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Role Of Magnetic Resonance Imaging In Evaluation Of Posterior Cranial Fossa Mass Lesions

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Abstract
Background
The posterior fossa is situated between tentorium cerebellum above and the foramen magnum below. It's the vital structure which includes brainstem, optic nerve vii-xii, vertibro basilar vessels and venous sinuses. Children are more likely to develop posterior fossa tumors than adults. Any lesion in this area involves all these structures which makes surgical approach difficult. For these reasons radiological imaging plays an important role.
Methodology
The prospective study includes twenty patients who were suspected to have lesions based on clinical features and examination. The patients who were excluded who had a provisional diagnosis of posterior cerebral circulation stroke and history of trauma. The patients were evaluated for 1.5t magnetic resonance imaging in ge signa with consent. In many of the cases gadolinium contrast was given.
Results &discussion
Total twenty patients satisfying inclusion criteria were included in the study and most common posterior fossa cranial mass lesion is schwannoma (70%). Overall diagnostic accuracy of magnetic resonance imaging with contrast is 96%.
Conclusion
The golden tool to characterize posterior fossa mass lesions such as morphology, localization, its extension, complete evaluation of lesions and its complication to adjoining brain parenchyma is magnetic resonance imaging. Thus the mri has the most potential diagnostic modality to allow complete and accurate diagnosis to such lesions for early detection and management

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I. Background

The posterior cranial fossa comprises all the space below the tentorium cerebelli and above the foramen magnum. The posterior fossa is the vital structure which includes the brainstem, cranial nerve CVII-CXII, vertebrobasilar vessels, and venous sinuses. Any lesion in the posterior fossa may directly involve these structures which makes the surgical approach and total excision very difficult or may even exclude any safe surgical approach. Obstruction to the CSF pathway in this area causes obstructive hydrocephalus which cannot be corrected without excision of the lesion. For these important reasons, precise radiological evaluation by MRI is a must to visualize all the identifiable structures and plan safe surgery for the patient. Although the appearance of CT findings is reasonably characteristic in evaluating posterior fossa space-occupying lesions, MRI is the preferred tool and is the investigation of choice as, It provides intrinsic tissue contrast and the problem of degradation of images by beam hardening, as seen on CT does not occur.

II. Materials & Methods

- The prospective study includes twenty patients for a period of 6months from January 2023 to June 2023 who were suspected to have lesions based on clinical features and examination. Those patients who were clinically suspected to have posterior fossa lesions or already detected to have posterior fossa lesions on other imaging modalities were included. Patients with vascular etiology i.e. stroke, trauma, and metabolic disorders& and general contraindications to MRI were excluded from the study.
- The patients were evaluated for 1.5T Magnetic Resonance Imaging in GE SIGNA with consent. In many of the cases, gadolinium contrast was given.

III. Results

- A total of 20 patients satisfying inclusion criteria were evaluated.
- Most common lesion was metastasis (25%) followed by schwannoma (20%).
- Overall diagnostic accuracy in detecting lesions with MRI with contrast was 97%.

Table 1. Showing the Number of cases within different age groups

Age	No of cases	Total cases	Percentage
0-10	4	20	20
11-20.	3		15
21-30	2		10
31-40	6		30
41-50	2		10
51-60	2		10
>60	1		5

Figure 1. Shows the % in the Pie chart of the Nature of Lesion.

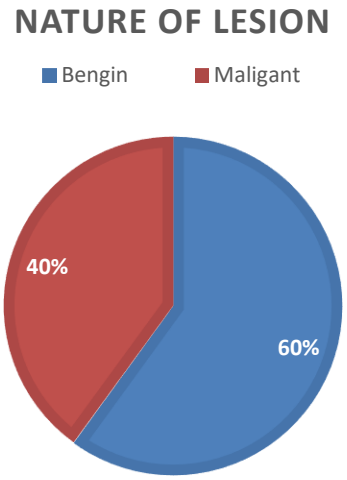


Figure 2. Shows the Types and Percentage bar graph.

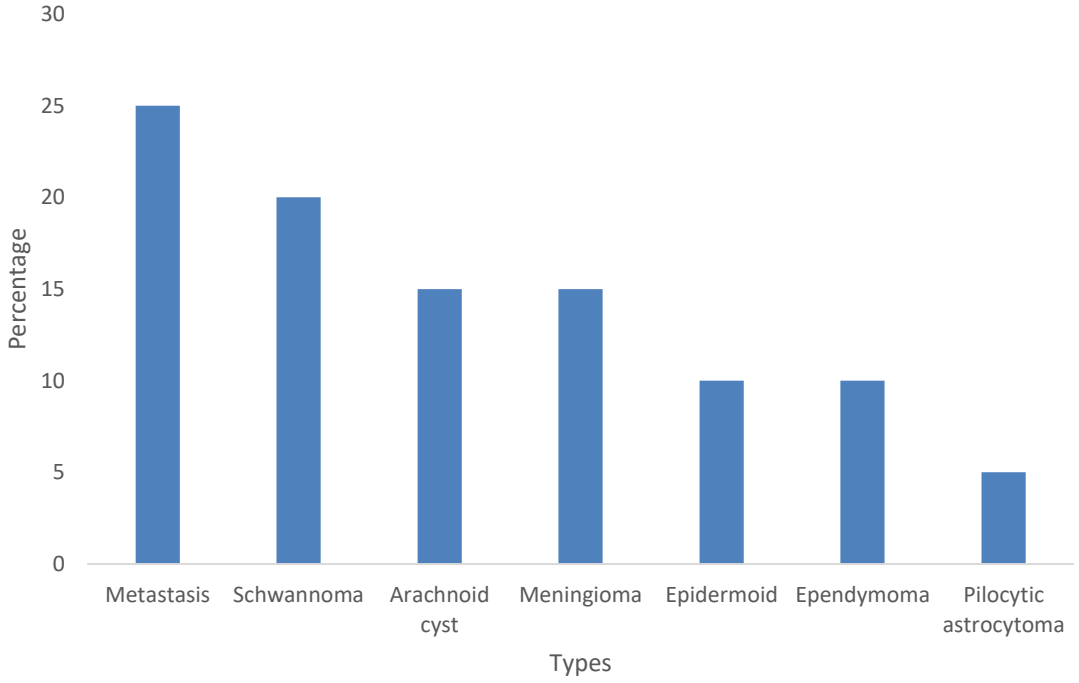


Figure 3. Shows the location (along with the %) with the help of the Pie Chart

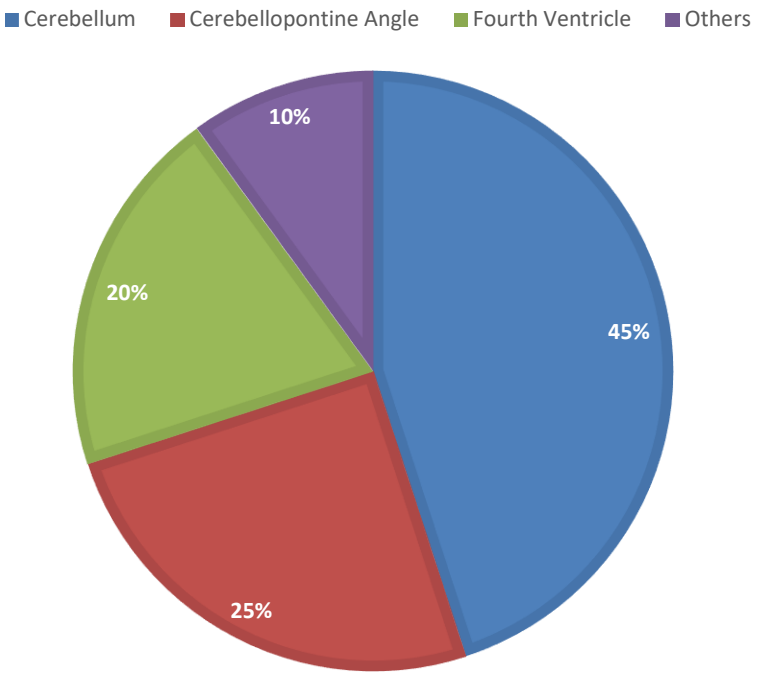
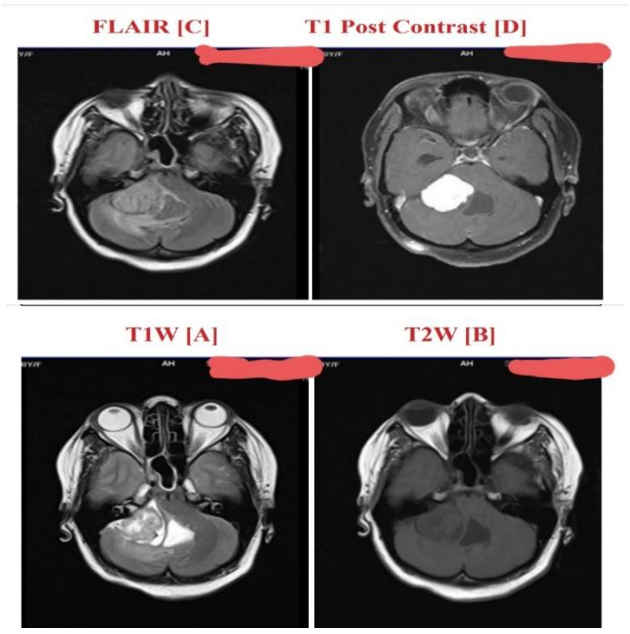


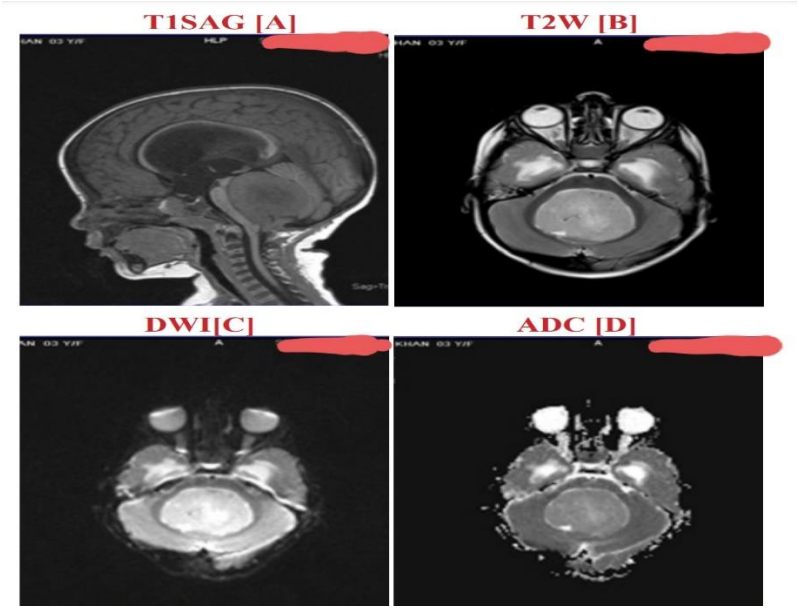
Table 2. Shows the Symptoms and the number of cases.

Symptoms	No. of cases	Total cases	Percentage
Cerebellar	16	67	23.88
Headache	15		22.39
Nausea/ Vomiting	13		19.40
Seizure	9		13.43
Hearing loss	6		8.96
Vision abnormality	4		5.97
Others	4		5.97

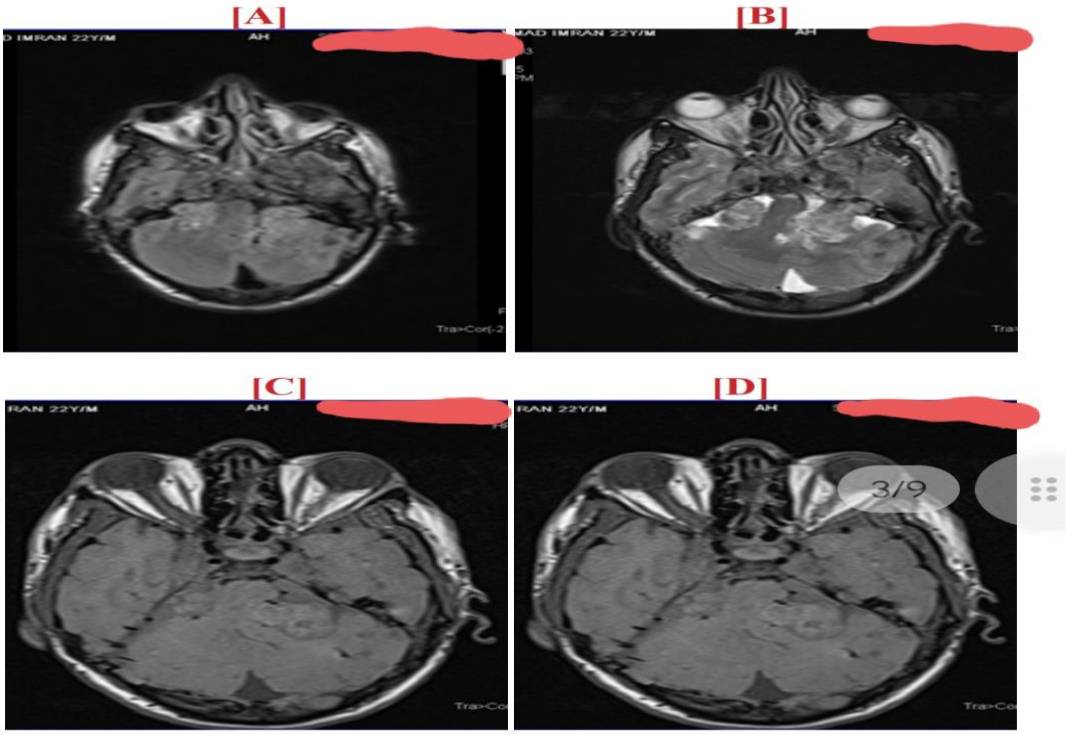
Solid extra-axial CP angle mass which is heterogeneously, isointense on T1WI [A], Hyper intense To grey matter on T2WI [B], and FLAIR[C] shows intense homogenous Contrast Enhancement [D] on post contrast Study. MENINGIOMA



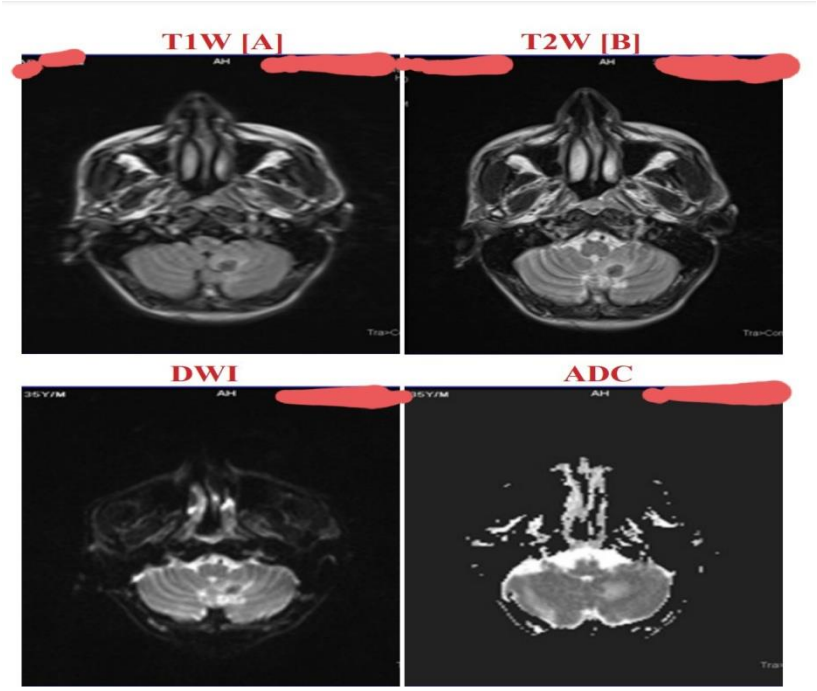
Midline 4th ventricular mass which is hypo intense on T1WI[A], hyper intense on T2WI[B], shows mild restricted diffusion on DWI[C], shows heterogeneous contrast enhancement[D] and causing moderate hydrocephalus -EPENDYMOMA



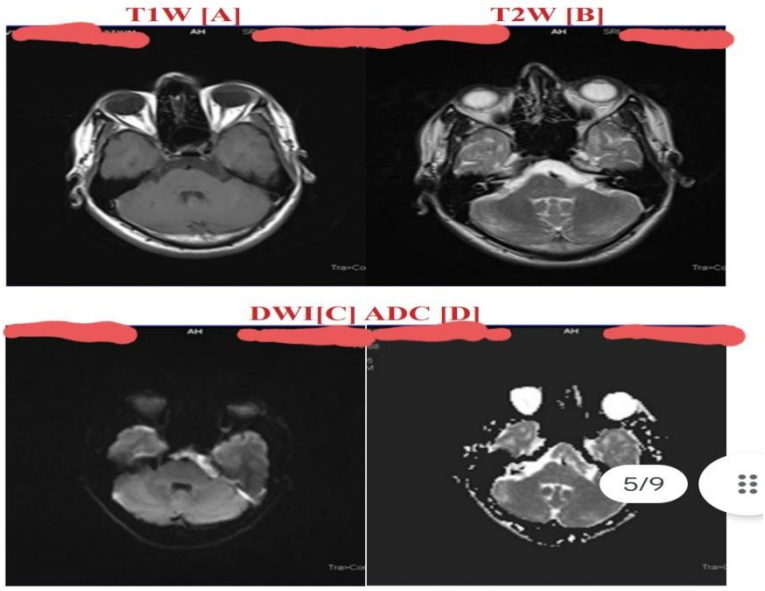
Isointense on T1WI [A], heterogeneously hyper intense on T2WI [B], FLAIR [C] images [D] shows moderate enhancement on post-contrast study (D). A typical "Ice-Cream Cone" appearance is seen that shows a larger CPA component centered around a smaller intra-canalicular component on T2W [B]. B/L ACOUSTISCHWANNOMA.



A well-defined thick ring enhancing lesion [D] shows the central portion which appears hypo intense on T1WI [A] and T2WI[C].There in no restricted diffusion. Moderate perilesional edema and mass effect on 4th ventricle and pons is seen TUBERCULOMA



These are cystic lesions that appear hypo-intense on T1WI [A], hyperintense on T2WI [B], shows restricted diffusion on DWI[C] and appears dark on the ADC map [D]. Epidermoid Cyst



IV. Conclusion

- The golden tool to characterize posterior fossa mass lesions such as morphology, localization, extension, complete evaluation of lesions, and its complications to adjoining brain parenchyma is Magnetic Resonance Imaging. Thus the MRI has the most potential diagnostic modality to allow complete and accurate diagnosis of such lesions for early detection and management.
- MRI not only is helpful to better delineate the lesion itself but also the secondary effects of the lesions on the adjacent neuroparenchyma, cranial nerves, and ventricular system. These mechanical effects and structural deformities are of great importance because the posterior fossa has extremely limited space and compliance to accommodate the increase in intracranial pressure.

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