

Audit of 100 Cases of Space Occupying Lesions of Brain

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ABSTRACT

Brain tumors comprise 10% of all tumors and account for the most common tumors of childhood. Peak incidence is seen at 5th decade. Supratentorial tumors are present in adults and Infratentorial tumors are frequent in childhood. In this study, 100 cases of SOL (space occupying lesion) brain were received as biopsies or as whole specimens fixed in 10% formalin. Out of the total 100 cases, male to female ratio was 61: 39. Highest number of cases was seen in ages 51 years and above. Out of the total of 100 tumors, 47 were benign & 53 were malignant tumors. Among the benign tumors, following cases were reported: Meningioma, 24; Pituitary adenoma, 12; Schwannoma, 09; Choroid plexus papilloma, 01 and Neurofibroma, 01. Among the malignant tumors, following types were seen: Glioblastoma multiforme, 12; Metastatic carcinoma, 08; Fibrillary astrocytoma, 08; Anaplastic astrocytoma, 08; Medulloblastoma, 06; Oligodendroglioma, 03; Gemistocytic astrocytoma, 03; Ependymoma, 03; Pilocytic astrocytoma, 01 and subependymal giant cell astrocytoma (SEGA), 01. Thus, the commonest benign tumor reported was classical meningioma & commonest malignant tumor was glioblastoma multiforme.

INTRODUCTION

Brain tumors comprise 10% of all tumors of the body. Brain tumors account for 85% to 90% of all primary central nervous system (CNS) tumors¹. Worldwide, approximately 176,000 new cases of brain and other CNS tumors were diagnosed in the year 2000, with an estimated mortality of 128,000². In general, the incidence of primary brain tumors is higher in whites than in blacks, and mortality is higher in males than in females³.

Different brain tumors are seen in different ages. These tumors Peak in childhood, then declines to age 25 years, and then increases with age. Among the childhood tumors, 33% in anterior fossa (Supratentorial) and 67% in posterior fossa (astrocytoma-26%, medulloblastoma/PNET-24%, and ependymoma-14%). In adults, metastases are more common than primary brain tumors but are usually not biopsied. Among the biopsied tumors, 67% arise in anterior fossa (glioma-33%, meningioma-13%, metastases-12%, pituitary adenoma-5%) and 33% in posterior fossa (schwannoma-8%, miscellaneous tumors-25%)⁴. Most common spinal cord tumors are schwannoma,

Meningioma and ependymoma. Metastasis of primary CNS tumors outside CNS is rare, usually occurs along brain and spinal cord via subarachnoid space or due to surgery related implantation of tumor cells into vessels. Benign appearing tumors may still be infiltrative and difficult to resect⁵.

The median age for diagnosis for brain tumours is 55-59 years for males and 60-64 years for females. The median age at diagnosis for brain tumours for all persons was 55-59 years, lower than for cancers as a whole (median age at diagnosis for all cancers 65-69 years). Most cases of cancers of the cerebellum, cerebral ventricle, and brain stem occur in young people. Cancers of the cerebrum and lobes are most likely to occur in people aged 55 years or more⁶.

There are more than 160 different types of brain tumours, of which some 40 are classified as malignant⁷. It is possible that each type of tumour has different causal factors, and its degree of severity or malignancy (the grade of tumour), its location within the brain, the size of surrounding tissue mass affected by the tumour, whether it is diffuse or defined, are just some of the factors to be considered when classifying, treating or researching brain tumours. Brain tumours are classified in

several ways. The first level of classification is according to the World Health Organization's International Classification of Diseases, now up to its 10th edition (ICD-10). Finer detail of brain tumour types is found in WHO's cancer classification system and modifications of it⁸.

Anaplastic astrocytoma and glioblastoma account for approximately 38% of primary brain tumors; meningiomas and other mesenchymal tumors account for approximately 27%⁹. Other less common primary brain tumors include pituitary tumors, schwannoma, CNS lymphoma, oligodendroglioma (Fig. 1), ependymoma, low-grade astrocytoma, and medulloblastoma (Fig. 2), in decreasing order of frequency. The most common primary cancers metastasizing to the brain are lung cancer (50%), breast cancer (15%-20%), unknown primary cancer (10%-15%), melanoma (10%), and colon cancer (5%)^{9,10}. Eighty percent of brain metastases occur in the cerebral hemispheres, 15% occur in the cerebellum, and 5% occur in the brain stem¹¹. Metastases to the brain are multiple in more than 70% of cases, but solitary metastases also occur¹².

Although brain tumours account for a relatively small proportion of new cancer cases reported each year, brain tumours have a disproportionately higher mortality rate and decreased survival rates when compared to the more common types of cancer¹³.

Our study dealt with series of 100 pathologically verified brain tumors analyzed for the relative incidence and location of tumors as well as the distribution of age and sex.

MATERIALS AND METHODS

From November 2004 to March 2006, 100 cases of SOL brain were received from Lahore General Hospital & Sheikh Zayed Hospital, Lahore. These cases were received as biopsies or as whole specimens fixed in 10% formalin. Brief history was included with every case. Routine H&E staining was done on all the slides. Special stains were also performed as required like Gomori's silver for any associated fungal infection & PAS to demonstrate mucin etc. Unfixed and inadequate specimens were not included in this study.

The histopathology reports of the cases were evaluated with special references to age and gender of the patients, and each tumor was graded according to the WHO grading system. Morphological spectrum of benign & malignant tumors was elaborated & evaluated.

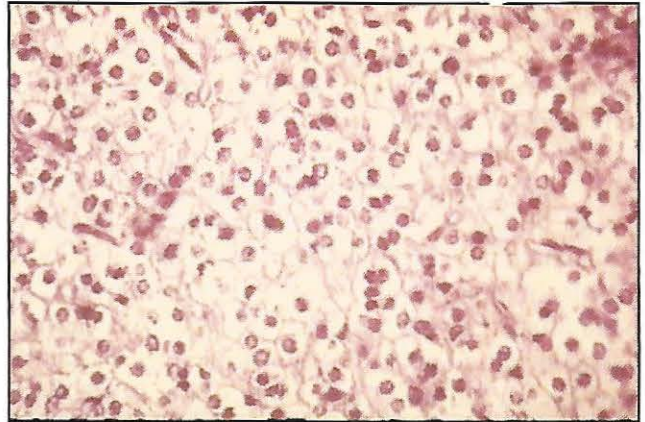


Fig. 1. Oligodendroglioma showing sheets of malignant Tumour cells with perinuclear halos.

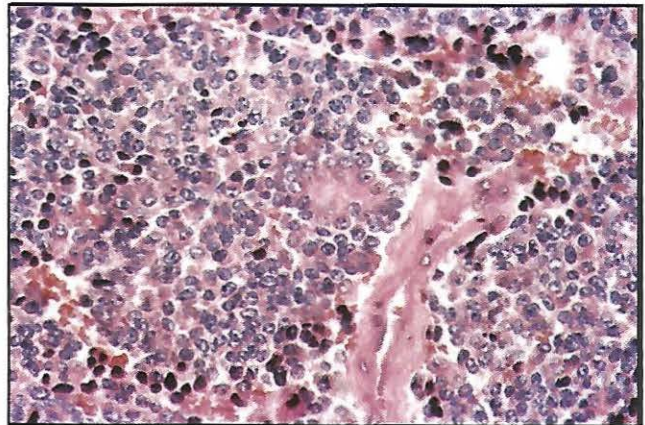


Fig. 2: Medulloblastoma showing sheets of round to oval malignant tumour cells.

RESULTS

Out of the total 100 cases, 61 were males, and 39 were females (Table 1). The ages were divided into six categories as follows: 1-10 yrs, 08 cases; 11-20 yrs, 11 cases; 21 – 30 yrs, 17 cases; 31- 40 yrs, 19 cases; 41- 50 yrs, 18 cases and 51 & above, 27 cases. Highest numbers of brain tumors were noted in the old age category of 51 years & above. (Table 2).

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Table 1: Sex distribution for total 100 cases (n = 100).

Sex	Number	Percent
Males	61	61.0
Females	39	39.0
Total	100	100.0

Table 2: Sex distribution for total 100 cases.

Age (Years)	Number	Percent
1 - 10	08	8.0
11 - 20	11	11.0
21 - 30	17	17.0
31 - 40	19	19.0
41 - 50	18	18.0
51	27	27.0
Total	100	100.0

Out of the total of 100 tumors, 47 were benign & 53 were malignant (Table 3). Among the benign tumors, results were as follows: Meningioma, 24; Pituitary adenoma, 12; Schwannoma, 09; Choroid plexus papilloma, 01 and Neurofibroma, 01. (Table 4).

Table 3: Grading of brain tumors.

Sex	Number	Percent
Begins	47	47.0
Malignants	53	53.0
Total	100	100.0

Among the malignant tumors, following results were noted: Glioblastoma multiforme, 12; Metastatic carcinoma, 08; Fibrillary astrocytoma, 08; Anaplastic astrocytoma, 08; Medulloblastoma, 06; Oligodendroglioma, 03; Gemistocytic astrocytoma, 03; Ependymoma, 03; Pilocytic astrocytoma, 01 and subependymal giant cell astrocytoma (SEGA), 01 (Table 5).

Thus, the commonest benign tumor reported was Meningioma (WHO grade I) & commonest malignant tumor was Glioblastoma multiforme (WHO grade IV).

Table 4: Benign tumors.

Tumors	Number	Percent
Tumors	24	51.06
Meningioma	12	25.53
Pituitary Adenoma	09	19.14
Schwannoma	01	2.12
Choroid Plexus Papilloma	01	2.12
Neurofibroma	01	2.12
Others	0	0
Total	47	100.0

Table 5: Malignant tumors.

Tumors	Number	Percent
Glioblastoma multiforme	12	22.64
Metastatic Carcinoma	08	15.09
Fibrillary astrocytoma	08	15.09
Anaplastic astrocytoma	08	15.09
Medulloblastoma	06	10.52
Oligodendroglioma	03	5.66
Gemistocytic astrocytoma	03	5.66
Ependymoma	03	5.66
Pilocytic astrocytoma	01	1.88
SEGA	01	1.88
Total	53	100.00

Table 6 : Grading of tumors.

Grades	Number	Percent
I	52	52.0
II	11	11.0
III	17	17.0
IV	12	12.0
Total	100	100.0

DISCUSSION

Brain tumors are the leading cause of Solid tumor death in children under age 20 now surpassing acute lymphoblastic leukemia (ALL), and are the third leading cause of cancer death in young adults ages 20-39⁵. Patients with brain tumor, including those with certain "benign" brain tumors, have poorer survival rates than breast cancer patients. Metastatic brain tumors occur at some

point in 10 to 15% of patients with cancer and are the most common type of brain tumor. The incidence of brain tumors has been increasing as cancer patients live longer. Only 31 percent of males and 30 percent of females survive five years following the diagnosis of a primary or malignant brain tumor⁸.

In our study, the brain tumors were mostly found in males as compared to females. Malignant tumors were more common than benign tumors. Majority of tumors were found in old age group.

It is estimated that in 2005, there were a total of 18,500 new cases of brain and other nervous system tumors diagnosed - 10,620 males and 7,880 females. The estimated number of deaths was 12,760, of which 7,280 were males and 5,480 were females. From 1998-2002, the median age at diagnosis for cancer of the brain and central nervous system was 55 years¹.

Over the last 20 years, the overall incidence of cancer, including brain cancer, has increased by more than 10%, as reported in the National Cancer Institute statistics, with an average annual percentage change of approximately 1%. Between 1973 and 1985, there has been a dramatic age-specific increase in the incidence of brain tumors⁴.

The average annual percentage increases in primary brain tumor incidence for ages 75-79, 80-84, and 85 and older were 7%, 20.4%, and 23.4%, respectively. Since 1970, the incidence of primary brain tumors in people over the age of 70 has increased seven fold⁹. Comparisons between age-related mortality rates suggest that increasing primary brain tumor mortality rates among the oldest age groups are directly proportional to the increasing population size of these age groups¹⁴. Malignant gliomas, particularly glioblastoma multiforme (Fig. 3), are the most common primary brain tumors in the elderly. The incidence of GBM is constant world wide. Burger in his study of 1440 malignant astrocytic gliomas has emphasized the association between advancing age and shorter survival in patients with malignant gliomas¹⁵.

Brain tumors are the second most common type of tumor in children. They account for almost 21% of tumors, and are a leading cause of death in children younger than 15 years of age. Most brain tumors develop by age 10¹⁰.

The incidence is 2.2-2.5 cases per 100,000, with the peak being between birth and 10 years of age. Brain tumors are slightly more common in boys¹¹.

The most common benign tumour in our study was meningioma (Fig. 4). Meningiomas and other mesenchymal tumours account for approximately 27%². Meningiomas are typically slow growing benign WHO grade I tumours attached to dura and composed of neoplastic meningiothelial cells.

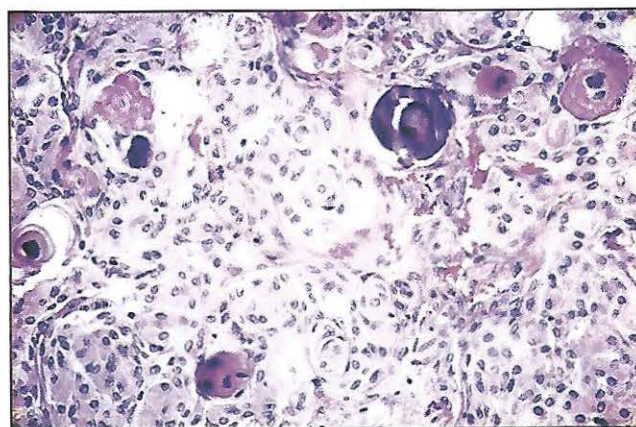


Fig. 3. Meningioma showing whorls of tumour cells with psammoma bodies.

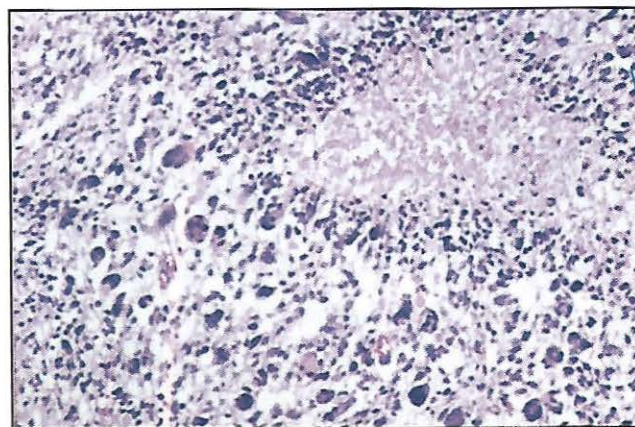


Fig. 4: Glioblastoma Multiforme showing sheets of anaplastic astrocytes arranged around an area of necrosis.

The earlier the patient presents, prompt surgery may virtually cure the patient. The delay in presentation leads to morbidity and mortality due to recurrence of the tumor.

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