepithelial tumors were the most common histological finding (84%). Glioblastoma multiforme was the most common subset (33.1%), followed by anaplastic astrocytoma (13%) and diffuse infiltrating astrocytoma (13%) in neuroepithelial tumors. Medulloblastoma (6.5%) was found to be commonest tumor in pediatric age group. The most common symptom was headache (51.4%) followed by Seizures (25.2%). CECT Brain was done in 89.71%, while MRI brain was done in 10.28% patients. Frontal lobe was the most common site of involvement. Surgical procedure consisted of excision in 37.3% followed by decompression in 24.7%.

Conclusion

Our study helps to provide information regarding burden of disease in our area. Major limitation of our study it is institution based and may not reflect entire population. It also reflects the need to strengthen follow-up practices.

Keywords: Brain tumors, Central Nervous System, Astrocytoma, Glioblastoma Multiforme, Epidemiology

INTRODUCTION

Safdarjung Hospital is a 1600 bedded multispecialty hospital, one of the largest government hospital in India. It provides multispecialty medical care to patients not only from Delhi but also from neighboring states of Bihar, Uttar Pradesh, Haryana, Madhya Pradesh.

Around 1700 cancer patients are registered per year in Radiotherapy department of our hospital.

MATERIALS AND METHODS

We did an audit of Primary central nervous system tumor patients from year 2011 January to 2016 December. Data regarding age, sex, histology, symptoms, imaging, location of tumor, surgery, radiotherapy, chemotherapy, recurrence if any and salvage treatment for recurrence were collected and analyzed from the departmental record room. The inclusion criteria were Primary central nervous tumors of all age groups. Exclusion criteria were Brain metastasis and peripheral nervous system tumors. Histopathological diagnosis was done based on WHO classification and Grading (2007). Molecular analysis could not be done as it was unavailable at our setup. The treatment response was assessed clinically based on resolution of neurological symptoms as repeat imaging results were not available in medical records of majority of our patients. The present study was done with a view to have insight into pattern of Central nervous tumors in our region and to compare it with published literature in India and Worldwide.

RESULT AND DISCUSSION

Results

A data of 214 patients of Primary central nervous system tumors was retrospectively analyzed from January 2011 to December 2016. Age ranged from 4years to 72 years. Median age was 36 years. Out of 214 patients, males (n=154, 71.9%) outnumbered females (n= 60,28.03%) (Fig 1). M: F ratio was found to be 3.85:1.5. Most common tumor in our audit were neuroepithelial tumor (n=180, 84%). Glioblastoma Multiforme constituted 33.1% of cases (n=71). The second most frequent group was embryonal tumor, consisting of medulloblastoma which was commonest in pediatric age group (n=14,6.5%) (Table 2). The most common symptom was headache (51.4%) followed by Seizures (25.2%) (Table 3). CECT brain was done in 89.71%, while MRI brain was done in 10.28% patients. According to the sites, frontal lobe was the commonest site of involvement. Surgical procedure consisted of excision in 37.3% followed by decompression in 24.7% (Table 4). 135 (63-08%) received radiotherapy while 68(31.7%) defaulted for radiotherapy. Chemotherapy (capsule temozolomide) was given to 37(17.2%) as concurrent chemoradiotherapy and adjuvant therapy mostly in Grade 3-4 gliomas. 35(16.3%) patients received as concurrent regimen, and 2(0.9%) patients as adjuvant treatment. 69(32.2%) patients didn't received chemotherapy (defaulted for chemotherapy). At median follow up of 8 months out of 214 patients, 46 (2.4%) were available for analysis. Out of 46, 12(26%) were of Glioblastoma Multiforme, 12(26%) Grade III astrocytoma, 7(3.2%) Grade II astrocytoma, 5(10.8%) Grade III oligodendroglioma, 2(4.3%) medulloblastoma, 2(4.3%) gliosarcoma, 2(4.3%) grade II oligodendroglioma and 1(2.1%) each of grade III ependymoma, pilocytic astrocytoma and grade III meningioma. Also, males (89.1%) were found to be more common than females (10.8%) for analysis during follow-up. Out of 46 (21.4%), recurrence was seen in 11(23.9%) and 38 (82.6%) were found to be disease free at 8-month follow-up period. Recurrence was seen in 8(72.7%) cases of Glioblastoma multiforme and in 1 (9.09%) each of Gliosarcoma and grade II & III astrocytoma. Salvage treatment consisted of surgery in 3(27.27%) and chemotherapy in 8(72.7%) cases. 100(46.7%) cases were not available for analysis at follow-up of 8 months. Out of 100 (46.72%), 11(11%) defaulted during treatment, 89 (89%) completed radiotherapy but were unable for analysis at a follow up of 8 months. 68(31.7%) defaulted for treatment itself after first visit. The probable reason for default could be long waiting time of radiotherapy dates, illiteracy, long distant patients and ignorance.

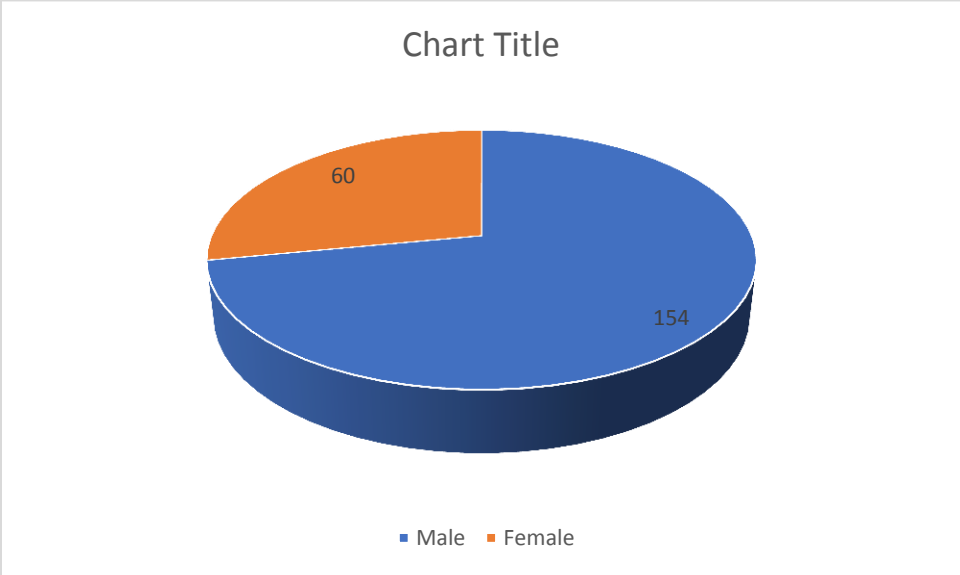

Fig 1-Male & Female distribution

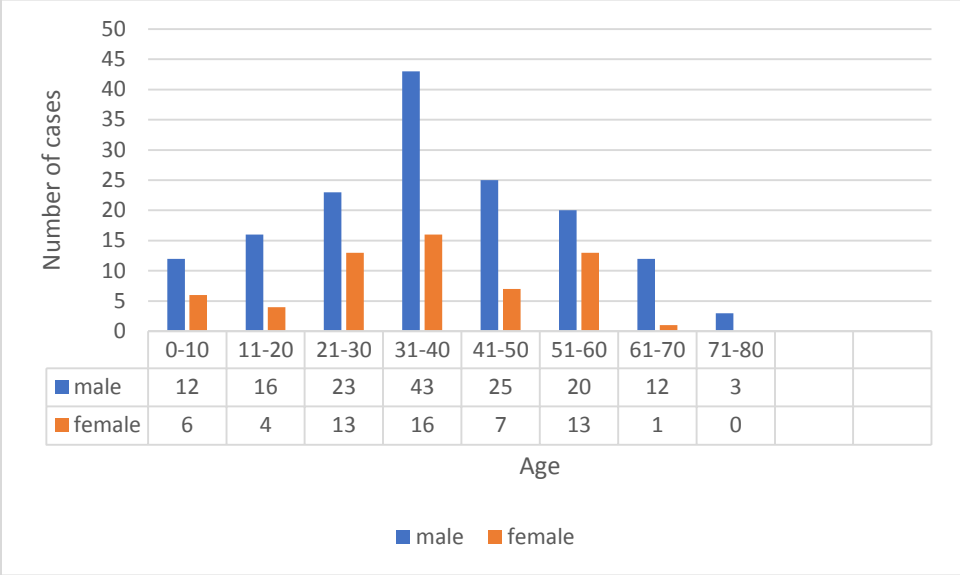

Fig 2- Age wise distribution of brain tumor patients

Diagnosis	Total	M	F	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80
Pilocytic Astrocytoma	3	3	0	1	1	0	1	0	0	0	0
Diffuse Infiltrating Astrocytoma	28	17	11	1	3	8	10	1	3	2	0
Anaplastic Astrocytoma	28	25	3	3	1	9	9	5	1	0	0
Glioblastoma Multiforme	71	53	18	0	1	6	18	15	21	9	1
Gliosarcoma	3	3	0	0	1	0	1	0	0	1	0
Oligodendroglioma	12	7	5	0	2	3	6	0	1	0	0
Anaplastic oligodendroglioma	19	17	2	0	1	1	8	6	2	0	1
Ependymoma	1	0	1	1	0	0	0	0	0	0	0
Anaplastic ependymoma	7	5	2	1	3	1	1	0	1	0	0
Oligoastrocytoma	6	1	5	0	0	2	2	2	0	0	0
Anaplastic oligoastrocytoma	1	1	0	0	0	1	0	0	0	0	0

Astroblastoma	1	1	0	0	0	1	0	0	0	0	0
Medulloblastoma	14	8	6	10	4	0	0	0	0	0	0
Benign meningioma	1	1	0	0	0	0	1	0	0	0	0
Atypical meningioma	8	6	2	0	1	2	2	0	2	1	0
Malignant meningioma	1	1	0	0	0	0	0	1	0	0	0
Pituitary adenoma	5	1	4	0	2	1	0	1	1	0	0
Craniopharyngioma	3	3	0	1	0	1	0	1	0	0	0
CNS lymphoma	2	1	1	0	0	0	0	0	1	0	1
	214	**154**	**60**	**18**	**20**	**36**	**59**	**32**	**33**	**13**	**3**

Table1-Patient characteristics of Primary central nervous tumor patients

Type of Brain tumorain tumor	**n(%)**
1.Neuroepithelial	
A. Astrocytic	
Pilocytic Astrocytoma	3(1.4%)
Diffuse Infiltrating Astrocytoma	28(13%)
Anaplastic Astrocytoma	28(13%)
Glioblastoma multiforme	71(33.1%)
Gliosarcoma	3(1.4%)
B.Oligodendroglial tumors	
Oligodendroglioma	12(5.6%)
Anaplastic Oligodendroglioma	19(8.8)
C.Ependymal tumors	
Ependymoma	1(0.4%)
Anaplastic ependymoma	7(3.2%)
D.Mixed gliomas	
Oligoastrocytoma	6(2.8%)
Anplastic Oligoastrocytoma	1(0.4%)
E.Other neuroepithelial tumor	
Astroblastoma	1(0.4%)
2.Embryonal	
Medulloblastoma	14(6.5%)
3.Tumors of meninges	
Benign meningioma	1(0.4%)
Atypical meningioma	8(3.7%)
Malignant meningioma	1(0.4%)
4.Sellar tumors	
Pituitary adenoma	5(2.3%)
Craniopharyngioma	3(1.4%)
5.Hematopoietic neoplasms	
Lymphoma	2(0.9%)

Table 2- Distribution of Primary CNS tumors with histologic subtypes

Symptom	**n (%)**
Seizure	54(25.2%)

Headache	110(51.4%)
Vomiting	5(2.3%)
Gait disorder	4(1.8%)
Personality changes	2(0.9%)
Visual disturbance	6(2.8%)
Inability to speak	6(2.8%)
Hemiparesis	25(11.6%)
Tingling numbness	1(0.4%)
Altered sensorium	1(0.4%)

Table 3- Clinical Presentation of Primary CNS tumors

Surgical Procedure Type	n(%)
Excision	37.30%
Decompression	24.70%
Gross total excision	21.40%
Total/Near total excision	7.40%
Subtotal excision	4.20%

Table 4- Surgical procedures in Primary CNS tumors

DISCUSSION

Brain tumors are heterogeneous group of neoplasm accounting for less than 2% of all malignant neoplasms [1]. They constitute 1.9% of all tumors in India [2]. Bimodal age distribution with a peak at childhood and second peak at 45-70 years is seen [3]. The age adjusted incidence rate of central nervous system tumor during 1988-2003 showed increase in incidence from 0.5 to 2.4 for male and 0.5 to 1.1 for females as per Bhopal Cancer registry in India [4]. Among 214 cases of Primary central nervous tumor in our study we found that the patient's age ranged from 4 to 72 years with a peak between 20 and 40 years. Our finding was similar to the findings of Krishnatreya M et al [5]. The median age was found to be 36 years which is comparable to the study done by Jalali and Datta [6], which was found to be lower than the developed countries [7, 8]. Males were more commonly affected than females which was comparable to study done by Jalali and Datta [6]. Neuroepithelial tumors were the most common tumor (n=180, 84%), glioblastoma multiforme being the most common subtype (n=71, 33%). Our findings support studies from other countries which also showed that the most common central nervous system tumors were astrocytoma in United States (49%) [11], Germany (41.7%) [12], Croatia (58.3%) [13] and from India Dastur and Lalitha et al [14], Dhar et al [9], Aryal et al [10] and by Dasgupta [15]. Glioblastoma multiforme was the most common subtype (n=71, 33%) followed by diffuse infiltrating astrocytoma which is nearly same as seen in literature [16,17,18,19]. We didn't get the cases of meningiomas (n=10, 4.6%) frequently, as they are benign and surgery is the main treatment modality. Radiotherapy is required when the histology is of higher grade, in case of recurrence and if surgery is not feasible. The most common symptom in our study was headache which was found to be similar to other studies [3, 20]. We found frontal lobe as the most common site of brain tumor in our study, which was similar to the findings of Masoodi et al and Jalali et al [3, 6]. Most of the cases are referred from the neurosurgery department and majority are operated so the most common surgical procedure done was excision (37.3%), followed by decompression (24.7%) (Table:4). Out of 214 patients, 135(68.08%) received radiotherapy which were grade III, grade IV tumors, while 68(31.7%) defaulted for treatment (mainly grade 1, grade II tumors). Chemotherapy in the form of capsule temozolomide was given to 37(17.2%) patients as concurrent and adjuvant therapy (mostly in Grade III-IV gliomas). While 35(16.3%) patients received as concurrent regimen, and 2(0.9%) patients as only adjuvant treatment. 69(32.2%) patients didn't

received chemotherapy (defaulted for chemotherapy). The percentage of patient defaulting for radiotherapy is high (21.9%) in our study. It reflects illiteracy, lacunae in our follow-up practice and long waiting periods of radiotherapy dates.

CONCLUSION

This study helps to provide information regarding burden of disease in our area. It also reflects the need to strengthen follow-up practices. Major limitation of our study it is institution based and may not reflect entire population.

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REFERENCES

[1]. Stewart BW, Kleihues P. Tumor of the nervous system. In: World Cancer Report. Leon, France: IARC Press; 2003.
[2]. Iyenger B, Chandra K. The pattern of distribution of tumors in the brain and spinal cord. Ind J Cancer 1974; 11: 134-138.
[3]. Masoodi T, Gupta RK, Singh JP, Khajuria A. Pattern of central nervous system neoplasm: A study of 106 cases. JK Pract 17, 2012, 42-6.
[4]. Yeole BB. Trends in the Brain cancer incidence in India. Asian Pac J Cancer Prev 9, 2008, 267-70.
[5]. Krishnatreya M, Ketaki AC, Sharma JD, Bhattacharyya M, Nandy P, Hazarika M. Brief descriptive Epidemiology of Primary Malignant Brain Tumors from North East India. Asian Pac J Cancer Prev 15, 2014, 9871-9873.
[6]. Jalali R, Datta D. Prospective analysis of incidence of reported astrocytomas to be the commonest central nervous system tumors presenting in a tertiary cancer hospital from India. J Neurooncol 87, 2008, 111-114.
[7]. Jukich P, McCarthy B, Surawicz S, Freels S, Davis F Trends in incidence of primary brain tumors in the United States, 1985–1994. Neuro Oncol 3, 2001, 141–151.
[8]. Ries LA, Kosary CL, Hankey BF, Miller BA, Clegg L, Edward BK (1998) SEER cancer statistics review 1973–1996. NCI
[9]. Dhar A, Bhat AR, Nizami FA, Kirmani AR, Zargar J, Ramzan AU, et al. Analysis of brain tumors in Kashmir Valley - A 10 year study. Bangladesh J Med Sci 13, 2014, 268-77.
[10]. Aryal G. Histopathological pattern of central nervous system tumor: A three year retrospective study. J Pathol Nepal 1, 2011, 22-5.
[11]. Walker AE, Robin M, Weinfeld FD. Epidemiology of brain tumors: the national survey of intracranial neoplasm. Neurol 35, 1985, 219-26.
[12]. Kaatsch P, Rickert CH, Kühl J, Schüz J, Michaelis J. Population based epidemiologic data on brain tumors in German children. Cancer 92, 2001, 3155-64.
[13]. Materljan E, Materljan B, Sepcić J, Tuskan-Mohar L, Zamolo G, Erman-Baldini I. Epidemiology of central nervous system tumors in Labin area, Croatia, 1974-2001. Croat Med J 45, 2004, 206-12.
[14]. Dastur DK, Lalitha VS, Prabhakar V. Pathological analysis of intracranial space-occupying lesions in 1000 cases including children. 1. Age, sex and pattern; and the tuberculomas. J Neurol Sci. 6(3), 1968, 575–92.
[15]. Dasgupta A, Gupta T, Jalali R. Indian data on central nervous tumors: A summary of published work. South Asian J Cancer 5, 2016, 147-53.
[16]. Agnès Fleury, M.D., François Menegoz, M.D., Pascale Grosclaude, M.D., Jean-Pierre Daures, M.D.,Michel Henry-Amar, M.D., Nicole Raverdy, M.D.,Paul Schaffer, M.D., Michel Poisson, M.D., Jean-YvesDelattre, M.D. Descriptive epidemiology of cerebral gliomas in France. Cancer 79(6), 1994, 1195 – 1202.
[17]. Miguel Angel Lopez-Gonzalez and Julio Sotelo, M. Brain tumors in Mexico: characteristics and prognosis of glioblastoma. Neoplasm, 53(2), 2000, 157-162.
[18]. Schwartzbaum JA, Fisher JL, Aldape KD, Wrensch M. Epidemiology and molecular pathology of glioma. Nat Clin Pract Neurol. 2(9), 2006, 494-503.

[19]. Siegal Sadetzki, Leor Zach, Angela Chetrit, Dvor aNass, Chen Hoffmann, Zvi Ram, Menashe Zaaroor, Felix Umansky, Zvi Harry Rappaport, Avi Cohen, Uriel Wald, Sigmund Rothman, Moshe Hadani. Epidemiology of Gliomas in Israel: A Nationwide Study Neuroepidemiology 31, 2008, 264-269.

[20]. Mondal S, Pradhan R, Pal S, Biswas B, Banerjee A, Bhattacharyya D. Clinicopathological pattern of brain tumors: A 3-year study in a tertiary care hospital in India. Clin Cancer Investig J 5, 2016, 437-40.

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