



**ORIGINAL RESEARCH PAPER**

**Radio-Diagnosis**

**MRI IN SUPRATENTORIAL BRAIN TUMORS**

**KEY WORDS:**

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**ABSTRACT**

**Aim-** To assess diagnostic ability of MRI in evaluating and characterizing various supratentorial tumors using T1 and T2 weighted, FLAIR, diffusion weighted, Gradient images and contrast enhanced image. **Methods-** prospective study was carried out on 50 patients who underwent MRI of the brain and multimodality approach was used to characterise the lesion. **Results-** 27 (54%) patients were males and 23 (46%) were females, showing mild male predominance in our study, Age group most commonly involved in this study was 31-40 years, Patient in pediatric and adolescent age group (below the age of 18 years) accounted for only six cases (12%) and the adult population was 44 (88%) cases, The commonest supratentorial fossa tumor was glioma (50%, n=25). 2nd most common neoplasm found was meningioma (22%, n=11), 58% (n=29) of neoplasms were intra-axial and 42% (n=21) of neoplasms were extra-axial. Multiplanar capability of MRI was helpful in identifying the precise anatomic location and the exact extent of the tumors. Different MRI sequences were helpful in determining content of tumor like solid, cystic nature, bleed or calcification. On post contrast images there was a clear definition of the size, margins, and nature of the tumor and it also improved the differentiation between the tumor and surrounding edema. **Conclusion-** Multiplanar capacity of MRI helped in assessing exact localization and extent of tumor, which is important for preoperative work up of the tumor. Superior contrast resolution is provided via multiple sequences which exploit the various tissue characteristics of normal and pathological structures. Magnetic resonance imaging is exquisitely sensitive for the detection of both solid and cystic. Lesions within the brain on Pre and post gadolinium sequences were excellent for characterizing secondary effects of tumors such as edema, necrosis, and hemorrhage. Multiplanar images provide superior evaluation of mass effect and associated anatomic distortion.

**INTRODUCTION**

Brain tumors represent 1.7% of all the cancers and contributes for 1.8% of all cancer deaths. Of all the brain tumors 50 to 60% are supratentorial, Brain tumors are second most common form of malignancy in children and primary brain tumors rank from sixth to eighth in frequency of all neoplasms in the adult. Supratentorial tumors include those tumors that occur above the tentorial leaf and includes the sellar or supra sellar region, pineal region and other areas of cerebrum. Among the supra tentorial tumors gliomas and meningiomas are the commonest. Since majority of these tumors present with nonspecific complains such as headache, stroke like syndromes or seizures, often a diagnosis is made or suggested initially by the findings on imaging studies.

Clinical evaluation, radiology and pathology play major roles in deciding the long term prognosis. Radiological diagnosis is based on;

1. Topography of the lesion
2. Characterization into intra versus extra-axial location
3. Morphology analysis and
4. Presence of secondary changes adjacent to the lesion

Imaging plays an integral role in intracranial tumor management. Magnetic resonance (MR) imaging in particular has emerged as the imaging modality most frequently used to evaluate intracranial tumors, and it continues to have an expanding, multifaceted role. In general, the role of MR imaging in the workup of intraaxial tumors can be broadly divided into tumor diagnosis and classification, treatment planning, and posttreatment surveillance.

In addition to conventional MR imaging techniques, a variety of advanced techniques such as spectroscopy, blood oxygen level-dependent (BOLD) imaging have revolutionized the role of MRI in study of intracranial tumors.

**Aims and objectives**

- To detect, study and characterize various supra tentorial fossa tumors on Pre and post contrast MR images.

**Study Material**

Patients of all age group with clinically suspected supra tentorial tumors and presented with clinical features of space occupying lesions like seizures, headache, projectile vomiting, weakness in limbs, altered sensorium etc were referred for MRI and those who found to have brain tumor were included in this study.

**Exclusion Criteria**

All patients with cardiac pacemakers, prosthetic heart valves, cochlear implants or any metallic implants.

All patients with history of adverse reaction to contrast agent used.

All patients who did not consent to be a part of this study.

**Procedure**

Patients selected on the basis of above mentioned criteria were subjected to a detailed examination with following MRI machine and technique.

**#MACHINE:**

Philips Achieva 1.5 Tesla —16 channels Superconducting Magnet.

- **COIL:** Standard head coil.
- **FOV:** 200 mm
- **MATRIX:** 256 x 256
- Brain was assessed in axial, sagittal and coronal planes.
- Gadolinium- DTPA was used as the contrast media (0.1mmol/Kg).
- Sedation was given for pediatric and uncooperative patients.

**Risk Factor:**

- Adverse drug reactions due to contrast agent.

**RECOMMENDED SEQUENCES:**

DWI, ADC, T1- Axial/sagittal, T2-Axial/coronal, T2- Flair, GRE, POST CONTRAST T1- Axial /Sagittal / Coronal

**Results**

**Table 1- Age wise distribution of tumor**

SUPRA TENSORIAL TUMORS	AGE (YEARS)									TOTAL
	0 - 10	11 - 20	21 - 30	31 - 40	41 - 50	51 - 60	61 - 70	71 - 80	81 - 90	
GLIOMA	1	3	8	5	3	3	2	0	0	25
MENINGIOMA	0	0	2	6	0	1	1	0	1	11
PITUITARY ADENOMA	0	0	1	2	2	1	0	0	1	7
METASTASIS	0	0	0	0	1	0	0	0	0	1
CRANIOPHARYNGIOMA	1	0	1	0	0	0	0	0	0	2
EPIDERMOID CYST	0	1	0	0	2	0	0	0	0	3
PNET/EWING'S	0	0	0	1	0	0	0	0	0	1
<b>TOTAL</b>	<b>2</b>	<b>4</b>	<b>12</b>	<b>13</b>	<b>8</b>	<b>5</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>50</b>

**Table 2-Sex wise distribution of tumor**

Tumors	Males	Females	Total
GLIOMA	15	10	25
MENINGIOMA	5	6	11
PITUITARY ADENOMA	1	6	7
METASTASIS	0	1	1
CRANIOPHARYNGIOMA	1	1	2
EPIDERMOID CYST	3	0	3
PNET/EWING'S	1	0	1
<b>TOTAL</b>	<b>27</b>	<b>23</b>	<b>50</b>

**Table 3-Incidence of various tumors**

Tumors	Number of cases	Percentage (%)
GLIOMA	25	50
MENINGIOMA	11	22
PITUITARY ADENOMA	7	14
METASTASIS	1	2
CRANIOPHARYNGIOMA	2	4
EPIDERMOID CYST	3	6
PNET/EWING'S	1	2
<b>TOTAL</b>	<b>50</b>	<b>100</b>

- 27 (54%) patients were males and 23 (46%) were females, showing mild male predominance in our study.
- Age group most commonly involved in this study was 31-40 years.
- Patient in pediatric and adolescent age group (below the age of 18 years) accounted for only six cases (12%) and the adult population was 44 (88%) cases.
- The commonest supratentorial fossa tumor was glioma (50%, n=25). 2<sup>nd</sup> most common neoplasm found was meningioma(22%, n=11).
- In this study, 58% (n=29) of neoplasms were intra-axial and 42% (n=21) of neoplasms were extra-axial. Intra-axial neoplasms were common in present study.
- In our study, most of the brain neoplasms were observed in the frontoparietal region, comprising of 56% Second most common location was in the sellar and suprasellar region, comprising of 20 %.
- The commonest sellar and suprasellar tumor was pituitary adenoma, Multiplanar capability of MRI was helpful in identifying the precise anatomic location and the exact extent of the tumors.

- Different MRI sequences were helpful in determining content of tumor like solid, cystic nature, bleed or calcification.

On post contrast images there was a clear definition of the size, margins, and nature of the tumor and it also improved the differentiation between the tumor and surrounding edema.

**CONCLUSION**

Multiplanar capacity of MRI helped in assessing exact localization and extent of tumor, which is important for preoperative work up of the tumor. Patient in Pediatrics and adolescent age group (below the age of 18 years) accounted for 12% of the study population and the adult population was 88%.The commonest supratentorial fossa tumor was glioma. The commonest intra axial tumors were gliomas while the commonest extra axial tumors were meningiomas. Superior contrast resolution is provided via multiple sequences which exploit the various tissue characteristics of normal and pathological structures. Magnetic resonance imaging is exquisitely sensitive for the detection of both solid and cystic.Lesions within the brain on Pre and post gadolinium sequences were excellent for characterizing secondary effects of tumors such as edema, necrosis, and hemorrhage. Multiplanar images provide superior evaluation of mass effect and associated anatomic distortion. Unlike the X-rays , computed tomography, a bone artifact and radiation are not a problem with MR imaging of the supratentorial fossa and a high level of contrast is seen between gray and white matter.

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