ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25mar1485

Case Report: A Rare Case of Central Intraventricular Neurocytoma

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Publication Date: 2025/04/07

Abstract:

- ***Background:***

Central neurocytoma (CN) is a rare, well-differentiated neuroepithelial tumor, classified as WHO Grade 2. It primarily arises within the ventricles, most commonly in the lateral ventricles, and accounts for less than 1% of all intracranial tumors. Due to its location and imaging characteristics, CN poses a diagnostic challenge and may be mistaken for other intraventricular neoplasms.

- ***Case Presentation***

We present a case of a 28-year-old female who presented with headache, vomiting, and giddiness for two days. MRI brain revealed a heterogeneously enhancing intraventricular mass lesion in the frontal horn and body of the right lateral ventricle, causing obstruction at the foramen of Monro and leading to ventricular dilatation. Imaging features, including T2 hyperintensity, diffusion restriction, and a glycine peak on MR spectroscopy, suggested a neurocytoma. Neurosurgical biopsy confirmed central neurocytoma (CNS WHO Grade 2) based on histopathological and immunohistochemical findings.

- ***Discussion***

The patient's symptoms were due to obstructive hydrocephalus, a common presentation of CN. MRI played a crucial role in identifying the lesion, distinguishing it from differential diagnoses such as ependymoma, astrocytoma, and meningioma. Complete surgical resection remains the preferred treatment, with a generally favourable prognosis.

- ***Conclusion***

Early recognition of CN on MRI is essential for prompt surgical intervention. Given its benign behaviour and low recurrence rate, CN has an excellent prognosis if completely excised. Radiologists must be aware of its imaging characteristics to aid in accurate diagnosis and appropriate surgical planning.

How to Cite: Dr. Paawan; S Chordiya; Dr. Ashwin Patil; Dr. Santosh Patil; Dr. Pradeep Goudar. (2025). Case Report: A Rare Case of Central Intraventricular Neurocytoma. *International Journal of Innovative Science and Research Technology*, 10(3), 2273-2276. https://doi.org/10.38124/ijisrt/25mar1485.

I. INTRODUCTION

A. Case Report

Intraventricular neurocytomas (WHO grade 2) are rare, well-differentiated neuroepithelial tumors that predominantly arise in the ventricles of the brain, often in the lateral or third ventricle (1,2). These tumors are more common in younger adults, with a peak incidence in the second and third decades of life (3). There is no clear gender predilection (4).

B. Case Summary

A 28-year-old female presented with complaints of headache, vomiting, and giddiness for the past two days (5). The patient was advised MRI Brain (plain + contrast) for further evaluation (6).

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II. IMAGING FINDINGS

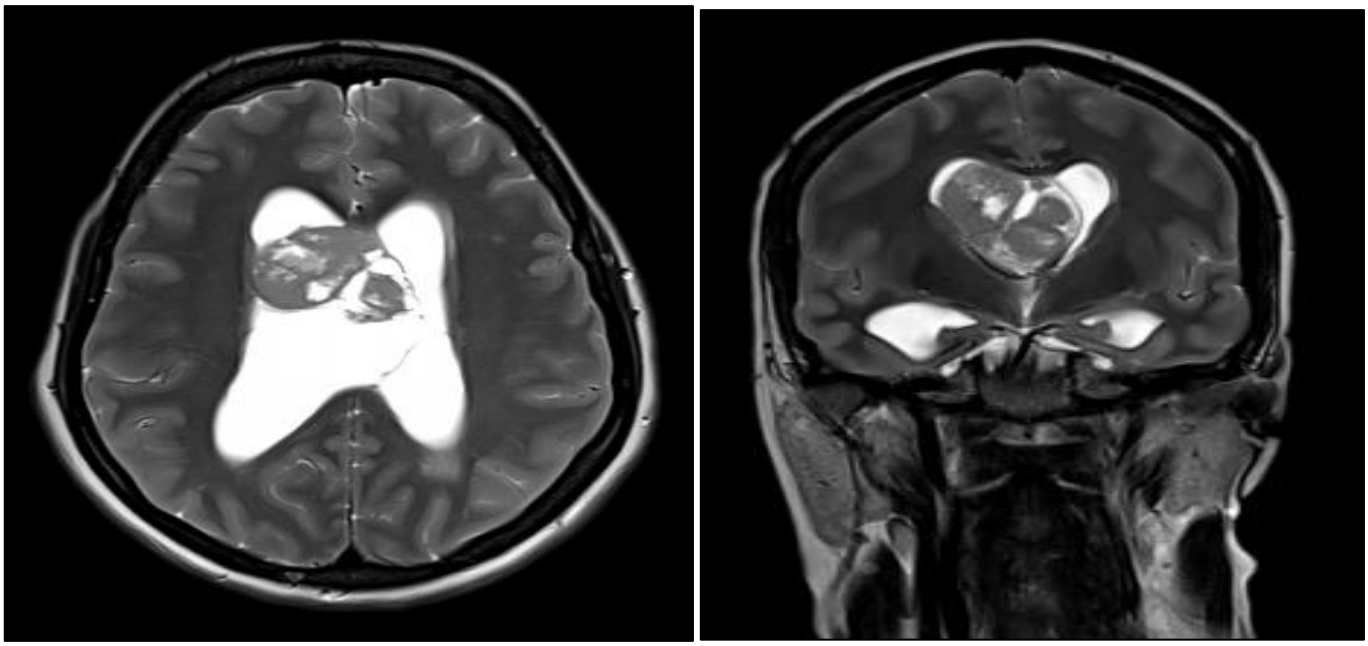

Fig 1: Axial and coronal T2-weighted MRI of the brain

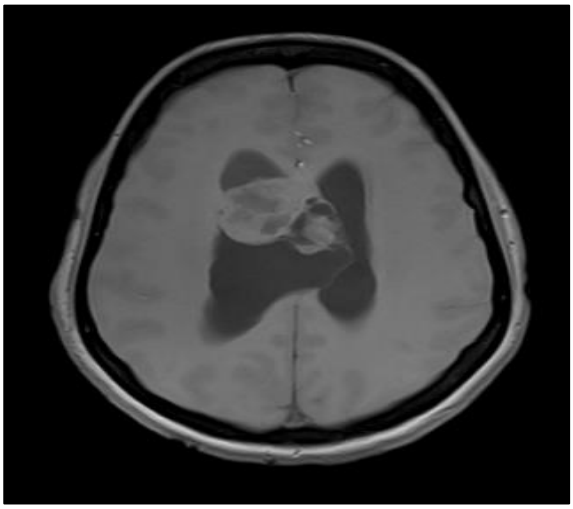

Fig 2: Axial T1 Weighted MRI of the Brain

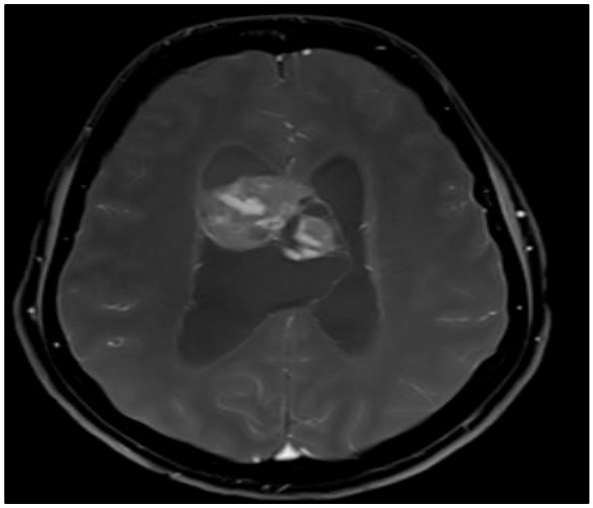

Fig 3: Post Contrast Axial T1 Weighted MRI of the Brain

A well-defined, lobulated, heterogeneously enhancing T2 & FLAIR heterointense intraventricular mass lesion with T2 hyperintense cystic areas was noted involving the frontal horn and body of the right lateral ventricle, resulting in its dilatation and displacement of the septum pellucidum to the contralateral side . There was associated moderate bilateral lateral ventricular dilatation due to obstruction of the foramen of Monro.

- On the DWI sequence, the lesion showed areas of diffusion restriction.
- On the SWI sequence, few areas of blooming were noted within the lesion, suggestive of calcification/bleed.
- On MR spectroscopy, a glycine peak was noted at 3.5 ppm.

III. DISCUSSION

Patients with central neurocytomas commonly present with complaints of headache, seizures, nausea, and vomiting due to increased intracranial pressure and possible focal neurological deficits depending on the tumor's location (1,3).

➢ *Radiological Features*

- Location: Most often located in the lateral or third ventricle (4).

MRI Findings

- T1-weighted images: Isointense or slightly hypointense relative to brain tissue.
- T2-weighted images: Hyperintense, with areas of cystic degeneration often present.
- Post-contrast images: Homogeneous enhancement with well-defined borders.

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- GRE/SWI: Calcification and hemorrhage, especially in larger tumors.
- DWI: Diffusion restriction of the solid component.
- MR Spectroscopy: Shows elevated choline and decreased N-acetylaspartate; a glycine peak at 3.5 ppm is seen (7).

➢ *NCCT Scan Findings:*

- A well-defined, hyperdense lesion with occasional calcifications (8).

Differential Diagnosis

- Ependymoma (3).
- Meningioma (5).
- Ganglioglioma (6).
- Astrocytoma (7).

The mainstay of treatment is surgical removal, especially if the tumor causes significant mass effect or obstructs CSF pathways (9). Intraventricular neurocytomas have a generally favorable prognosis with complete resection (10). Recurrence is rare but can occur if the tumor is not entirely excised (4).

IV. NEUROSURGICAL BIOPSY

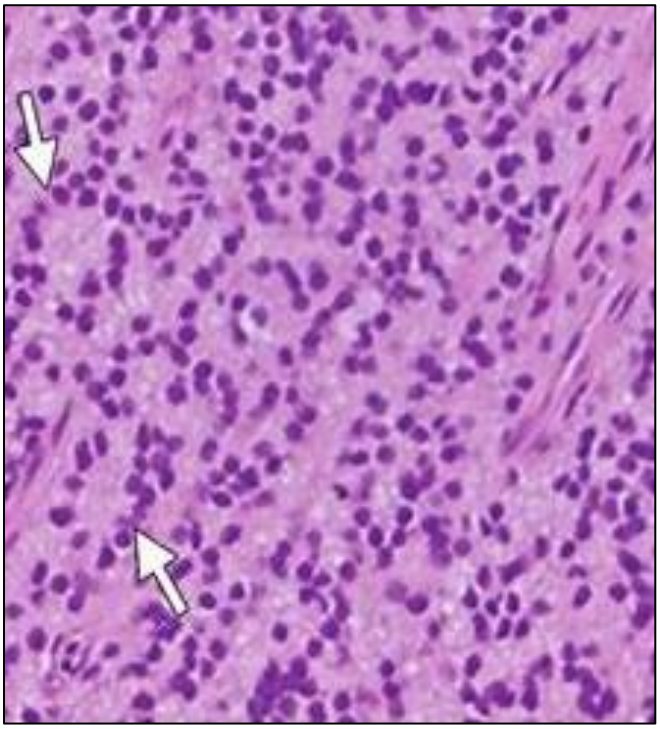

Fig 6: Histopathology Slide Showing Uniform Round Cells in a Neuropil Background

- Histopathology: Resected tissue showed fragments of a neuroepithelial tumor composed of uniform round cells with a rounded nucleus and finely speckled chromatin, arranged against a delicate neuropil background. Mitotic activity was increased. Intratumoral calcification was seen, along with cystic changes (2).

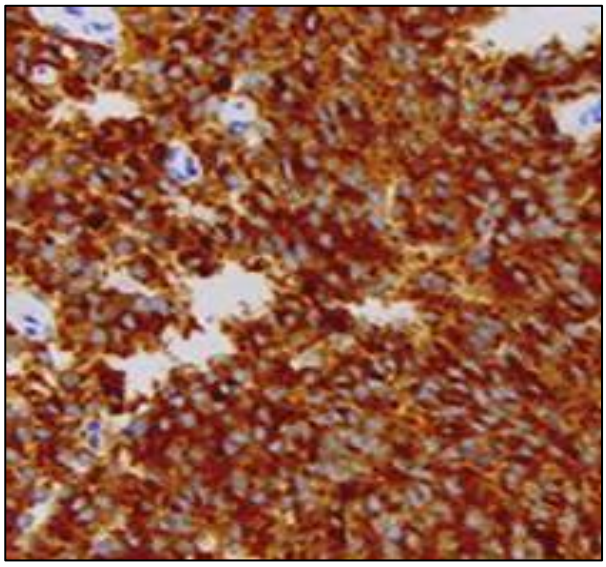

Fig 7: Immunohistochemistry Showing Synaptophysin and NeuN Positivity

➢ *Immunohistochemistry:*

- Synaptophysin, NeuN – positive.
- OLIG2, GFAP – negative.
- Mib 1 labeling index – 8%-9% in hot spots.
- Impression: Central neurocytoma, CNS WHO Grade 2 (5).

V. CONCLUSION

Intraventricular neurocytomas are rare, benign tumors of the central nervous system, presenting a diagnostic challenge on imaging due to their location and radiologic appearance (7).

➢ *Takeaways for Radiologists*

- Early recognition on MRI is critical to guide treatment decisions (8).
- MRI is the imaging modality of choice for evaluation and preoperative planning (9).

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ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25mar1485

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