

Demographic and Clinical Profiles of Patients with Intracranial Neoplastic Mass Detected In Magnetic Resonance Imaging: A Retrospective Study

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Abstract

Introduction: Brain tumor account for 85% to 90% of all primary central nervous system (CNS) tumors. It is common in children and elderly. Rest account for secondary brain tumor (metastasis). It is more common in adults. Brain tumor is the 10th leading cause of death for both men and women in US.

Objective: To know the demographic and clinical profile of patients with intracranial neoplastic mass at Indira Gandhi Institute of Medical Sciences (IGIMS), a tertiary care hospital of Bihar.

Materials and Methods: It is a retrospective study and done over a period of four months, from mid December 2016 to April 2017, in the department of Radio diagnosis at IGIMS.

Result: Majority of the patients were found in the 4th decade. Glioma was the most common brain tumor followed by meningioma. There was no definite lobar predilection. Males were affected more as compared to females.

Conclusion: MRI remains the first line investigation for the diagnosis and evaluation of intracranial masses in pre and postoperative period with reasonable degree of diagnostic accuracy. With the advent of newer modification of MRI such as MR venography, MR spectroscopy and MR perfusion etc. diagnostic accuracy has been increased.

Key words: Demographic profile, Intracranial tumor, MRI

INTRODUCTION

A brain tumor or intracranial neoplasm occurs due to uncontrolled abnormal cell proliferation. It is of two types 1) benign and 2) malignant. Depending upon the site of origin it is again of two types 1) primary and 2) secondary. Depending upon the cell origin, it is of two types 1) glial origin and non-glial origin.

All types of brain tumor produce symptoms. Symptoms vary depending upon the area of the brain involved. Symptoms include headache, seizure, visual disturbance,

vomiting and behavioral changes etc. MRI has been considered to be gold standard for the pre-operative diagnosis, local staging and post-therapeutic (post surgery as well as post radiotherapy) monitoring for brain tumors.

Advantages of MRI over computed tomography (CT) scan are 1) to know the nature of the lesion, 2) to know whether focal or infiltrative mass 3) assessment of the residual or recurrence of the mass lesion. Many more lesions are picked up in MRI that is not visible on CT scan. Glioma is the most frequent primary brain tumor in adults, they account for 70% of adult primary brain tumor.

MATERIALS AND METHODS

This study is a retrospective, single institutional study, which was conducted during a period of 20th December 2016 to 30 April 2017 (four months approximately).

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This study has been approved by the ethical committee of this institute. A total of 84 patients with intracranial neoplastic masses were included in this study. Patients with all the ages and both the sexes were included in this study. Post-treated cases were not included.

The MR scanning was performed on GE optima MR 360, 1.5T MRI machine. Images were taken in axial plane with 15 degree angulation of the gantry to the cantho-meatal line, after selecting proper field of view and localizer. Slices were taken without overlapping cuts with slice thickness 3-5 mm. Coronal as well as

sagittal sections were taken in all cases for the accurate determination of anatomical location and extension of the lesion.

Routine sequences included fast spin echo (FSE) T1 weighted images, T2 weighted images, fluid attenuated inversion recovery (FLAIR), gradient recalled echo (GRE), diffusion weighted images (DWI), and MR spectroscopy (MRS). Contrast studies were performed in all the patients. 10 cc of intravenous Magnilek (Gadopentate Dimeglumine) was given for contrast enhancement on T1 weighted images.

Patients from the neurology and emergency department of this institute were included in the study whose MRI shows intracranial neoplastic mass. Written and informed consent were taken from all the participants. A semi-structured questionnaire was prepared. Demographic and clinical data like age, sex and clinical symptoms like headache, vomiting, visual and gait disturbances etc were recorded.

Table 1: MRI brain reviewed

Sl. No.	Month	No. of brain scan	No. of brain tumor
1	December 2016	60	2
2	January 2017	243	16
3	February 2017	270	32
4	March 2017	305	14
5	April 2017	286	20
	Total	Total - 1164	84

Table 2: Age group of the patient

Sl. No.	Age group (in Years)	No. of patients (%)
1	1-10	4 (4.76)
2	11-20	7 (8.33)
3	21-30	15 (17.86)
4	31-40	17 (20.24)
5	41-50	15 (17.86)
6	51-60	15 (17.86)
7	61-70	10 (11.9)
8	>70	1 (1.19)
	Total	Total - 84

Table 3: Sex distribution

Sl.no.	Sex	No. of patients (%)
1	Female	33(39.29)
2	Male	51(60.71)
	Total	Total - 84

Table 4: Clinical presentation

Sl. No.	Symptoms	No. of patients (%)
1	Headache	52(61.90)
2	Vomiting	28(33.33)
3	Vertigo	22(26.19)
4	Visual disturbances	16(19.05)
5	Giddiness	12(14.29)
6	Paralysis	11(13.10)
7	Seizure	11(13.10)
8	Fall	5(5.95)
9	Gait disturbances	5(5.95)
10	Loss of appetite	5(5.95)
11	Fever	4(4.76)
12	Loss of memory	4(4.76)

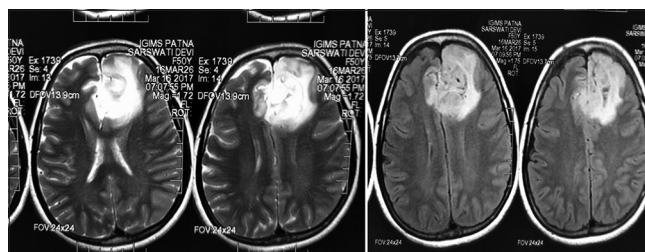


Figure 1: (a) T2WI and (b) FLAIR sequences show hyperintense mass lesion in the left frontal lobe with extension into the right frontal lobe associated with moderate amount of perilesional edema and mass-effect (effaced) over the both frontal horn – glioblastoma multiformis

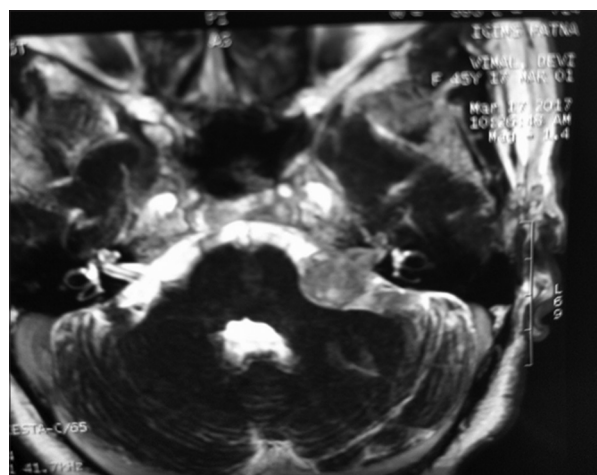


Figure 2: FIESTA sequence shows well-defined round shaped hyperintense mass lesion at the left cerebellopontine angle with widening of the internal auditory canal – vestibular schwannoma

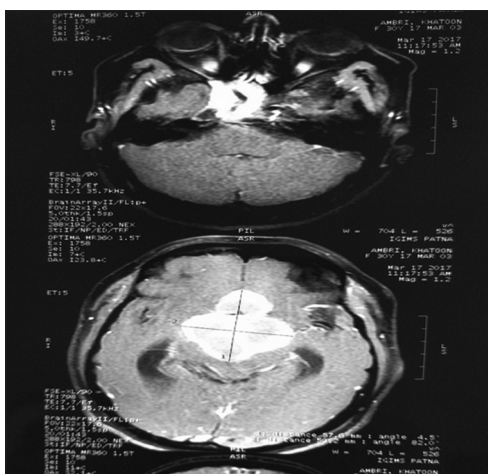


Figure 3: CEMRI (contrast enhanced MRI) shows well defined homogenous enhancing mass lesion in the sellar and suprasellar region extrinsically compressing the anterior commissure of the 3rd ventricle leading to dilatation of both lateral ventricle – pituitary macroadenoma

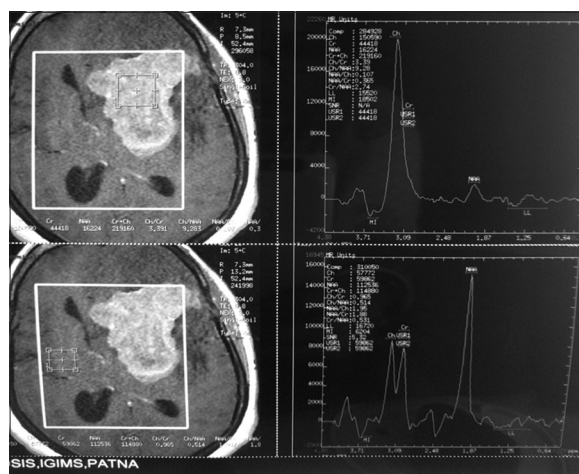


Figure 4: CEMRI with MRS (MR spectroscopy) shows multilobulated homogenous enhancing mass in the left parietal lobe with effaced ipsilateral lateral ventricle with elevated choline peak

DISCUSSION

A total of 1164 patients were underwent MRI brain. Among these 84 (7.22%) patients, MRI brain revealed presence of intracranial neoplastic mass.

Age of the patient ranges from 2-75 years. The mean age was 41.11 year.

The maximum number of patients was in 4th decade, comprising 20.24% cases, and were followed by 3rd, 5th and 6th decade comprising 17.86% each. In a similar study by B.R. Goyani¹, maximum number of patients was in 4th decade (28.5%) followed by 5th decade (18.5%). While according to K.Mahesh², maximum number of patient was

Table 5a: Mass distribution

Location	No. of patients(%)
Intra-axial	63(75)
Extra-axial	21(25)

Table 5b: Mass distribution

Location	Lobar involvement	No. of patients (%)
Intra-axial mass	Frontal lobe	14(16.67)
	Temporal lobe	12(14.29)
	Parietal lobe	5(5.95)
	Occipital lobe	5(5.95)
	Multiple lobe	18(21.43)
	Brain stem	2(2.38)
	Posterior fossa	7(8.33)
Extra-axial mass	Sellar and suprasellar	9(10.72)
	Cerebello-pontine angle	7(8.33)
	Others - Cerebral convexity and base of skull	5(5.95)

Table 6: MRI findings

Sl. No.	Disease	No. of cases (%)
1	Glioma	27(32.14)
2	Meningioma	16(19.04)
3	Metastasis	13(15.48)
4	Sellar & suprasellar mass	7(8.33)
5	Schwannoma	5(5.95)
6	Ependymoma	4(4.76)
7	Medulloblastoma	4(4.76)
8	Glioblastoma multiformis	3(3.57)
9	Metastasis	3(3.57)
10	Hemagioblastoma	1(1.20)
11	Ganglioglioma	1(1.20)

in 6th decade (36%). Where as by B.Shah et al³ maximum number of patient were in 1st decade (21%) followed by 4th decade (18%).

The sex ratio of the present study was found to be quite comparable with study conducted by B.R.Goyani¹, K.Mahesh², etc. Male preponderance was observed in all studies.

Headache (61.90%) was most common presenting complaint in our study followed by vomiting (33.33%) and then vertigo (26.19). In study of B.R.Goyani¹, headache (51.42%) was most common symptom followed by seizure (32.85%). However in study by K.Mahesh², convulsions (50%) was the most frequent symptom followed by headache (40%).

Intra-axial neoplastic mass were much more common than the extra-axial neoplastic mass in this study⁴.

Among the intra-axial mass, Glioma was the most common tumor followed by metastasis. Among the extra-axial mass, meningioma was the most common tumor and is followed by Sellar and supra-sellar mass. Meningioma was the most common extra-axial intracranial neoplasm and they account for the 15-10 % of intracranial neoplasm⁶.

There was no definite lobar predilection for the neoplastic mass, but multiple lobe (21.43 %) involvement was found to be more common [Tables 1-6 and Figures 1-4].

CONCLUSION

Brain tumor is more common in 4th decade. Males are affected much more than the females. Headache is

the most common presenting symptoms followed by vomiting.

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