

## HISTOPATHOLOGICAL STUDY OF SPECTRUM OF THE LESIONS OF CENTRAL NERVOUS SYSTEM IN A TERTIARY CARE HOSPITAL

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**ABSTRACT:** The aim of our study was to establish the relative frequency of biopsy proven tumors of central nervous system (CNS). Two hundred and forty two (242) CNS Biopsy specimens were studied in a one year period. Out of 72 CNS tumors, 66 were primary 4 were metastatic. Among 4 metastatic tumors, the most common histological type is adenocarcinoma. The most frequent type of CNS tumour was astrocytoma followed by meningioma.

**KEYWORDS:** Glioma, astrocytoma, oligodendroglioma, ependymoma, medulloblastoma, meningioma, schwannoma.

**INTRODUCTION:** The human central nervous system is an enormously complex tissue serving the organism as a processing center linking the information between the body and outside world. Tumors of central nervous system have unique characteristics that set them apart from neoplastic processes elsewhere in the body.

The frequency and location of CNS tumors in children differ from that in adults. In adults majority of tumors arise above tentorium while in children 70% of intracranial tumors arise in the posterior fossa. Histological type of tumors is also different in children and adults.

**MATERIALS AND METHODS:** A total of 242 CNS lesions studied in the department of pathology in our hospital in 2012. The diagnosis in was made on HPE of routinely processed tissue. The H&E stained sections in all cases were reviewed and diagnosis was confirmed applying revised WHO classification.

### RESULTS:

Year	Total No. of biopsies	CNS biopsies	%
2012	3091	242	7.8%

Table 1: CNS specimens out of total histopathology specimens

Neurosurgical specimens constitute 7.8% of the total number of surgical specimens received.

Sl. No.	Site	No. of cases	%
1	Cerebro parietal region	22	30.50
2	Cerebro frontal region	17	23.61
3	Cerebro temporal region	5	6.94
4	Cerebro occipital region	1	1.38

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5	Cerebellum	5	6.94
6	Pons	3	4.16
7	Cerebellopontine angle	12	16.66
8	Sellar/ Supra sellar	2	2.77
9	Spinal cord region	5	6.94
	<b>Total</b>	<b>72</b>	<b>100%</b>

**Table 2: Site distribution of various CNS neoplasm**

Among a total number of 72 major CNS neoplastic lesions, supratentorial lesions were 42 (58.33%) and infratentorial lesions were 22(30.55) %. There were 6(8.33%) lesions situated in spinal cord region. Among spinal cord lesions, 3 were meningiomas, one was schwannoma and 2 were neurofibromas. The two lesions from suprasellar region were pituitary adenomas.

Sl. No.	Site	No. of cases	%
1	Astrocytoma	30	41.66
2	Meningioma	20	27.77
3	Schwannoma	5	6.94
4	Oligodendroglioma	3	4.16
5	Medulloblastoma	4	5.55
6	Neurofibroma	2	2.77
7	Craniopharyngioma	2	2.77
8	Ependymoma	1	1.38
9	Pituitary adenoma	1	1.38
10	Metastatic tumor	4	5.55
	<b>Total</b>	<b>72</b>	<b>100%</b>

**Table 3: Incidence of Major CNS neoplasmas**

Out of 72 neoplastic lesions of CNS, majority were astrocytomas (30) accounting 42%. Next in frequency was meningioma. Among a total of 20 meningiomas, 17 were located intracranially and 3 were situated in spinal cord region.

Among 72 cases, 32 were benign and 40 were malignant. Among the malignant ones, astrocytomas are commonest neoplastic lesions with percentage of 42%

Sl. No.	Lesion	No. of cases	%
1	Prolapsed intervertebral discs	141	82.94
2	Non-specific inflammation	09	5.29
3	Tuberculomas	06	3.52
4	Developmental malformations		
	a) Meningocele	4	2.35
	b) Meningo Myelocele	3	1.76
	c) Meningo encephalocele	7	4.11

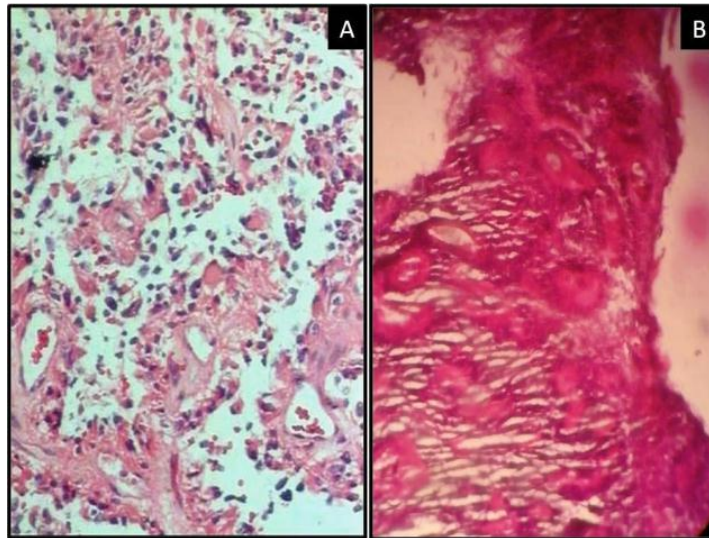
**Table 4 : Non-neoplastic CNS lesions in the present study**

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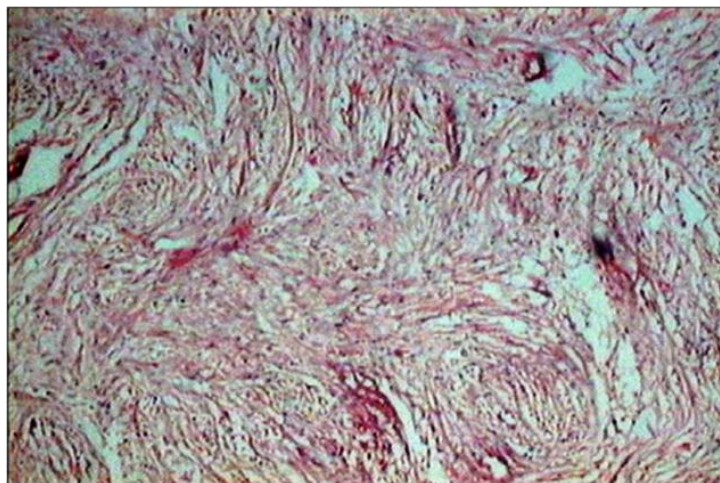
Apart from intervertebral discs and congenital malformations, tuberculous infection is also important lesion.

In our study incidence of low grade astrocytomas were the commonest of all gliomas and fibrillary astrocytoma was the frequent histological type among astrocytomas.

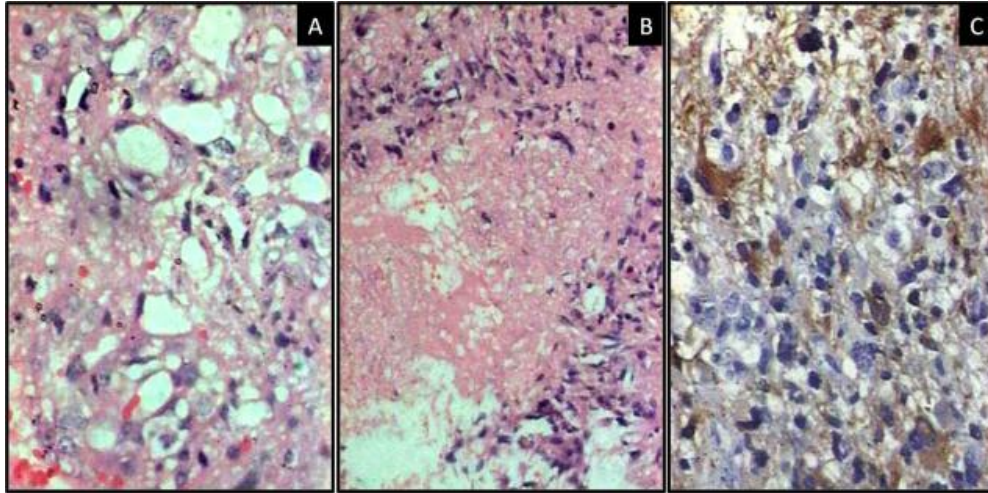
Metastatic lesions were more common in males than females, because of the fact that bronchus was the main primary site of tumor in metastatic diseases of nervous system.



**Fig. 1: Shows (A) pilocytic astrocytoma and (B) ependymoma**



**Fig. 2: Schwannoma**



**Fig. 3: Shows a case of glioblastoma multiforme showing (A) vascular proliferation, (B) necrosis and (C) tumor cells showing GFAP positivity**

#### DISCUSSION:

**General Incidence:** Among 3091 biopsies, number of CNS biopsies was 242 constituting 7.82%.

**Age and Sex Incidence:** CNS neoplasms were widely distributed in all ages. But they form second commonest neoplasm in paediatric age group. In our study, out of 67 intracranial space occupying lesions, 11 lesions are in paediatric age group forming 16.4%. This is slightly less compared to reported incidence of 17.6% (Dastur 1980).<sup>(2)</sup> And slightly higher compared to 13.7% of Cushing (1926). In our study male to female ratio was 1.08:1. Rubinsten observed a male: female ratio of 2:1.

#### SPECIFIC INCIDENCE:

**Gliomas:** The gliomas are the commonest of the intracranial tumors. In the present study they constitute 34 out of 67 intracranial neoplastic lesions accounting for 50.7%. This is slightly higher than reported by A.K. Bannerjee (49%)<sup>(3)</sup>, while our incidence is less with that of Pal and Chopra (54.2%); Dastur (1980) reported 50.24% in a study from 2237 intracranial space occupying lesions.

**Astrocytomas:** Most common tumors among gliomas were the astrocytomas accounting for 30 out of 34 cases (88%). Grade-I and grade-II astrocytomas were more common than high grade astrocytoma in our study. Fibrillary Astrocytomas were the frequent histological type among astrocytoma. There were 2 cases of pilocytic astrocytoma.

**Oligodendrogliomas:** Oligodendrogliomas were 2 in number in our study accounting for 5.88% of gliomas. This is slightly higher than recorded in Norwegian cancer registry in which Oligodendroglial tumors account for 4.2% of all primary brain tumors (Mork et al 1985).<sup>(4)</sup> According to Cushing it is 5% of all intracranial lesions and Bannerjee (1972) reported it as 10.2% in a study of 200 cases. Male to Female ratio was 2.5:1.

**Ependymomas:** In present study, there was one ependymoma constituting 2.9% of gliomas. This falls in the range of study by Duncan et al.<sup>(5)</sup> Our incidence was less than incidence of Varma and Subramanyam, which was 5%. Russel and Rubinstein<sup>(6)</sup> reported an incidence of 6% ependymomas.



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**Medulloblastomas:** In present study 4 cases of Medulloblastomas were seen accounting for 5.97% of all intracranial neoplasms. This is much higher when compared to other studies. Cushing and Zulch<sup>(7)</sup> reported incidence of 4% and 3.8% respectively. Dastur reported it as 4.2% while Bannerjee reported a higher incidence of 9.2%. They constitute 28.94% of all intracranial tumors of childhood. This falls around the range quoted by Juan Rosai.<sup>(8)</sup>

**Meningiomas:** Out of 20 Meningiomas studied, 17 were intracranial and 3 were intraspinal in location. Percentage of intracranial Meningiomas compared to other neoplasms was 23.6%. This falls in range given by Lantos et al (13 to 26%) and Rubinstein (13 to 18%); 12.75% by Pal and Chopra.<sup>(9)</sup>

The commonest location of meningiomas was supratentorial region similar to that observed by Dastur et al and Ranjan et al.<sup>(2,10)</sup>

Meningiomas were common in middle aged and elderly patients with a peak occurrence during sixth and seventh decades of life although these tumors can occur in children and in very old.<sup>(11)</sup> In our study the incidence is highest in 5<sup>th</sup> and 6<sup>th</sup> decades.

**Schwannomas:** Out of 5 Schwannomas reported in our study 1 was spinal and 4 were intracranial in location. They constituted 5.5% of all intracranial tumors and 20% of intraspinal tumors. This was less when compared to incidence of Casadei et al<sup>(12)</sup> which was 8% of all intracranial tumors and 29% of primary spinal tumors given by Herregots et al.<sup>(13)</sup> The incidences of schwannomas was much less in studies of Zimmerman<sup>(14)</sup> (1.52%) and Zulch<sup>(7)</sup> 6.8%.

### NON NEOPLASTIC LESIONS:

**Prolapsed intervertebral Disc:** Among non-neoplastic lesions prolapsed intervertebral discs form majority of cases i.e., 141/170 accounting for 82.94% of all non-neoplastic lesions.

**Tuberculosis:** 6 cases of tuberculosis were reported in our study. This is comparable with incidence of Cushing (1926) and Zimmerman (1971) i.e., 2% and 6.4% respectively.<sup>(14)</sup>

**CONCLUSIONS:** In the present study glial tumors are most frequent neoplasm and Ashocytoma is the most common glial tumor reported. Most common location is cerebrum. Meningiomas are the next common CNS tumors. Meningiotheliomatous meningioma is the commonest type.

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