

# Histological Subtypes of Brain Tumor: Pattern in a Hospital in Dhaka, Bangladesh

**Nadira Majid<sup>1\*</sup>**  
**Zahed Ali<sup>2</sup>**  
**Md. R Rahman<sup>3</sup>**  
**Afia Akhter<sup>1</sup>**  
**Rubyath C Rajib<sup>1</sup>**  
**Uttam K Saha<sup>2</sup>**

<sup>1</sup>Department of Pathology,  
Delta Medical College, Dhaka,  
Bangladesh

<sup>2</sup>Department of Neurology,  
Sir Salimullah Medical College,  
Dhaka, Bangladesh

<sup>3</sup>Department of Biochemistry,  
Delta Medical College, Dhaka,  
Bangladesh

**\*Correspondence to:**

**Dr Nadira Majid**, MD (Pathology)  
Assistant Professor, Department of Pathology,  
Delta Medical College, Dhaka, Bangladesh  
E-mail: nadiramajid2009@yahoo.com  
Mobile: 01819297216

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## Abstract

**Background:** A brain tumor is an intracranial solid neoplasm which involves varied types of cells. Management strategies and prognosis of tumor depends on the combination of factors like the type and grade of tumor, its location, size and state of development. So definite typing of brain tumor by histological examination is essential for appropriate treatment. **Methods:** This cross-sectional study was carried out from May 2011 to June 2012 in Delta Hospital Limited, Dhaka, Bangladesh. A total of 65 brain tissue biopsy samples were collected irrespective of age and sex along with patients' clinical diagnoses, CT scan or MRI report, and operative findings and histological diagnosis were done. The frequency and proportion were calculated using SPSS 12.0 for Windows. **Results:** Majority (38.5%) of the study subjects belonged to 40–49 years of age group with male predominance (63.1%). Astrocytoma comprised the largest group (27.7%) and majority of the tumors were in spinal region (23.1%). **Conclusions:** It is concluded from this study that among the different varieties of brain lesions astrocytoma is the most common one and the location of tumor is more common in spinal region with male predominance between the age group of 40–49 years confirmed by biopsy and histopathology along with CT or MRI.

**Key words:** Brain tumor; Astrocytoma; Histological subtype.

## INTRODUCTION

Tumor is defined as an abnormal growth of cells, which are created by an abnormal and uncontrolled cell division.<sup>1</sup> A brain tumor is an intracranial solid neoplasm which occurs not only in the brain, but also in lymphatic tissue, blood vessels, the cranial nerves, the brain envelopes (meninges), skull, pituitary gland, pineal gland and spinal canal. Within the brain involved cells may be neurons or glial cells which include astrocytes, oligodendrocytes and ependymal cells.<sup>2</sup> Brain tumors may also be metastatic that is spread from cancers primarily located in other organs. Intracranial neoplasm can be malignant (cancerous) or benign (non-cancerous). Central nervous system (CNS) tumors are relatively uncommon but are among the most feared of cancers. It attacks the patient's sense of self by causing paralysis, seizures, cognitive impairment, and personality changes. It is the second most common cause of death from neurological disease, surpassed only by stroke.<sup>3</sup>

The brain is well protected by the skull, so the early detection of a brain tumor occurs only when diagnostic tools are directed at the intracranial cavity. Computed tomography (CT) scans and especially magnetic resonance imaging (MRI) play a

central role in the diagnosis of brain tumor. But there are some difficulties in their interpretation. Errors in reporting of CT or MRI are even more common when attempts are made to predict the type of malignancy.<sup>4,5</sup> The definitive diagnosis can only be confirmed by histological examination of brain tissue samples obtained either by means of brain biopsy or open surgery. Histological examination is essential for the appropriate treatment and prognosis. Management strategies and prognosis of tumor depends on the combination of factors like the type and grade of tumor, its location, size and state of development.<sup>3,6</sup> So, it is wise not to be overconfident about the suspected type or grade of a tumor prior to biopsy.

## MATERIALS AND METHODS

This cross-sectional study was carried out from May 2011 to June 2012 in Delta Hospital Limited, Dhaka, Bangladesh. A total of 65 study subjects were enrolled in this study irrespective of age and sex. Data were collected when brain tissue biopsy samples were sent to from different hospitals along with patients' clinical diagnoses, CT scan or MRI report, and operative findings. CT or MRI of brain was strongly suspicious of being tumor. Histological diagnosis was made from the brain biopsy sample by doing hematoxylin and eosin stain performed by pathologists. The frequency and proportion were calculated using SPSS 12.0 for Windows. Ethical clearance was obtained from concerned authority.

## OBSERVATION AND RESULTS

Out of 65 study subjects the majority belongs to 40–49 years of age group (38.5%) and there was male predominance (63.1%) (Tables 1 and 2).

**Table 1:** Distribution of the study subjects by age ( $n = 65$ )

Age group	Frequency	Percentage (%)
<10	2	3.1
10–19	6	9.2
20–29	7	10.8
30–39	14	21.5
40–49	25	38.5
50–59	6	9.2
>60	5	7.7

**Table 2:** Distribution of the study subjects by sex ( $n = 65$ )

Sex group	Frequency	Percentage (%)
Male	41	63.1
Female	24	36.9

Table 3 shows the histological pattern of brain tumors among which astrocytoma comprised the largest group (27.7%). Majority of the tumors were in spinal region (23.1%) (Table 4).

**Table 3:** Distribution of the study subjects by histopathological diagnosis ( $n = 65$ )

Histopathological diagnosis	Frequency	Percentage (%)
Astrocytoma	18	27.7
Oligodendroglioma	4	6.2
Ependymoma	2	3.1
Oligoastrocytoma	2	3.1
Neurilemmoma	6	9.2
Hemangioblastoma	2	3.1
Gliosis	2	3.1
Tuberculosis	5	7.7
Metastatic tumor	6	9.2
Pituitary adenoma	2	3.1
Meningioma	8	12.3
PNET	1	1.5
Choroid plexus papilloma	1	1.5
Medulloblastoma	4	6.2
Arachnoid cyst	1	1.5
Ganglioneuroma	1	1.5

**Table 4:** Distribution of the study subjects by tumor location ( $n = 65$ )

Location of tumor	Frequency	Percentage (%)
Spinal	15	23.1
Frontal lobe	5	7.7
Frontotemporal	1	1.5
Parietofrontal	1	1.5
Parietal	3	4.6
Temporal	5	7.7
Temporoparietal	2	3.1
Occipital	7	10.8
Parieto-occipital	5	7.7
Thalamus	1	1.5
Cerebellum	3	4.6
Pituitary	2	3.1
Ventricle	2	3.1
Unknown	13	20.0

## DISCUSSION

Brain tumors refer to a mixed group of neoplasm originating from the intracranial tissues and the meninges with degrees of malignancy ranging from benign to aggressive. Benign tumors can be lethal due to their site in the brain, their ability to infiltrate locally and the propensity to transform to malignancy.<sup>7</sup> Here we focus on primary, metastatic and other lesions of brain which include the site of cerebrum, cerebellum and spinal cord. The incidence of brain tumor rises with the age range from less than 10 years to more than 60 years.<sup>8</sup> It is more common between the ages of 40–49 years with a drop in incidence over 60 years. Our study also shows more frequency between the age of 40–49 years. Males are more likely to be diagnosed than females, with a male:female ratio of 1.7:1. Similar results are documented by Counsell et al.<sup>9</sup> Coleman et al<sup>10</sup> also reported brain tumors to be more commonly diagnosed in males than females and that most are detected in older adults. According to cancer registry of South Australia the incidence increases with age. It is relatively low under 30 years of age and higher among males than in females.<sup>11</sup>

These data differ from the Mayo Clinic and the Central Brain Tumour Registry of the United States where they reported that there is a small peak before the age of 10 years and a steady rise from 15 years onwards, with the highest incidence between the age of 75 and 84 years. This discrepancy may be due to higher life expectancy in the western world. They also mentioned that intracranial tumors may occur at any age but the incidence and histologic types vary with age.<sup>3</sup>

Brain tumors in adult arising in the frontal, temporal and parietal lobe collectively form the greatest proportion and majority (86%) are gliomas which include astrocytoma, glioblastomas, oligodendrogliomas and unspecified glioma and both the observations are similar to that of our findings.<sup>12</sup>

## CONCLUSION

It can be concluded from this study that among the different varieties of brain lesions in our population, astrocytoma is the most common one and the location of tumor is more common in spinal region with male predominance between the age group of 40–49 years.

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