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CYSTIC SURPRISE: UNVEILING A RARE CEREBELLAR SOL IN A YOUNG ADULT :A CASE REPORT

Neurosurgery

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ABSTRACT

Brain space occupying lesions (SOLs) may present acutely with symptoms of brainstem compression, herniation, or even death, more so in posterior fossa, primarily because of the limited space within it. **Case:** A young female, 31 yrs old, with history of holocranial headache and gait instability for last 5-6 months. CT Scan and MRI was suggestive of intra-axial ,infratentorial , heterogenous mass in right cerebellar region with areas of hypo and hyeprintensities (solid and cystic components seen) (?partially calcified mass) with effacement of 4th ventricle. After HPE, it was diagnosed to be a case of Oligodendroglioma(WHO grade II). **Conclusion:** Being a rare location(usually supratentorial), they require careful evaluation and a multidisciplinary approach to treatment.

KEYWORDS

cerebellar, compression, oligodendroglioma

INTRODUCTION:

Brain tumor/ SOLs ,especially when occurring in the posterior fossa , may present acutely with symptoms of brainstem compression, herniation, or even death. Tumors in the posterior fossa are considered critical brain lesions, primarily because of the limited space within the posterior fossa and the potential involvement of vital brain stem nuclei. The clinical presentation depends on the site of the tumor, biological behavior and aggressiveness of the tumor, and the rate of growth. At the time of presentation, the patient may be very ill from severe headache or frequent vomiting due to associated hydrocephalus. Symptoms may be caused by focal compression of the cerebellum or brain stem centers and increased intracranial pressure.(1,2,3)

Case report:

In this case report, we present a young male, 31 yrs old, with history of holocranial headache and gait instability for last 5-6 months. CT Scan was suggestive of calcified mass lesion in right posterior fossa with effacement of 4th ventricle .After admission, MRI Brain was done and it suggested an intra-axial ,infratentorial , heterogenous mass in right cerebellar region with areas of hypo and hyeprintensities (solid and cystic components seen). The tumor had irregular margins and non-uniform contrast uptake (solid component and periphery took up contrast) . A radiological impression of hemangioblastoma/ calcified granuloma /pilocytic astrocytoma were kept in mind, and the patient was prepared for surgery. Surgery was planned and midline suboccipital craniotomy followed by gross total excision of the SOL done . Intraoperatively, the mass was soft to hard(calcified areas) in consistency, moderately vascular and infiltrating to cerebellar parenchyma at places.

On HPE examination, the neoplasm was composed of monomorphic cells with uniform round vesicular nuclei, small distinct nucleoli, and a perinuclear halo giving a “fried egg” appearance and interspersed by arborizing thin-walled blood vessels. Ectatic dilated and congested blood vessels visible with cells interspersed along with few areas of necrosis with strongly positive GFAP and S-100 staining. It was diagnosed to be a case of Oligodendroglioma(WHO grade II) . but we could not send the samples for IDH mutations or for chromosomal studies to look for co-deletions. Post-operatively, patient had uneventful recovery and subsequently enrolled for radiotherapy. Patient was stable and in follow up done at 3 and 6 months, the condition was stable and imaging showed no recurrence till then. Patient was lost in further follow up at 1 year.

DISCUSSION :

An oligodendroglioma is a type of brain tumor that originates from oligodendrocytes, which are cells responsible for producing myelin, a substance that insulates nerve cells. These tumors are typically found in the cerebral hemispheres of the brain, but they can occasionally occur in other locations, including the posterior fossa.

Oligodendrogliomas ,accounting to approximately 4-7% of all primary intracranial gliomas(4), are mostly seen supratentorially and uncommonly in the posterior fossa. In a large study of 323 patients including oligodendrogliomas and anaplastic oligodendrogliomas, Ludwig, et al.(5) found that the primary location was frontal in 55%, and cerebellar in 3%. Ernest, et al.(6) reported 14 cases (7%) out of 200 cases of oligodendrogliomas ; 5 in the cerebellar vermis, 4 in the fourth ventricle, 3 in the hemisphere, and 2 in the cerebello-pontine angle. Packer, et al.(7) found 4 cases (1.6%) arising in the posterior fossa out of 249 children with primary intracranial neoplasms. In Korea, Kim, et al.(8) reported one case of anaplastric oligodendroglioma arising from pons.

In 2022, Abbasi et al, in their literature review, point out that the infratentorial ODGs incidence is inconclusive and reported around 2–7%, primarily located in the cerebellum. (9)Posterior fossa ODGs seem to be more frequent in the pediatric population. Notably, predominantly cystic ODGs are quite rare. In the study, they searched for all infratentorial cystic ODGs in English literature and found that just eight cases of cystic ODG have been reported so far (Table 1). Including their case, only 2 such cases in cerebellar regions were reported in adult population, ours could be the 3rd case.

Table 1 summary of reported cases of oligodendroglioma in posterior fossa

Year	Report	Age/Sex	Initial presentation	Location	Diagnosis
1933	Green-field(9)	5cases with cerebral ODG	Headache, nausea	cerebral hemisphere	cystic ODG
1945	Wycis (10)	13y/F	Headache, nausea	cerebellum	cystic ODG
2001	Hosono et al(11)	6yr/F	Psychomotor	temporal lobe	multilocular Cystic ODG
2004	Baysafer et al(12)	7yr/F	headache/ vomiting	cerebellum	cystic ODG
2006	Das et al(13)	59yr/F	headache/ confusion	Pineal region	anaplastic ODG
2010	Levidou et al(14)	37yr/F	gaze impairment	Pineal region	cystic ODG
2010	El Ouni et al(15)	8yr/F	headache/ vertigo/visual symptoms	cerebellum	cystic ODG
2017	Bhaskar et al(16)	36yr/M	headache/ vertigo/visual symptoms	cerebellum	cystic ODG
2022	Abbasi et al(17)	21yr/F	headache/ nausea/visual symptoms	cerebellum	cystic ODG

When an oligodendroglioma forms in this area, it can present unique challenges due to the limited space and the critical functions of the structures within the posterior fossa. The symptoms of an oligodendroglioma in the posterior fossa can vary depending on its size and location. The symptoms of oligodendroglial tumors do not reliably distinguish them from other types of lowgrade gliomas. The most common presenting symptom is seizures (generalized, simple partial, complex partial), ranging in incidence from 35% to 85% of patients.(18) Other presenting symptoms are headache, change mental status, visual complaints, nausea, vomiting, vertigo, and/or localized sensory/motor deficit.(18,19)The clinical course of oligodendroglioma in the posterior cranial fossa is relatively indolent, and symptoms (nausea, vomiting,imbalance and vertigo) are usually long standing.(20)

Diagnosing an oligodendroglioma in the posterior fossa typically involves imaging studies such as MRI (Magnetic Resonance Imaging) or CT (Computed Tomography) scans. Treatment options for oligodendrogliomas in the posterior fossa depend on factors like the tumor's size, location, grade, and the patient's overall health. Surgery is often the primary treatment to remove as much of the tumor as possible without causing damage to critical brain structures. Oligodendrogliomas are treated by surgical excision with or without adjuvant radiation therapy based on multiple prognostic factors. Oligodendrogliomas seem to be more likely to metastasize outside the central nervous system (to bone, lung, pleura, and liver) than other gliomas.(18) In cases where complete removal isn't feasible, radiation therapy and chemotherapy may be used to target any remaining tumor cells.

The prognosis for patients with an oligodendroglioma in the posterior fossa varies widely and depends on several factors, including the tumor's grade, location, and how well it responds to treatment. Low-grade oligodendrogliomas generally have a better prognosis compared to high-grade tumors. Regular follow-up care and monitoring are crucial to detect any recurrence or progression of the tumor. Managing an oligodendroglioma in the posterior fossa poses several challenges as the proximity to vital brainstem and cerebellar structures can complicate surgical planning and increase the risk of post-operative complications.

These tumors have tendency to spread via CSF and hence some authors also recommend fluid cytology and <RI imaging of whole spine to look for metastasis and plan for prophylactic craniospinal irradiation post surgery. Others suggest that the oligodendroglioma of the posterior fossa be considered potentially malignant and treat with local as well as prophylactic craniospinal radiotherapy.(20) Infratentorial oligodendrogliomas may be more aggressive and malignant than supratentorial ones.(21)while few are in favour of close observation considering the morbidity after irradiation to craniospinal axis.(22)The exact treatment protocols of posterior fossa oligodendroglioma are yet to be established due to the paucity of cases.

CONCLUSION:

In conclusion, while oligodendrogliomas in the posterior fossa are relatively rare compared to those in other brain regions, they require careful evaluation and a multidisciplinary approach to treatment. Advances in neuroimaging, surgical techniques, and adjuvant therapies continue to improve outcomes for patients diagnosed with these tumors, offering hope for better quality of life and extended survival.

Conflict of Interest: The authors declare that they have no competing interests

Consent: Written informed consent was obtained from the patient to publish this case report and any accompanying images.

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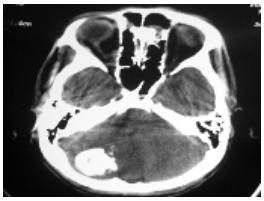
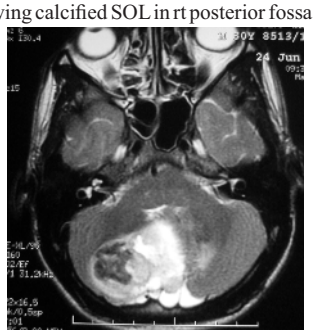
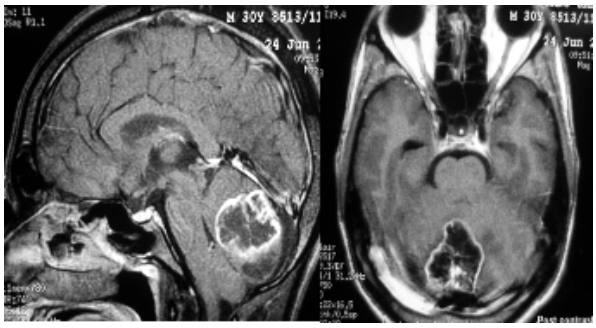
Images:



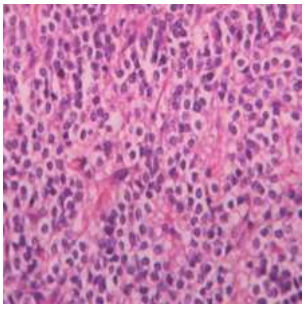
1. Ct Image showing calcified SOL in rt posterior fossa



2.T2 image showing heterointense areas peritumoral edema , areas of calcifications and effaced 4th ventricle



3.T1 contrast image-sagittal and coronal sections showing irregular contrast uptake



4.HPE image showing ecstatic blood vessels with diffusely infiltrating monomorphic tumor cells with perinuclear halo and areas of necrosis in between

REFERENCES :

1. Badhe PB, Chauhan PP, Mehta NK. Brainstem gliomas--a clinicopathological study of 45 cases with p53 immunohistochemistry. *Indian J Cancer*. 2004 Oct-Dec. 41(4):170-4. [QxMD MEDLINE Link].
2. Zhou LF, Du G, Mao Y, Zhang R. Diagnosis and surgical treatment of brainstem hemangioblastomas. *Surg Neurol*. 2005 Apr. 63(4):307-15; discussion 315-6. [QxMD MEDLINE Link].
3. Wilne S, Collier J, Kennedy C, Koller K, Grundy R, Walker D. Presentation of childhood CNS tumours: a systematic review and meta-analysis. *Lancet Oncol*. 2007 Aug. 8(8):685-95. [QxMD MEDLINE Link].
4. Russel DS, Rubinstein IJ : Pathology of tumors of the nervous system, ed 4. London : Edward Arnold Ltd, 1977, pp195-203
5. Ludwig CL, Smith MJ, Godfrey AD, Armbrustmacher AW : A clinicopathological study of 323 patients with oligodendrogliomas. Ann Neurol 19 : 15-21, 1986
6. Ernest F, Kernohan JW, Craig WM : Oligodendroglioma. A review of two hundred cases. Arch Neurol Psychiat 63 : 964-976, 1950
7. Packer RJ, Sutton LN, Rorke LB, Zimmerman RA, Littman P, Brauce DA, et al : Oligodendroglioma of the posterior fossa in childhood. Cancer 56 : 195-199, 1985
8. Kim DH, Chung CO, Kim HI, Lee MC : A case of brain stem anaplastic oligdendroglioma with exophytic growth. J Korean Neurosurg Soc 29 : 684-687, 2000
9. Abbasi Fard S, Tabasi F, Pourzand P, Vahedi A, Heravi M, Mortazavi MM. Large infratentorial cystic oligodendroglioma in a pregnant patient: A case report of a rare presentation and literature review. Clin Case Rep. 2022 Jun 21;10(6):e5988. doi: 10.1002/ccr3.5988. PMID: 35769235; PMCID: PMC9210134.
10. Greenfield JG, Robertson EG. Cystic oligodendrogliomas of the cerebral hemispheres and ventricular oligodendrogliomas. *Brain*. 1933;56(3):247.264. [Google Scholar]
11. Wycis HT. Oligodendroglioma of the cerebellum. *Arch Neurol Psychiatry*. 1948;59(3):404.407. [PubMed] [Google Scholar]
12. Hosono M, Machida K, Matsui T, et al. Oligodendroglioma with cystic component in infant. *Comput Med Imaging Graph*. 2001;25(4):361.365. [PubMed] [Google Scholar]
13. Baysefer A, Düz B, Erdoðan E, Deveci MS. Pediatric cerebellar cystic oligodendroglioma: case report and literature review. *Turk J Pediatr*. 2004;46:95.97. [PubMed] [Google Scholar]
14. Das S, Chandler JP, Pollack A, et al. Oligodendroglioma of the pineal region: case report. *J Neurosurg*. 2006;105(3):461.464. [PubMed] [Google Scholar]
15. Levidou G, Korkolopoulou P, Agrogiannis G, Paidakakos N, Bouramas D, Patsouris E. Low grade oligodendroglioma of the pineal gland: a case report and review of the literature. *Diagn Pathol*. 2010;5(1):1.5. [PMC free article] [PubMed] [Google Scholar]

16. El Ouni F, Gaha M, Moulahi H, Daadoucha A, Krifa H, Tlili K. Infratentorial oligodendroglioma in a child: a case report and review of the literature. *Turk Neurosurg*. 2012;22(4):461.464. [PubMed] [Google Scholar
17. Bhaskar MK, Jaiswal M, Ojha B, Meel M, Harsha AH. Cerebellar cystic oligodendroglioma in a young adult. *J Neurosci Rural Pract*. 2017;8(03):479.481. [PMC free article] [PubMed] [Google Scholar]
18. Allam A, Radwi A, El Weshi A, Hassounah M. Oligodendroglioma: An analysis of prognostic factors and treatment results. *Am J Clin Oncol.* 2000;23:170–5. [PubMed] [Google Scholar]
19. Nadkarni TD, Menon RK, Desai KI, Goel AH. Cerebellar oligodendroglioma in a young adult. *J Clin Neurosci.* 2005;12:837–8. [PubMed] [Google Scholar]
20. Packer RJ, Sutton LN, Rorke LB, Zimmerman RA, Littman P, Bruce DA, et al. Oligodendroglioma of the posterior fossa in childhood. *Cancer.* 1985;56:195–9. [PubMed] [Google Scholar]
21. Bhaskar MK, Jaiswal M, Ojha B, Meel M, Harsha AH. Cerebellar Cystic Oligodendroglioma in a Young Adult. J Neurosci Rural Pract. 2017 Jul-Sep;8(3):479-481. doi: 10.4103/jnrp.jnrp_436_16. PMID: 28694642; PMCID: PMC5488583.
22. NadKarni TD, Menon RK, Desai KI, Goel AH : Cerebellar oligodendroglioma in a young adult. J Clin Neurosci 12 : 837-838, 2005