DOI: https://doi.org/10.53350/pjmhs22166149

ORIGINAL ARTICLE

Experience of Brain Tumors in Tertiary Care Hospital

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ABSTRACT

Background: Brain tumors arising in the brain are called primary brain tumors. The brain tumors could be meninges, glands, nerves or brain tissue. Although brain tumors comprise of a small number of all cancers, but are disproportionately responsible for cancer-related deaths. The neoplasms may be low grade, high grade, primary tumor or metastatic.
Aim: To evaluate the experience of brain tumors in a tertiary care hospital.
Place and duration of study: Department of Neurosurgery, CMH, Lahore from March 2021 to March 2022.
Methodology: This descriptive study included 38 patients. Age of patients ranged between 26 to 70 years and both genders having primary and secondary (metastatic) brain tumors who were considered fit for surgery were included. Patients who were unfit for anesthesia or unwilling for operation were excluded. Diagnosis of brain tumors was made by histopathology.
Results: Mean age was 46.18±12.17 years. Male patients were 25(65.8%) and 13(34.2%) were female. All patients 38(100%) had headache 31(82%) patient had seizures, focal weakness in 26(68.42%) patients and 3(7.89%) patients had urinary/fecal incontinence. Majority of patients 16(42.11%) had glioblastoma, meningioma in 8(21.05%) patients while 3(7.89%) patients had pituitary adenoma. 15(39.47%) patients had tumor in right frontal lobe, 8(21.05%) patients in left parietal lobe and 4(10.52%) patients had tumor in right parietal lobe. Out of 3 patients, 1(2.63%) had right CP angle tumor, 1(2.63%) had in sphenoid ridge tumor, 1(2.63%) had tumor in Tuberculum Sallea respectively.
Conclusion: It is concluded that male population had more brain tumor and glioblastomawas the most common tumor.
Keywords: Brain tumors, Headache, Glioblastoma, Meningioma.

INTRODUCTION

Brain tumors are diverse group of tumors, which include both low grade and high grade cases.[1] Tumors arising in the brain are called primary brain tumors. Origin of the brain tumors could be meninges, glands, nerves or brain tissue. It has a profound effect both on families and health system, as well as morbidity and mortality of all age groups[2]. Systemic malignancies spread to brain as metastasis cause both morbidity and mortality[3].

Although brain tumors comprise of a small number of all cancers, but are disproportionately responsible for cancer-related deaths. The neoplasms may be low grade, high grade, primary tumor or metastatic. About 2% of all body primary tumors come from primary high-grade brain tumors[4].

The common primary brain tumors are glioblastoma, meningioma, pituitary adenoma and schwannoma. 15% of patients who died of systemic cancers have brain metastases and 5% have spinal column involvement[5]. Epidemiology and outcome for brain tumors varies by histologic type of tumor, age at time of diagnosis, gender and different races or ethnicities[6]. There is a huge difference in occurrence of primary brain tumors in developed and non-developed countries; with high rates in the developed world[7]. Diagnosis of brain tumors is done by complete history, relevant physical examination, appropriate laboratory and radiological investigations. MRI plays a significant role in diagnosis of brain tumors preoperatively[8]. Brain biopsy, a valuable diagnostic technique is required to make plans about management of brain tumors[9].

This study was conducted to identify the pattern of brain tumors in local population, its clinical presentation and diagnoses so as to find out similarities and differences in comparison to international literature. This would help in drawing strategies for better management of brain tumors in our own population.

MATERIALS AND METHODS

This case series was carried out in the Department of Neurosurgery, Combined Military Hospital, Lahore from March 2021 to March 2022 after IRB permission. The sample size of 38 patients estimated by using 95% confidence level and 10% margin of error with expected frequency of brain tumors 10.82%. After the approval of Hospital Ethical Committee, 38 patients with brain tumors, fulfilling inclusion criteria were registered. All data was collect from Neurosurgery and Pathology Department of CMH Lahore. All patients were between 3-95 years of age and both genders included in the study. All patients were divided in to 3 groups, group 1 (26 to 46 years), group 2 (47 to 66 years) group 3 (>67 years). Diagnosis of brain tumors was made by brain biopsy.

Inclusion Criteria: Male and female patients with brain tumors. Age 3-95 years.

Exclusion Criteria: Patients who were not willing for surgery or declared unfit by anesthetist fit for either surgical intervention or MRI brain.

All the data of study was entered in SPSS version 22 and analyzed. Quantitative variable like age was calculated as Mean±SD and qualitative variables like type of tumors, clinical features, location of tumors, type of tumors, type of tumors according to age and type of tumors according to sex were calculated as frequency and percentages.

RESULTS

The mean age was 46.18±12.17 years. Out of 38 patients, 19(50%) patients were in age group 26-46 years, 18(47%) patients in age group between 47-66 years and 1(2.63%) patient was more than 67 years of age. There was 13(34.2%) female and 25(65.8%) male patients. A major portion of 16(42.11%) patients had glioblastoma, 8(21.05%) patients had meningioma, 2(5.27%) patients had lymphoma while 3(7.89%) had pituitary adenoma. Histopathology reported inconclusive finding in 6(15.7%) patients. Regarding clinical features of brain tumor, all patients 38(100%) had headache, 81.57% had history of seizures, focal weakness in 26(68.42%) patients and 3(7.89%) patients had urinary/fecal incontinence (Table 1).

In our study according to type of tumors and age, most of the patients had glioblastoma 16(42.11%), it was more common between 26-66 years of age, 8 patients had meningioma, most common between age group of 26 and 46 years, and only 6(15.79%) patients had other tumors from 26 to 67 years of age group. The type of tumors according to gender, majority of patients 16(42.11%) of glioblastoma, 29% were male, 13% were female

Received on 03-04-2022
Accepted on 13-06-2022

and 8(21%) patients had meningioma, 16% in male and 5% had meningioma in female patients (Table 2).

The location of tumors in which most of the 14(36.84%) patients had tumor located in right frontal lobe, 8(21.05%) patients had left parietal lobe tumor and 4(10.52%) patients had right parietal lobe tumor. 1(2.63%) patient has right cerebellopontine angle tumor, 1(2.63%) patient had involvement of sphenoid ridge and 1(2.63%) patient had tumor at tuberculum sellae. 36(95%) patients had single and only 2 (5%) patients had multiple tumors (Table 3).

Table 1: Frequency of clinical symptoms in patients

Clinical features	n (%)
Headache	38(100.0)
Vomiting	31(81.57)
Seizure	31(81.57)
Weakness/Focal	26(68.42)
Altered consciousness	19(50.0)
Visual disturbance	19(50.0)
Vertigo	19(50.0)
Movement imbalance	8(21.05)
Ataxia	7(18.42)
Weight loss	4(10.52)
Aphasia	3(7.89)
Urinary and Fecal incontinence	3(7.89)
Loss of consciousness	1(2.63)
Others	9(23.68)

Type 2: Type of tumor represented over gender and age

Type of Tumor	N (%)	Gender		Age (years)		
		Male	Female	26-46	47-66	>67
Glioblastoma	16(42.11)*	11(28.94)	5(13.15)	6(15.78)	10(26.21)	0(0.00)
Meningioma	8(21.05)	6(15.78)	2(5.00)	5(13.15)	3(7.89)	0(0.00)
Pituitary adenoma	3(7.89)	3(7.89)	0(0.00)	3(7.89)	0(0.00)	0(0.00)
Lymphoma	2(5.27)	1(2.63)	1(2.63)	1(2.63)	1(2.63)	0(0.00)
Epidermoid cyst	1(2.63)	0(0.00)	1(2.63)	0(0.00)	1(2.63)	0(0.00)
Metastatic tumors	1(2.63)	1(2.63)	0(0.00)	0(0.00)	1(2.63)	0(0.00)
Schwannoma	1(2.63)	0(0.00)	1(2.63)	0(0.00)	1(2.63)	0(0.00)
Others	6(15.79)	3(7.89)	3(7.89)	4(10.52)	1(2.63)	1(2.63)

*Numbers represent sample size(percentage)

Table 3: Frequency of location of tumor

Location	n (%)
Right frontal lobe	14(36.84)
Left parietal lobe	8(21.05)
Right parietal lobe	4(10.52)
Left frontal lobe	3(7.89)
Pituitary fossa	3(7.89)
Posterior fossa	3(7.89)
Right CP angle tumor	1(2.63)
Sphenoid ridge	1(2.63)
Tuberculum smell	1(2.63)

DISCUSSION

Developed world, like Europe have higher incidence of brain tumors as compared to Asian countries.[10] Brain tumors have been classified on the basis of histopathology and immunohistochemistry at the same time designating a grade to the tumor on the basis of morphology, growth pattern and molecular profile[11]. Brain tumors are remarkable health problem, primary and secondary brain tumors incidence ranges from 10 to 17 per 100000 people annually[12].

Average age of patients was 46.18±12.17 years with age range from 26-75 years in our study. A similar study reported by Rebecca, in which patient were divided in 3 groups (1.0 to 14, 2–15 to 39 & 40 plus) which is comparable with our study[13]. Another study reported by Comelli the age range of the patients was 18-80 which is comparable with our study.[14] Male patients were 25(66%) and 13 (34%) were female in current study. Dho did study which showed that brain tumors were more common in females than in males, with a female to male ratio of (1.70:1), which is contradictory to our study[15]. In our study, overall brain tumors and specifically both glioblastoma and meningiomas were more common in male patients as compared to female patients. This might be due to the observation that females are more reluctant to undergo surgical intervention and many times are lost to follow up. As our study only included those patients who had undergone surgery so males had more chances for inclusion. A study carried out by Ostrom, glioblastomas were more common in males, which is comparable to our study[16].

Study carried out by Riaz et al, brain tumors in pediatric population identifying male preponderance with a male to female ratio 1.4:1[17]. Our inclusion criteria had age range starting from 3 years, though youngest patient was 26 years of age. Hence we could not find out gender distributions in our pediatric population. Another study done by Dho most of the male patients had glioblastoma which is comparable with our study[15]. In our study most of the patients had glioblastoma 16(42.11%), meningioma 8(21.05%) patients, pituitary adenoma was in 3(7.89%), lymphoma 2(5.27%), schwannoma 1(2.63%), Ependymoma 1(2.63%) respectively. Study carried out by Sarah in which gliomas were more common brain tumors, which is comparable to our study[18].

Study carried out by Buerki, in which meningiomas were more common in females than in males, which is contradictory to our study[19]. Some hypothetically evidence has been established that meningioma may associated with hormonal exposure, because meningiomas are more common in females than males. Incidence of these tumors may have been possibly affected by variation in estrogen exposure, ethnicity, obesity, old age, high blood pressure, menopausal hormonal replacement therapy and usage of hormonal contraceptives[20].

Meningiomas have been classified by WHO in to 3 grades, I, II and III. Most meningioma falls in grade I, which is low grade. Grade II is intermediate and III is high grade. Increase mitotic percentage increases aggressiveness of the tumor (anaplastic meningioma)[21]. In our study there were various location of brain tumors i.e. right frontal lobe, 15(39.47%) left parietal lobe 8(21.05%), right parietal lobe 4(10.52%), right vestibular nerve 1(2.63%), sphenoid ridge 1(2.63%) and tuberculum sella 1(2.63%) respectively. A study reported by Perkins, brain tumors are located in different location which is comparable with our study.[11] Longo reported the radiation is also used to treat pituitary adenomas. Longo told that, pituitary adenomas could also be treated by radiation. Radiation therapy of pituitary adenomas can halt tumor growth for many years, but pituitary nonfunctioning occurs within 10 years in most of the patients, who becomes hormonal replacement therapy dependent for rest of life[22]. Pituitary adenomas originate from anterior pituitary gland. Most of the time these adenomas are benign and slow growing. Classification of pituitary adenomas depends on size of the tumor, functional/non-functional or cell of origin. In a study carried out by Molitch, about diagnosis and treatment of the pituitary adenomas, 15 to 54% were nonfunctional pituitary adenomas with a mass effect; surgery was required only for symptomatic adenomas[23].

Glioblastomas constitute a major portion of brain tumors that have different histology subtypes and grades from (WHO grade I to IV). I and II constitute WHO low grade while III and IV constitute WHO high grade. In our study, majority of the patients had grade I, 9(24%), 6(16%) had grade II and 4(11%) had grade IV and only 1(2.63%) patient had ancient type. (WHO grading was done in only 14 patients in our study). Eleven patients (29%) had GFAP (Glial

fibrillary acidic protein), Ki (Kiel)-67 in 8(21%) patients and only 1(2.63%) patient had LCA (Leukocyte common antigen).

In our study immunohistochemistry was done in 20 patients. This grading system which assess the tumor cells microscopically depend upon the following characteristics. 1) Atypia (extent to which cells look abnormal), 2) Mitosis (behavior of cell growth), 3) Angiogenesis/vascular proliferation of tumor (presence of new blood vessels in tumor). Most of the time, glioblastomas affect people above 40 years of age with exception of grade I which is more common in children. With advancing the age, the chance of glioblastoma to be higher grade also increases.

Our study is single institution based where access to treatment is free and patients are investigated by early CT/MRI scans, so results should be interpreted cautiously once applied to civilian population in general. More data and national registry system for evaluation of brain tumors in the country can be helpful in establishing our local guidelines for brain tumor management.

CONCLUSION

It is concluded that most of the patients had headache and glioblastomas were most common brain tumours. Histology of tumours varied among regions and different age groups. Incidence and environmental risk factors varied between developed and non-developed countries. As this difference in incidence and risk factors persisted in Asians living in United Kingdom and United States of America. To evaluate burden and geographical variation in epidemiology, a more accurate and holistic approach is needed to study the incidence and prevalence of these tumours.

Conflict of interest: Nil

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