



AN AUDIT OF CENTRAL NERVOUS SYSTEM TUMORS IN A TERTIARY HEALTH CENTER AT GWALIOR

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ABSTRACT **BACKGROUND:** Tumors of the central nervous system (CNS) constitute approximately 2% of all malignancies. Although relatively rare, the associated morbidity and mortality and the significant proportion of affected young and middle-aged individuals has a major bearing on the death-adjusted life years compared to other malignancies. The incidence of central nervous system (CNS) tumors in India ranges from 5 to 10 per 100,000 population with an increasing trend and accounts for 2% of malignancies. **AIM:** The present retrospective study analyses the histological spectrum of brain tumors in tertiary care hospitals in GWALIOR (M.P) INDIA. **MATERIAL AND METHODS:** Data regarding frequencies of various brain tumors (diagnosed according to the world health organization (WHO) classification), in 652 patients was collected. **RESULTS:** The most common primary brain tumors were astrocytic tumors (35.6%), followed by meningioma (17%). Posterior fossa is the most common site for the pediatrics and adolescence (age < 20 yrs) intracranial tumors. Medulloblastoma incidence is highest among them. **CONCLUSIONS:** There are very less studies done on the histological spectrum of brain tumors in India. the histological profile of brain tumors in India is similar to that reported in the various studies of Indian and worlds literature.

KEYWORDS : CNS TUMORS, HISTOPATHOLOGY,ASTROCYTOMA,MENINGIOMA

INTRODUCTION

Central Nervous System (CNS) tumours, though uncommon are not a rare entity in clinical practice. neoplasms represent a unique, heterogenous population of neoplasms and include both benign and malignant tumors. The tumors of central nervous system are reported to be less than 2% of all malignancies¹ and affecting all age groups right from the very young to the very old.

There is no organized brain tumour registry in India; hence, robust epidemiologic data is not available for the country. All currently quoted data is based on hospital-based cancer registries under the National Cancer Registry Program. The situation is compounded by the fact that major academic neurosurgical centers are not affiliated to comprehensive cancer centers and as such are not obliged to report their data to the national cancer registry.

The crude incidence of primary brain tumour in India is 3.4 per 100,000 populations for males and 1.2 per 100,000 populations for females. It represents < 1% of new cancer cases detected every year in the country². However, there has been a steady increase in the incidence of primary brain tumours over the last decade or so primarily due to higher detection rates due to more widespread availability of diagnostic imaging. In India, tumors of the CNS constitute about 1.9% of all tumors³.

Males are involved more frequently, meningiomas being an exception with higher rates in females. Heritable syndromes and ionizing radiations are the only two established causes of primary CNS neoplasms⁴.

MATERIALS AND METHODS

The present study comprises 652 cases of CNS Surgeries were recorded in the files of Pathology Department of G.R. Medical College, Gwalior for a period of 17 MONTHS from OCT 2013 TO APRIL 2015.

It includes all the patients admitted in the Department Of Neurosurgery J.A Group Of Hospitals, Gwalior and were operated & their biopsy sent to Pathology Department for histopathological examination.

MATERIAL

During study there are 652 cases operated in department of neurosurgery for which biopsy sample sent for histopathological examination. all the relevant data were recorded from requisition form which were sent along with biopsy sample.

In all the cases detailed clinical history as regard to their age , sex ,site, and microscopic findings were recorded follow up study was not possible , as majority of patients did not come back for follow up.

1.) Incidence

2.) After receiving biopsy sample in formalin is processed for

histopathological examination. in this institute both manual and automatic tissue processing facility available.

OBSERVATIONS

1. CNS LESIONS AND CNS TUMOURS OVERVIEW

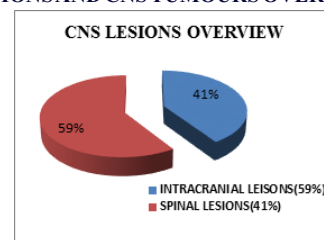


FIGURE 1. The above pie diagram explains that there were total 652(100%) cases were operated for which biopsy sample was received for histopathological examination, out of which 387(59%) cases were of disc material & spinal lesions, while 265(41%) cases were of intracranial lesions. In this all types of cases included whether tumours, inflammatory or unremarkable tissue.

2. CNS TUMOURS OVERVIEW

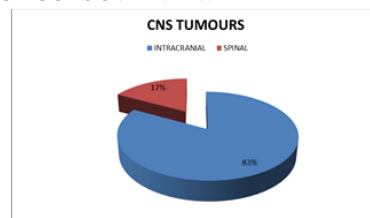


FIGURE 2 pie diagram depicts that there were total 310 (100%) cases of CNS tumours, out of which most of tumours were, intracranial tumours 250(83%) while 60 (17%) were from spinal tumours.

3. TUMOUR AND TUMOUR LIKE CONDITIONS OF INTRACRANIAL LESIONS (SOL).

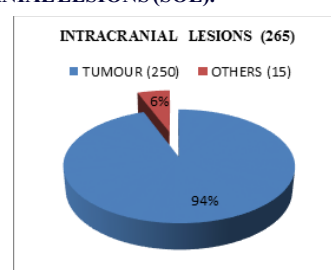


FIGURE 3 explains that there were total 265 cases for which intracranial biopsy sample received out of that 250(94.3%) were having tumour or tumour like condition present while 15(5.7%) were including inflammatory, tuberculosis, arteriovenous malformation and abscesses.

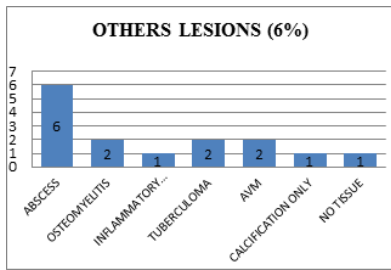


FIGURE 4 shows that total 15(6%) cases out of 265 intracranial lesions included in others category, lesions shown in this bar diagram. Avm is over sclap so it was not included as a part of intracranial tumours.

4. PRIMARY V/S SECONDARY TUMOURS

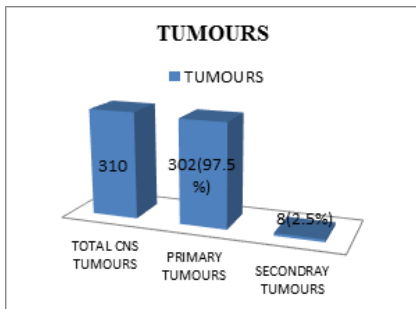


FIGURE 5 shows that :8 (2.5%) metastatic deposits were from ,Adenocarcinoma-06,Melanoma-01, Clearcell carcinoma 01.Most of the metastatic deposits were in frontal lobe (5) while 3 were overlapping lobes Frontoparietal lobe (02), frontotemporal lobe (01).

5.SITE-WISE BRAIN TUMOURS INTRACRANIAL LESIONS. (TOPOGRAPHY ICD-10).

TOPOGRAPHY (ICD- 10)	MALE	FEMALE	TOTAL
FRONTAL LOBE (C71.1)	50(20%)	27(10.8%)	77 (30.8%)
PARIETAL LOBE(C71.3)	10(4%)	07(2.7%)	17(6.8%)
FRONTOPARIETAL(C71.8)	13(5.2%)	05(2%)	18(7.2%)
FRONTOTEMPORAL(C71.8)	11(4.4%)	09(3.6%)	20(8%)
POSTERIOR FOSSA	24(9.6%)	13(5.2%)	37(14.8%)
CP ANGLE	16(6.4%)	15(6%)	31(12.4%)
SELLER/SUPRASSELLER (C71.0)	14(5.6%)	04(1.6%)	18(7.2%)
TEMPORAL LOBE (C71.2)	06(2.4%)	07(2.7%)	13(5.2%)
TEMPOROPAREITAL LOBE (C71.8)	05(2%)	01(0.4%)	06(2.4%)
BRAINSTEM(71.7)	05(2%)	03(1.2%)	08(3.2%)
INTRAVENTRICULAR (C71.5)	02(0.8%)	01(0.4%)	03(1.2%)
FALCINE (C71.0)	01(0.4%)	00	01(0.4%)
CORPOUS CALLOSUM(C71.0)	01(0.4%)	00	01(0.4%)

TABLE 2

AGE (YRS)	MALE(158)	FEMALE(92)	TOTAL(250)
≤ 15	17(6.8%)	04(1.6%)	21(8.4%)
16-30	34(13.6%)	27(10.8%)	61(24.4%)
31-45	52(20.8%)	32(12.8%)	84(33.6%)
46-60	42(16.8%)	22(8.8%)	64(25.6%)
61-75	09(3.6%)	07(2.8%)	16(6.4%)
76-80	03(1.2%)	NIL	03(1.2%)
≥80	01(0.4%)	NIL	01(0.4%)

Table 2 depicts that sex ratio of CNS lesions was m:f(1.7), most of the patients were from age group 31-45yrs(33.6%).

6. SPINAL TUMOURS AGE-WISE DISTRIBUTION

AGE	MALE (39) 65%	FEMALE (21) 35%	TOTAL (60)
≤15YRS	4	0	4
16-30	12	7	19
31-45	14	11	25
46-60	8	3	11
61-75	1	0	1
76-80	0	0	0
≥80YRS	0	0	0

table 3 shows that there were total 60(19%) cases of spinal tumours out off total 310 cases. sexratio was 1.8 and most common age group was 31-45yrs (41.6%).

7.ASTROCYTIC TUMOURS IN CNS SEX-WISE DISTRIBUTION WITH GRADING {TOTAL=109(35.16%)} OUT OFF 310 CNS TUMOURS.

GRADING	MALE	FEMALE	TOTAL
GRADE 1	2(1.8%)	1(0.91%)	3(2.7%)
GRADE 2	35(32.11%)	14(12.8%)	49(44.9%)
GRADE 3	23(21.1%)	10(9.7%)	33(30.2%)
GRADE 4	11(10%)	6(5.5%)	17(15.5%)
GRADE 2→3	2(1.8%)	0	2(1.8%)
GRADE 3→4	5(4.5%)	0	5(4.5%)

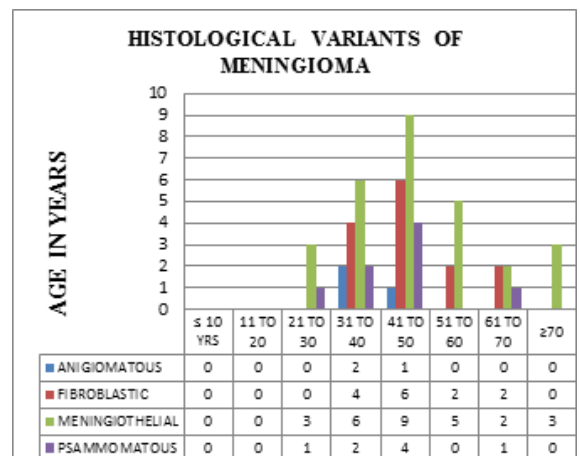
Above table 4 shows that there were total 109(35.8%) of cases were astrocytic tumours, among astrocytoma grade ii was the most common variant, followed by grade iii, grade iv & grade I.

8.ASTROCYTIC TUMOURS DISTRIBUTION AGE-WISE.

AGE (YRS)	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 2→3	GRADE 3→4
≤10	NIL	NIL	NIL	NIL	NIL	NIL
11-20	NIL	03	01	NIL	NIL	NIL
21-30	NIL	09	06	01	NIL	01
31-40	03	13	09	04	NIL	NIL
41-50	NIL	12	12	04	01	02
51-60	NIL	08	03	04	01	02
61-70	NIL	04	02	03	NIL	NIL
≥71	NIL	NIL	NIL	01	NIL	NIL

Table 5 shows that astrocytic tumours were most common in age group 31 to 40 followed by 41 to 50 yrs.

9. MENINGIOMA AGE-WISE DISTRIBUTION (INTRACRANIAL + SPINAL) TOTAL 53(17%) OUTOFF 310 CNS TUMOURS.



The above figure 11 depicts that all the meningial tumours in this study was benign and most common entity was meningothelial followed by fibroblastic , psammomatous and lastly angiomatous. Most common age group was 41 to 50 yrs.

10.MENINGIOMA SEX-WISE DISTRIBUTION ALONG WITH HISTOLOGICAL VARIANTS.

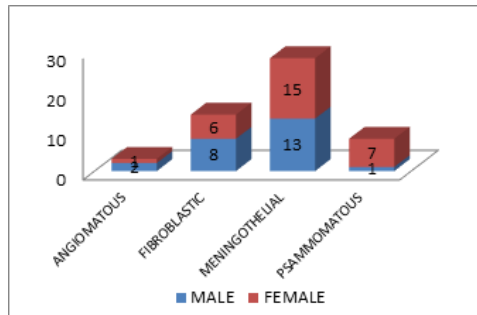
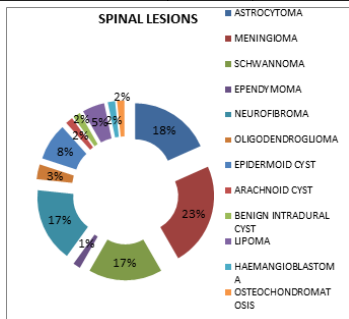


FIGURE 12 There were total 53(17%) cases of meningioma out off 310 CNS tumours.4 histological variants were seen out of which meningothelial meningioma, followed by fibroblastic,psammomatous & anigiomatous meningioma respectively.

There were 23(43.3%) male and 29(54.7%) cases were found in females out off 53 cases.here female preponderance was present **m:f**, 23:29=0.79.

11. SPINALCORD TUMOURS, TYPES & DISTRIBUTIONS (TOTAL60)SEX-WISE.

TUMOUR TYPE	MALE	FEMALE	TOTAL
ASTROCYTOMA	10	01	11(18.3%)
MENINGIOMA	04	10	14(23.3%)
SCHWANNOMA	08	02	10(16.6%)
EPENDYAMA	01	00	01(1.6%)
NEUROFIBROMA	07	03	10(16.6%)
OLIGODENDROGLIOMA	02	00	02(3.3%)
EPIDERMOID CYST	02	03	05(8.3%)
ARCHNOID CYST	01	00	01(1.6%)
BENIGN INTRA DURAL CYST	01	00	01(1.6%)
LIPOMA	01	02	03(5%)
HAEMANGIOBLASTOMA	01	00	01(1.6%)
OSTEOCHONDROMATOSIS	01	00	01(1.6%)



Above table 7 & figure 13 shows meningioma s most common tumour followed by astrocytoma and iird place is shared by schwannoma & neurofibroma.

12.VARIOUS TUMOURS OF CNS INTRACRANIAL AND SPINALCORD.

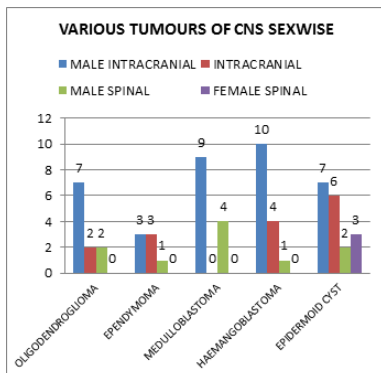


FIGURE 14 shows various other tumours of CNS besides meningioma and astrocytoma.

13. VARIOUS TUMOURS OF CNS AGE-WISE

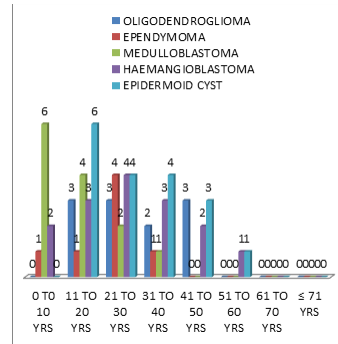


FIGURE 15 bar diagram showing age wise distribution of various CNS tumours besides astrocytoma and meningioma, including both benign and malignant tumours.

14. TUMOURS OF SELLAR AND SUPRASellar REGION

TUMOURS	MALE	FEMALE	TOTAL
PITUTARY ADENOMA	09	04	13
CRANIOPHYRANGIOMA	03	00	03

Above table 9 explains that there were 16 (5.0%) tumours out off 310 CNS tumours, in which pituitary adenoma 13(4.1%) was came out the most common tumour of sellar and suprasellar region.

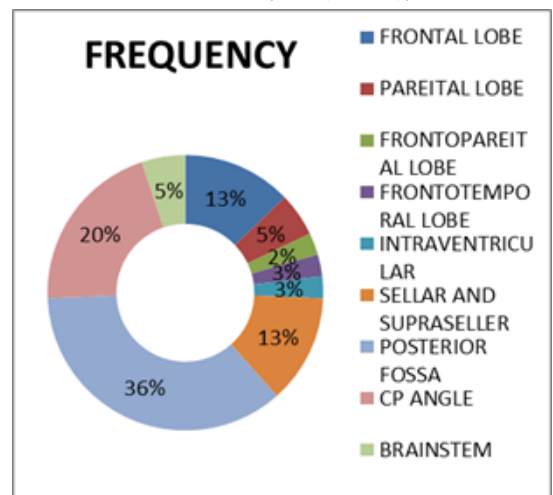
15. PEDIATRIC AND ADOLESCENCE TUMOURS (AGE GROUP ≤20 YRS).

TUMOUR	MALE (32=68%)	FEMALE (15=32%)	TOTAL (47)
BENIGN	17	06	23
MALIGNANT	15	09	24

TUMOUR	INTRACRANIAL (39)	SPINAL (8)	TOTAL (47)
BENIGN	15(31.9%)	08 (17%)	23 (48.9%)
MALIGNANT	24 (51%)	00	24 (51%)

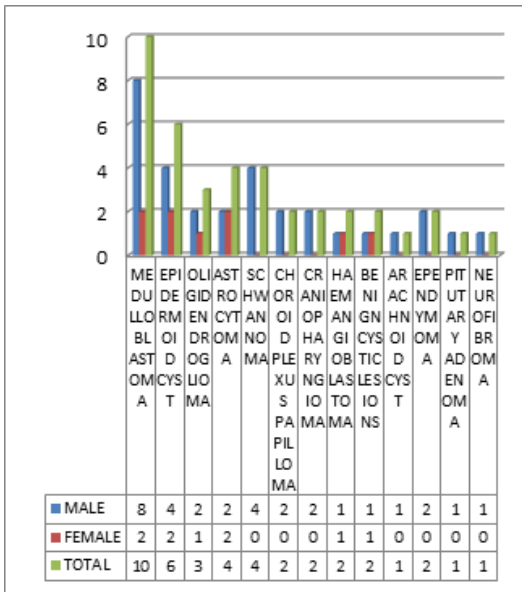
Above table depicts total 47/310(15.1%) cases were found in paediatric and adolescence category.here both benign and malignant primary tumours were present almost in equal ratio.sex ratio was (m:f) 2:1.

16. TOPOGRAPHY OF PAEDIATRIC AND ADOLESCENCE INTRACRANIAL TUMOURS {39/47(82.97%)}



Above figure 19 shows that posterior fossa (posterior fossa+ brainstem+cp angle=36%+20%+5%) was the most common area of tumour.

17. SPECTRUM OF PEDIATRIC AND ADOLESCENCE TUMOURS (AGE GROUP ≤20YRS).



Above figure 18 shows that medulloblastoma as highest numbers. There was male preponderance.

DISCUSSION

The present study is based on the critical analysis of the information obtained from the patients requisition forms and record files of Pathology Department of G.R. Medical College, Gwalior (M.P) for prospective 17 months period.

The requisite information was collected from the patients requisition forms, records, when ever required added information was obtained from the surgical files of the patients from the Department Of Neurosurgery, J. A. Group Of Hospitals Gwalior (M.P).

All the tissue sections of total 310 CNS tumours cases were reviewed, when ever slides were not clear or available multiple sections from the paraffin blocks were prepared and stained with the routine h&e technique and were examined histopathologically for confirmation of the diagnosis.

Various studies has been carried out on the neoplastic lesions of the CNS extensively in india and abroad in the past. We have tried to compare our results with the advancement and scientific achievement in modern era, our knowledge on the histological and various modifications of the classification of the CNS tumour has been progressed to present stage as a natural evolutionary process.

In the present study the classification proposed by W.H.O (2007) has been followed.

Present study compared of detailed prospective histopathological study of 310 cases of CNS tumours during october 2013 to April 2015. the total number of CNS lesions biopsy sample received were 652 out of which 310 found to be of neoplastic etiology. out of 310, 250 were intracranial tumours and 60 were from spinal cord tumours.

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