ORIGINAL RESEARCH PAPER

Pathology

HISTOPATHOLOGICAL STUDY OF CENTRAL NERVOUS SYSTEM TUMORS – A TWO YEAR RETROSPECTIVE STUDY FROM A TERTIARY CARE HOSPITAL IN KASHMIR

KEY WORDS: CNS tumors, Meningioma, Histopathology

Dr. Suhail Mushtaq Consultant Pathology GMC Srinagar, Jammu and Kashmir-India,

Dr. Humaira Aslam* Post Graduate Scholar, Deptt Of Pathology,GMC Srinagar, Jammu and Kashmir-India,*Corresponding Author

Dr. Ruby Reshi Head of Department Pathology, GMC Srinagar, Jammu and Kashmir-India,

Dr. Huma Mehmood Post Graduate Scholar, Deptt Of Pathology,GMC Srinagar, Jammu and Kashmir-India,

ABSTRACT

CNS tumors constitute a rare and a vast group of neoplasms.The brain tumors constitute 1-2% of tumors found in adults. **AIM** To st udy the epidemiological parameters like age distribution, gender distribution as well as different histopathological patterns of brain tumors. **MATERIAL AND METHODS** A two year retrospective study was carried out on a total of 71 patients in the department of pathology, government Medical College Srinagar Kashmir. Demographic data as well as slides of the patients were retrieved from the archives of the department. Data regarding the age and gender distribution and histopathological pattern were studied and analyzed. **RESULTS** The data analyzed showed that most of the tumors occur between the age group of 50 to 60 years accounting for 35.2% of total cases, with a male to female ratio of [1:1.6]. Meningioma [47.8%] was the commonest tumor found which was followed by astrocytoma [26.7%]. **CONCLUSION** This study will provide a glimpse of incidence and distribution of various histopathological patterns of CNS tumors in our region.

INTRODUCTION

Primary brain tumors are a heterogeneous and a rare group of tumors, which can originate from the parenchyma of brain or the structures that envelope it.They constitute 1- 2% of tumors found in adults [1]. The incidence of brain tumors across the globe is around 3.9/ 100000 / year in males and 3.6/ 100000 /year in females [1]. CNS tumors comprise of 20% of all tumors found during childhood [2]. CNS tumors constitute around 1.9% of all tumors in Indian population [3].

Young children and elderly persons [5th-7th decades] have highest incidence of malignant brain tumors [4]. Malignant tumors have a low 5- year survival rate, the average survival being 9 months only.They are the second commonest cause of death in the age group of less-than15 years in the both sex groups [2].

Certain factors can contribute to the devastating or life threatening characteristics of the benign tumors such as their site/location or compression of the adjacent vital brain structures and the risk of progression to malignancy over a period of time[4].

WHO has classified CNS tumors into 120 histological types. This classification is based on the cell of origin or site of origin. These tumors are not staged but are graded from grade 1 to grade 4 which predicts their outcome [5]. Various risk factors have been suggested by certain studies including dietary factors, occupational factors, exposure to chemical and environmental factors leading to increase in incidence of CNS tumors, but none have so far been confirmed as an exact etiological factor [1,6].

In developing Nations with the advent of advanced diagnostic modalities there has been a surge in CNS tumor incidence by 1- 2% per year [7], however, due to lack of proper and dedicated finances, reliable data collection have not been achieved so far that will be at par with western or developed nations.

This study is conducted with the aim to identify and categorize the age groups, gender distribution, site of tumor and to assess the incidence of different types of CNS tumors and their histopathological patterns, in a tertiary care hospital setup. Based on the demographic data collected and histopathological examination of the specimen received, the tumors were studied under the guidelines of WHO 2007 classification of CNS tumors.

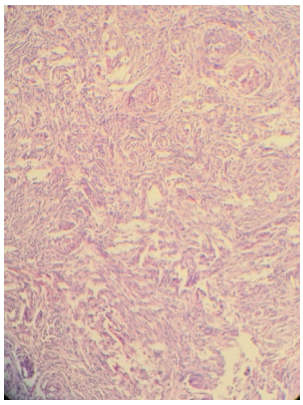
MATERIAL METHODS

The present study is a retrospective study based on the clinic pathological data collected from the department of Pathology during the last two year period (2018 and 2019). The histopathological slides of the neurosurgical biopsies received from the department of neurosurgery where retrieved and were then reviewed. Cases with incomplete data were excluded from the study. A total of 71 biopsies of CNS tumors were studied. After receiving the specimen, they were assessed on gross examination and then processed by routine paraffin embedding technique and the histopathological diagnosis was given based on the guidelines of WHO 2007. The histopathological diagnosis, age, sex and other relevant clinical data for example ,site of tumor were collected from the patients records. Final results were analyzed and data regarding histopathological pattern of CNS tumors was studied along with age and sex distribution.

RESULTS

During the period of two years we studied a total of 71 cases out of these 69 cases were primary CNS tumors and only two were metastatic. In our study the most common age group involved was 51 to 60 years, followed by greater-than 60 year age group. No case was reported from the age group of 0 to 10 years, however 4 cases reported from <18 years of age group. The most common brain tumor reported in our study was Meningioma and within this group the predominant one was that of meningothelial meningioma followed closely by transitional meningioma. The second commonest brain tumor was astrocytomas and within this group glioblastoma multiforme (WHO grade-IV) was the predominant one. Female predominance was seen among the commonest tumor that is meningioma. The most common site of CNS tumors was seen in relation to the dura of frontal and parietal

lobe.



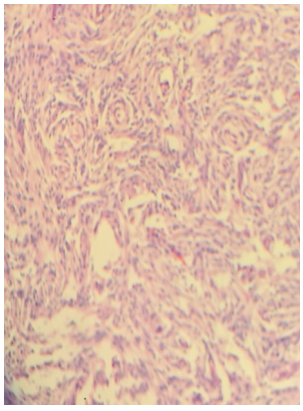


Figure 1A
Figure 1B
Figure 1A &1B: Photomicrograph of transitional meningioma comprised spindle cells with prominent whorl formation.

TABLE 1 AGEWISE DISTRIBUTION OF CNS TUMORS

HISTOLOGICAL TYPE	0-10 Years	11-20 years	21-30 Years	31-40 Years	41-50 Years	51-60 Years	>60 years	TOTAL
ASTROCYTOMA	0	1	5	3	1	6	3	19
MENINGIOMA	0	1	2	5	6	14	6	34
SCHWANNOMA	0	1	0	1	0	0	0	2
METASTATIC	0	0	0	0	0	1	1	2
PITUTARY ADENOMA	0	0	1	1	0	0	0	2
EPENDYMOMA	0	1	0	1	1	0	1	4
OLIGODENDROGLIOMA	0	0	0	1	0	3	1	5
GLIOSARCOMA	0	0	0	0	0	0	1	1
NON-HODGKIN LYMPHOMA	0	0	0	0	0	1	1	2
TOTAL	0	4	8	12	8	25	14	71

TABLE 2 AGEWISE DISTRIBUTION OF MENINGIOMAS

MENINGIOMA TYPE	0-10 Years	11-20 Years	21-30 Years	31-40 Years	41-50 Years	51-60 Years	>60 years	TOTAL
MENINGOTHELIAL	0	0	1	2	1	4	1	9
FIBROBLASTIC	0	0	0	0	1	0	3	4
TRANSISTIONAL	0	1	0	0	1	5	1	8
PSSAMOMAMATOUS	0	0	0	0	1	1	0	2
ANGIOMATOUS	0	0	1	1	0	1	0	3
CLEAR CELL	0	0	0	0	1	0	0	1
ATYPICAL	0	0	0	2	0	1	0	3
ANAPLASTIC	0	0	0	0	1	2	1	4
TOTAL	0	1	2	5	6	14	6	34

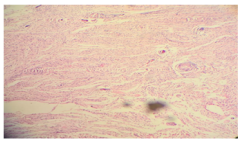


Figure 2A

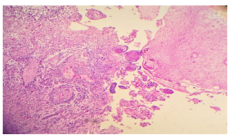


Figure 2C

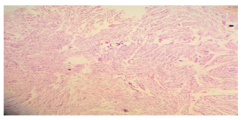


Figure 2B

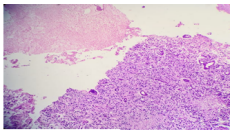


Figure 2D

Figure 2A-2B: Photomicrograph of Glioblastoma multiforme showing dense cellularity,

Figure 2C-2D: Photomicrograph of Glioblastoma multiforme showing palisading necrosis and micovascular proliferation.

TABLE 3 AGEWISE DISTRIBUTION OF ASTROCYTOMAS

ASTROCYTOMAS	0-10 Years	11-20 Years	21-30 Years	31-40 Years	41-50 Years	51-60 Years	>60 years	Total
DIFFUSE ASTROCYTOMA	0	0	3	1	0	1	0	5
ANAPLASTIC	0	0	1	0	0	0	0	1
GLIOBLASTOMA MULTIFORME	0	1	2	1	1	5	3	13
TOTAL	0	1	6	2	1	6	3	19

TABLE 4 GENDER WISE DISTRIBUTION OF CNS TUMORS

HISTOLOGICAL TYPE	MALE	FEMALE	TOTAL
ASTROCYTOMA	11	8	19
MENINGIOMA	8	26	34
SCHWANNOMA	1	1	2
PITUTIARY ADENOMA	0	2	2
EPENDYMOMA	1	3	4
OLIGODENDROGLIOMA	4	1	5
GLIOSARCOMA	1	0	1
METASTATIC	1	1	2
NON-HODGKIN LYMPHOMA	1	1	2
TOTAL	28	43	71

DISCUSSION

The incidence rate of various types of brain tumors in our study is heterogeneous and it likely reflects in a way the problems in the assessment of the overall epidemiological parameters of brain tumors, as there is also a wide difference in the incidence rates found within various studies done worldwide .These global variations could be due to differences in the diagnostic approaches / facilities, case reporting methodologies or even due to differences in study methods.

In our study meningioma was the most common diagnosis followed by astrocytomas. Similar findings of CNS tumor incidences were observed by Central Brain Tumor registry of United States [CBTRUS] [8] in United states - 35%, Das etal [9], in Singapore - 35.1%, Dho etal [10], in the republic of Korea - 37.3%, Idowu etal [11] in Nigeria - 35% and Nakamura etal [12] in Japan-36.8%, where meningioma was the most frequently reported tumor. However some studies from Crotia, Italy, Canada have reported glioblastoma as the most common tumor [13, 14].

In our study the predominant age group which was affected was between 51- 60 years age group. In the age group of less-than 20 years we had only 4 cases which included one case each from astrocytoma, schwannoma, meningioma and ependymoma. According to data from CBTRUS [2010- 2014] only 14% of brain tumors were seen in the age group of less-than 20 years, 28% from age group of [29 – 49] years and 31% from age group of [50-69] years and 27% from greater-than 70 years age group[15].

Female gender predominated over male in case of meningioma in our study and same was observed by Yeole, ganghoria etal [16], and Masoodi etal [17] .

In our study we found two cases of pituitary adenoma that is [2.8%] of total cases, however studies conducted by Masoodi etal [17], DASetal [9] and Bangas etal [18] found 11.3%, 11.8% and 15.5% of pituitary adenoma cases respectively.

As our study is limited to the cases reported in a tertiary care hospital, a more extended study that is a whole population-based study will give a better estimate of the incidence and tumor burden in our region.

CONCLUSION

Our study was a retrospective study in which 71 CNS tumor cases were studied. The most common histopathological type observed was meningioma followed by astrocytoma. The highest incidence of brain tumors was seen in the age group of 51- 60 years, with a male female preponderance [M : F ; 1: 1.5]. This study may provide a brief look of epidemiological parameters and incidence of various histopathological patterns of CNS tumors in our region.

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