



DECODING THE POSTERIOR FOSSA CYSTIC LESIONS ON CROSS-SECTIONAL IMAGING OF BRAIN : AN APPROACH.

Radiodiagnosis

Dhruvi Umarwadia* Junior Resident – Gujarat Adani Institute of Medical Sciences, Bhuj, Gujarat, India.
*Corresponding Author

Rahul Korat Junior Resident – Gujarat Adani Institute of Medical Sciences, Bhuj, Gujarat, India.

Narottam Patel Professor & Head - Gujarat Adani Institute of Medical Sciences, Bhuj, Gujarat, India.

ABSTRACT

Cystic lesions in the posterior fossa of the brain are commonly occurrence . Due to their location and imaging appearances it often ends up being a dilemma for a diagnostician. There are spectrum of conditions which fall under this entity. In this study we try to differentiate between these similar yet distinct etiologies on cross-sectional imaging – CT and MRI and reach a correct diagnosis.

KEYWORDS

posterior fossa, cystic lesions, CT, MRI

INTRODUCTION:

Cystic lesions in the posterior fossa are a commonly encountered entity in the routine practice which include cyst like malformations, actual cysts and cystic neoplasms. There is spectrum of disorders involving the including: The Dandy Walker Continuum, Arachnoid cysts, Mega cisterna magna, Vermian cerebellar hypoplasia, Blake Pouch Cyst, Joubert Syndrome and cystic posterior fossa neoplasms. Multi-planar imaging modalities like CT and MRI plays an important role in their differentiation however, reaching a correct diagnosis is a common dilemma. Proper diagnosis is required for correct management and genetic counselling if necessary. Various classifications of the CSF collections in the posterior fossa can be found in the literature which are mainly based on: stage of the embryological development in which specific triggering event may cause malformation, presence of absence of the communication of the cyst with subarachnoid space, gross morphological characteristics of the posterior fossa structures and association with the supratentorial structures.

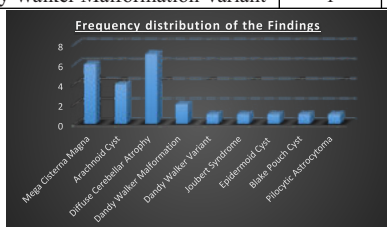
MATERIALS AND METHODS:

24 patients with who were referred to the Department of Radiodiagnosis for CT and MRI imaging were included in the study after taking written informed consent. Depending upon the complaints of the patient relevant investigations were done. In 5 patients CT was performed and in the rest of the patients MRI was performed. The objective of the study was understanding the posterior fossa cystic lesions on the basis of CT and MRI findings and differentiate them based on the findings.

RESULTS:

Out of the 24 patients, 11 patients were female and 13 were male patients between the age group of 2-70 years. Following conditions were obtained in the study population:

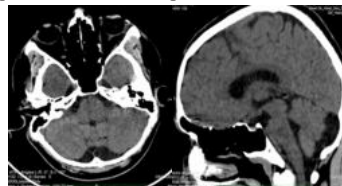
Sr. No.	Posterior Fossa Lesions	Frequency of patients(n)	Percentage distribution (in %)
1	Arachnoid Cyst	4	18
2	Mega Cisterna Magna	6	27
3	Diffuse Cerebellar Atrophy	7	31
4	Epidermoid Cyst	1	4
5	Blake Pouch Cyst	1	4
6	Pilocytic Astrocytoma	1	4
7	Joubert Syndrome	1	4
8	Dandy Walker Malformation	2	9
9	Dandy Walker Malformation Variant	1	4



DISCUSSION:

MEGACISTERNA MAGNA

- CT: Prominent retrocerebellar CSF space with normal posterior fossa structures. Usually measures > 10mm in midsagittal images
- MRI: Prominent retrocerebellar CSF space following CSF signals in all sequences with normal posterior fossa structures.

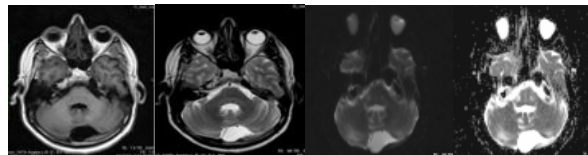


Above CT images of the 25 year old male shows enlarged retro-cerebellar space with normal cerebellar hemispheres , vermis and 4th ventricle. No mass effect in form of indentation of the cerebellar hemispheres.

ARACHNOID CYST:

Arachnoid cysts in the retro-cerebellar location (30-40 %) is the second most common location of the arachnoid cyst.

CT: Well circumscribed cystic lesions in the retro-cerebellar location with imperceptible wall.



MRI of a male who presented with generalized headache shows a well-defined retro-cerebellar cystic lesion following CSF signal on all sequences and with no diffusion restriction.

May cause mass effect over the adjacent structures. CT is best to demonstrate the remodeling effect on the adjacent bone. MRI: Follow CSF signal intensity on all sequences, including FLAIR and DWI.

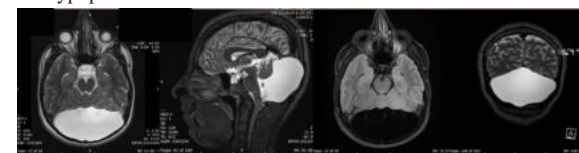
DANDY WALKER MALFORMATION:

It is the most common posterior fossa malformation.

MRI is the modality of choice for diagnosis.

CT/MRI: Shows a triad of:

- Posterior fossa enlargement
- Cystic dilatation of the fourth ventricle extending posteriorly and cerebellar hemispheres are usually displaced antero-laterally.
- Hypoplasia of the cerebellar vermis.

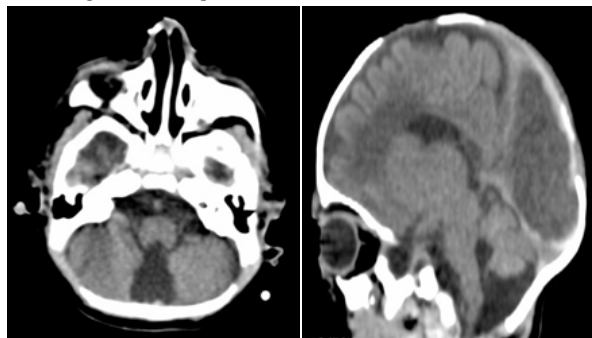


MRI of a 20 year old patient shows enlarged posterior fossa with

hypoplasia of the cerebellar vermis and dilatation of the 4th ventricle. Aqueductal flow is maintained.

DANDY WALKER VARIANT:

- CT/MRI: There is partial vermian hypoplasia with partial obstruction to the fourth ventricle, but without significant enlargement of the posterior fossa.



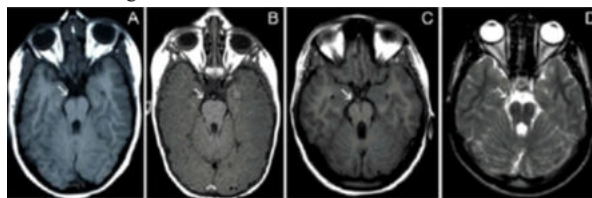
CT images of a 2 year old patient who presented with trauma shows a hypoplastic inferior vermis, with enlarged posterior fossa and normal cerebellar hemisphere.

BLAKE POUCH CYST:

MRI: Infra-vermian cyst communication with the 4th ventricle, upward displacement of the vermis, morphologically intact vermis, elevated tentorium, usually normally located torcula.

JOUBERT SYNDROME:

The molar tooth sign as seen in figure is the diagnostic finding which presents elongated thick horizontally oriented superior cerebellar peduncles, vermian hypoplasia and deep interpeduncular fossa along with a bat-wing 4th ventricle.



Images organized from left to right; arrows indicate Molar tooth sign of midbrain due to midbrain malformation with hypoplastic cerebellar vermis and midline cleft.

DIFFUSE CEREBELLAR ATROPHY:

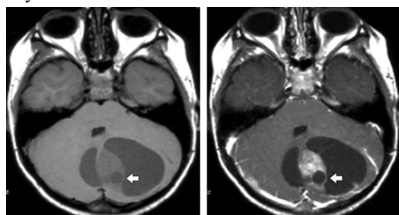
Imaging findings:CT/MRI: Hypoplastic or atrophic cerebellum with increased space in the posterior fossa.



CT of a 70 year female patient who was referred to the hospital with history of fall, shows prominent cerebellar folia with prominent basal cisterns. Findings are most likely atrophic changes due to normal aging process.

PILOCYSTIC ASTROCYTOMA:

MRI is the main imaging modality. In T1 the solid component is iso to hypointense and hyperintense in T2 whereas the cystic component is low T1 and high T2. T1 post contrast demonstrates enhancement however the cyst wall enhances in ~50% cases.

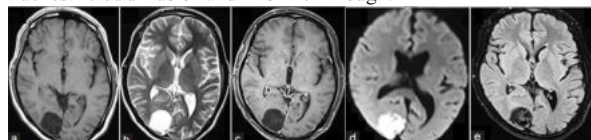


Above MRI image of the patient shows a mixed solid cystic lesion arising from the left cerebellar hemisphere and displacing the fourth ventricle towards the contralateral side which appears hypointense on precontrast image and on post-contrast image it shows enhancement of the internal solid component.

EPIDERMOID CYST:

CT: Epidermoid cyst contains debris with high cholesterol content which drop its density up to 0 HU and makes it similar to CSF density, calcifications are seen in 10-25%.

MRI: Isointense to CSF on both T1W and T2W. Rarely also shows high signal due to proteinaceous content. In T1 C+ only thin rim enhancement can be seen except in malignant transformation when more enhancement is appreciated, FLAIR is often heterogeneous higher than CSF, DWI shows increased signal due to a combination of true restricted diffusion and T2 shine Through.



MRI brain of 38 year old shows: (a) T1- well-defined hypointense cystic lesion of the occipital lobe. (b) T2- the lesion to be brightly hyperintense. (c) T1 post contrast - no enhancement of the lesion. (d) DWI- brightly hyperintense. (e) FLAIR - Internal heterogeneity giving dirty mop-like appearance

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