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Prospective analysis of CNS tumor spectrum: A single centre experience in South India

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I. Introduction

CNS neoplasms constitute 1-2% of all malignancies[1]. A global rise in CNS tumors has been observed in the last decade. The International agency for research on cancer in 2002 reported a global incidence of CNS tumors as 3.7/ one lakh population in males and 2.6/ one lakh population in females. It was 5.8/ one lakh in males and 4.1/ one lakh in females in developed countries versus 3.0/ one lakh in males and 2.1/ one lakh in females in developing countries[2]. By 2008 the burden has increased to 3.8/one lakh in males and 3.1/one lakh in females. The rate of incidence was more in developed countries with 5.8/one lakh in males and 4.4/one lakh in females. In the developing parts of the world the incidence has increased to 3.2/ one lakh in males and 2.8/one lakh in females.

Many of the developed countries maintain nationwide cancer registries[3]. In developing countries due to lack of complete registration of diagnosed cases with local cancer registries, CNS tumor burden is un noticed and underestimated[4].

Study of hospital based prevalence data, followed by maintenance of regional cancer registries is very much needed in developing countries. This initiative can pave way for framing a strong nationwide cancer registry. Only with such comprehensive local knowledge, well informed health programs and research priorities can be formulated.

The purpose of this study was to analyze the data of CNS tumors recorded over a period of 3 years at a tertiary referral centre in South India.

II. Materials and Methods

The Present study included all the patients who were diagnosed with CNS SOL and surgically treated in the Department of Neurosurgery between 2012 and 2016 a public sector tertiary referral centre in South India. The study has been approved by the institutional ethical committee and written informed consent was taken from all the patients who were included in the study after clearly explaining in detail about all the possible outcomes related to the treatment. The Demographic data and histopathological details along with the patient (performance) functional status were recorded systematically since the time of admission for treatment. WHO classification(R Louis etal 2007) was used for the tumor nomenclature and standard treatment protocols were followed during the diagnosis and treatment and as well as in the follow-up period. The data was analyzed using SPSS software version 16.0 and results were commented further in terms of demographic, histopathological and functional performances status of the patient. The WHO classification of CNS tumors which offers a histological grading system (Gr 1-4) was adopted in classifying the tumors which provides an arbitrary estimate in patient prognosis.

III. Results

A total of 96 patients were included in the current study(Table 1). The spectra of CNS malignancies varied in adults with that of childhood groups.
Meningioma(37) and glioma(25) were the most common tumors. The mean age was 42.66 years with the range being 4 years to 70 years. The present sample of study showed a male with the ratio being X: Y (M: F) 5:1.

A total of 85 cases we subjected to conventional open technique. 11 cases were subjected to non conventional methods. Of these 6 were managed by endoscopic approach and 5 patients needed stereotaxy for tissue biopsy for treatment.

Table 1: Clinical Profile of CNS tumors

Type of Tumor	**No of cases**	**Mean age of presentation**	**Sex ratio M:F**	**Mean Length of stay(days)**	**Complaints**	**HPE**
Primary tumors						
CP angle	10	39.2	6:4	12.3	Hearing loss, tinnitus	
Gliomas	27	38.4	14:10	15.45	Seizures motor deficit	24
Meningiomas	31	48.2	20:12 5:3	14	Seizures, Focal deficit	31
Sellar tumors	9	46.8	3:6	15		9
Secondaries	12	40.7	6:5	11.2	Sudden onset of weakness	11
Others (5)						
Medulloblastoma	2					
Hemangioma	1					
Brainstem lesion	1					
ependymoma	1					
Trigeminal Schwannoma	1					
Rt IV Schwannoma	1					

Two of the meningiomas, two gliomas, one pituitary tumor and one medulloblastoma were recurrences.

Most common supratentorial lobar involvement of CNS tumors in the present samples showed the following order.

Supratentorial : Frontal lobe tumors were more common than Parietal tumors followed by Temporal and Occipital lobe tumors.

Whereas Infratentorially CP Angle tumors more common than cerebellar convexity tumors followed by brainstem tumors was the order of presentation.

Out of 11 sella-suprasellar cases there were 9 sellar tumors(6-pituitaryand 3-meningiomas). Even though supra sellar ependymomas are rare, we noted one case. There was one case of supra sellar metastasis. Six cases of pituitary were managed by transnasal transsphenoid endoscopic approach and open technique was used for the sellar menigiomas, the metastatic tumor and the ependymoma. The most common presentation in sellar tumors was visual discomfort.

In these cases the mortality was the highest (45%) observed. Cases developed complications like hypothalamic infarct, postop SIADH and meningitis secondary to infjection .

Secondaries : A total of 12 cases were noted with 10 being supratentorial and 2 being infratentorial (poorly differentiated epithelial neoplasms.

Table 2: Mortality according to etiology of tumor

CP angle Tumors	3
Glioma	6
Meningioma	6
Secondaries	1
Others	1
Sellar tumors	5
Total	22 out of 96

Mortality rate is 21.12%

IV. Discussion

Glioma:
A total of 27 cases.
Mean age of presentation 38.4 with sex ratio of Male: Female 1.4:1.
Mean length of hospital stay was 15.45 and seizures with focal deficits was the most common complaint.
Histopathologically Grade 2(10) were more in umber followed by Grade 4(7), Grade 3(6)and Grade 1 (4).
Mortality 6 cases – 21%.

Meningioma:
A total of 31 cases of which the length of stay 14 days with male predominance M: F- 3: 5 and mean age being 48.2 years.

Seizures was the most common complaint and significant postop complications were noted with increase in Grade of Meningioma and size of tumor. There were 18 cases of Gr 1, 17 of Gr 2 and two of Gr 3.

Table 3: Comparative studies on CNS tumors

STUDY	TYPE	YEAR	NO OF CASES	SEX RATIO (M:F)	AGE	SPECTRUM
Wrensch etal 2002	Cancer region review of	2002		2.2:1	54 year	All spectrum
Nibhoria etal 2015	Prospective observational study	2015	100	1.2:1	Mean 40, Pediatric 12.3%	Neuro Epithelial- 51.7%, Meningeal-34.8%, Mets-5.6%, Peripheral-4.5%, Sellar-2.3%, Haemolymphoid-1.1%
Arora et al 2009		2009				
N chawla etal 2014	Retro spectic study	2014	77	1.6:1		
Munshi A and Jalali R 2009	Glioma study	2009				38.7% Glioma with HGG > 59.5%
Grant R et al 1996		1996				
Larjavaara S et al 2007	Study on Gliomas	2007	33%			GBM M.C
Ironside JW et al 2002	Pituitary study	2002				Pitutary-6 to 10% of SOL
Louis DN et al 2007	Classification	2007				WHO Classification of tumor
Chen et al etal 2013	Case study	2013	34140			GBM M.C 29.5%
Jain A et al S etal 2011	Pediatric study	2011	3936			Next is Mets with 19.5%

A Worldwide (or) Global rise in CNS tumors spectrum burden was noticed irrespective of age. The description of CNS tumors spectrum may have been constrained due to single hospital based data collection.

Recent advances in the imaging modalities and increased healthcare awareness in the worldwide population with improved medical provisions has helped in much more early diagnosis and increased rate of treatment for the brain tumor patients.

It is the time for focusing on CNS onco registries at local hospitals/medical centers which can be utilized to build standard nationwide registries. This information can be utilized for improvement of health services targeting the lacunae and unmet needs of the people.

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