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Central neurocytoma beyond the lateral ventricles: surgical resection of a primary third ventricle tumor

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Keywords
Neurocytoma, Cerebral ventricle neoplasms, Neurosurgical procedures, Third ventricle

Abstract

Central neurocytomas are rare primary tumors of the central nervous system, most commonly arising in the lateral ventricles. We report the case of a 34-year-old woman diagnosed with a central neurocytoma located in the third ventricle, an uncommon site.

The patient underwent surgical resection via a transcallosal-transchoroidal approach, with intraoperative placement of an external ventricular drain. Gross total resection was achieved. Despite the development of postoperative hydrocephalus, the patient had a favorable clinical outcome and was discharged with preserved functional status.

Histopathological and immunohistochemical analyses confirmed a World Health Organization (WHO) grade II central neurocytoma. Given the extent of resection and tumor characteristics, no adjuvant therapy was indicated. This case highlights the feasibility of complete surgical resection in atypical locations and underscores the importance of perioperative management in optimizing outcomes.

Introduction

Central neurocytomas (CN) are rare primary tumors of the central nervous system that originate from neuronal progenitor cells of the periventricular germinal matrix, as described by Pawar et al. [9]. They are most commonly located in the lateral ventricles, although they may also arise in the third or fourth ventricles [4]. Histopathologically, CN are typically classified as World Health Organization (WHO) grade II tumors [13]. However, some cases may exhibit atypical or malignant features, such as increased mitotic activity, necrosis, vascular proliferation, and elevated proliferation indices on immunohistochemistry [3].

The incidence of CN peaks between the second and fourth decades of life. The most common clinical

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manifestations include headaches, signs of increased intracranial pressure, and visual disturbances. Younger patients tend to present with more acute symptoms and larger lesions, but generally have better long-term outcomes compared to older individuals [3].

Management primarily consists of surgical resection, which may be gross total or subtotal [4], with adjuvant radiotherapy considered in selected cases. In general, adjuvant treatment is reserved for patients with subtotal resection or tumor recurrence [9,11]. Common postoperative complications include transient hemiparesis, seizures, and language impairment [4].

Despite the growing body of literature, CN remain poorly characterized, particularly when arising in atypical locations such as the third ventricle. To help address this gap, reporting such cases is essential to improve understanding of prognosis, optimize surgical strategies, and guide decisions regarding adjuvant therapy. Furthermore, most available data originate from high-income countries, highlighting the importance of documenting cases from low- and middle-income settings [3].

In this report, we describe a case of central neurocytoma primarily arising in the third ventricle, aiming to highlight its clinical presentation, course, and implications, given its rarity and the challenges associated with its surgical management at a tertiary care center in southern Brazil.

Case Presentation

A 34-year-old woman with no significant past medical history presented with a progressively worsening frontoparietal headache over the course of one year, associated with episodes of anterograde amnesia lasting from 2 to 15 days and visual blurring. She had no relevant family history and was not on regular medications. Physical and neurological examinations were unremarkable.

Brain magnetic resonance imaging (MRI) revealed a cystic mass located in the third ventricle, measuring approximately 4.6 × 2.7 × 4.0 cm, along with indirect signs of mild intracranial hypertension (Figure 1). Magnetic resonance spectroscopy did not provide additional relevant information.

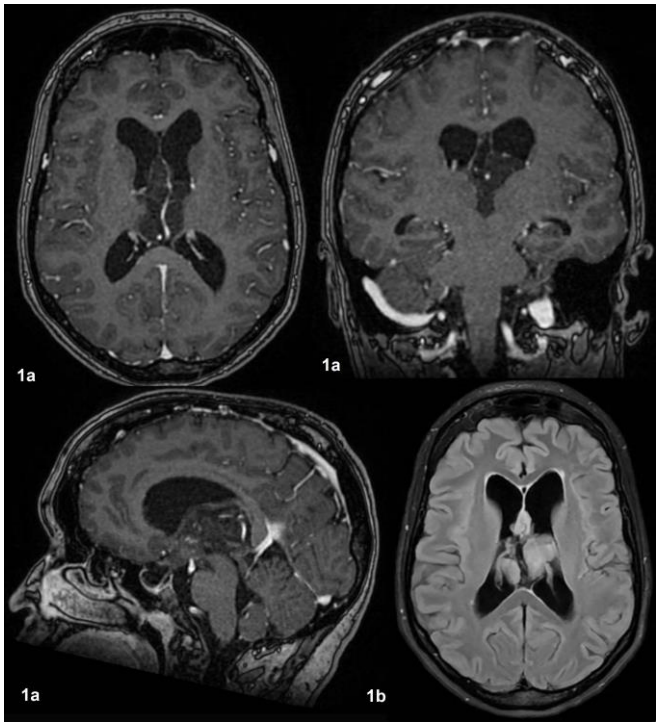

Figure 1. Preoperative brain MRI showing a cystic mass in the third ventricle, measuring approximately 4.6 × 2.7 × 4.0 cm, with indirect signs of mild intracranial hypertension.

Considering the patient's age, clinical presentation, and evidence of increased intracranial pressure, surgical resection was indicated for both diagnostic and therapeutic purposes. The patient was placed in the supine position, and a left frontoparietal craniotomy was performed. A transcallosal-transchoroidal approach was used to access the lesion, allowing tumor debulking followed by piecemeal resection. An external ventricular drain (EVD) was placed intraoperatively in the third ventricle. The procedure was performed with the aid of neuronavigation and intraoperative neurophysiological monitoring.

Histopathological analysis was consistent with neurocytoma. Immunohistochemistry was positive for synaptophysin, S100, SOX10, and Ki-67, supporting the diagnosis of a World Health Organization (WHO) grade II central neurocytoma.

A postoperative computed tomography (CT) scan demonstrated a small amount of intraventricular blood, consistent with expected findings in the immediate postoperative period (Figure 2A). The patient initially showed good recovery; however, on the first postoperative day, she developed decreased level of consciousness associated with blood

drainage through the EVD and signs of acute intracranial hypertension. A repeat CT scan revealed an increased volume of intraventricular hemorrhage and worsening signs of intracranial hypertension (IH) (Figure 2B).

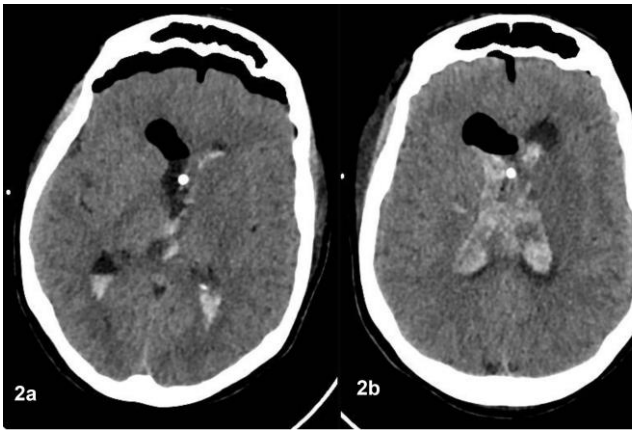

Figure 2. Postoperative CT scans. (A) Small amount of intraventricular blood, consistent with expected findings in the immediate postoperative period. (B) Repeat CT showing an increased volume of intraventricular hemorrhage and worsening signs of intracranial hypertension.

The complication was managed conservatively, given that an EVD was already in place. The patient's neurological status gradually improved over the following days; however, she was unable to tolerate EVD weaning. Therefore, a ventriculoperitoneal shunt was placed, and the intracranial hypertension resolved.

At discharge, the patient was alert and oriented, without headache, presenting only mild impairment in working memory, but remaining independent in daily activities. Given the gross total resection and WHO grade II classification, no adjuvant therapy was indicated. The patient was referred for outpatient follow-up.

Discussion

In this report, we describe a case of central neurocytoma (CN) in a young woman who underwent surgical treatment and achieved good functional status at discharge, despite postoperative complications. This finding is consistent with the existing literature, which indicates that CN generally have a favorable prognosis following surgical resection alone [1]. However, an important distinguishing feature of this case is the tumor location, as CN are rarely found outside the lateral ventricles [10,12]. Additionally, our case highlights the occurrence of postoperative hydrocephalus, an uncommon complication following CN resection [10].

The choice of surgical approach depends on tumor location, patient anatomy, and surgeon experience. In this case, a transcallosal-transchoroidal approach was selected due to its suitability for lesions located in the middle and posterior thirds of the third ventricle. This approach often requires some degree of manipulation of the fornical columns [8]. The fornix is a key structure of the limbic system involved in memory and cognitive function [7], and its injury has been associated with postoperative memory deficits [5], which may partially recover over time due to neural plasticity [6]. Although the fornix appeared anatomically preserved intraoperatively, a subtle ischemic injury related to surgical retraction cannot be excluded and may explain the patient's transient memory impairment.

Another relevant aspect of this case is the intraoperative placement of an external ventricular drain (EVD) in the third ventricle. This strategy proved particularly valuable in the management of postoperative intraventricular hemorrhage and hydrocephalus, allowing for prompt and effective cerebrospinal fluid diversion.

Our findings also reinforce that gross total resection of CN is a feasible and effective treatment strategy, with the potential to preserve neurological function. Previous studies have demonstrated that patients may achieve long-term disease control without the need for adjuvant therapy [10], which supported our management decision in this case.

At the time of manuscript preparation, the patient had not yet returned for scheduled outpatient follow-up. Therefore, long-term clinical, neurological, and oncological outcomes could not be assessed. This limitation should be considered when interpreting the results, as the absence of follow-up precludes evaluation of tumor recurrence, delayed complications, or late functional outcomes. Continued surveillance will be essential to determine the durability of the surgical results.

Finally, this report is inherently limited by its design as a single-case study, which is subject to potential biases, including retrospective data collection and observer interpretation. Consequently, no definitive clinical recommendations can be drawn. Nevertheless,

given the rarity of CN, particularly in atypical locations, this case contributes to existing literature and may assist clinicians in managing similar presentations while encouraging further research in this field.

Conclusion

Central neurocytomas are rare primary central nervous system tumors in which surgical resection remains the cornerstone of treatment. Gross total resection, when safely achievable, is associated with favorable outcomes and reduced risk of recurrence.

This case highlights the feasibility of achieving complete resection in an atypical location, such as the third ventricle, while preserving functional status, even in the presence of postoperative complications. It also underscores the importance of careful surgical planning and perioperative management in optimizing patient outcomes.

Given the rarity of central neurocytomas in non-lateral ventricular locations, this report contributes to the limited body of evidence and may support clinical decision-making in similar cases.

References

1. Cao D, Chen Y, Guo Z, Ou Y, Chen J. Clinical outcome after microsurgical resection of central neurocytoma: a single-centre analysis of 15 years. Front Neurol. 2021;12:790641.
2. Chen H, Zhou R, Liu J, Tang J. Central neurocytoma. J Clin Neurosci. 2012;19(6):849-853.
3. Durrani S, Tebha SS, Qamar MA, Nathani KR, Harrison DJ, Aljameey UA, et al. Central neurocytomas: research trends, most cited papers, and scientometric analysis to date. Neurosurg Rev. 2023;46:57.
4. Eng DY, DeMonte F, Ginsberg L, Fuller GN, Jaeckle K. Craniospinal dissemination of central neurocytoma: report of two cases. J Neurosurg. 1997;86(3):547-552.
5. Louis DN, Ohgaki H, Wiestler OD, Cavenee WK, Burger PC, Jouvet A, et al. The 2007 WHO classification of tumours of the central nervous system. Acta Neuropathol. 2007;114(2):97-109.
6. Mackenzie IR. Central neurocytoma: histologic atypia, proliferation potential, and clinical outcome. Cancer. 1999;85(7):1606-1610.
7. Mazarakis NK, Summers F, Murray AD, Waiter GD, Fouyas IP. Partial recovery from amnesia following bilateral surgical fornix transection is correlated with cortical plasticity. Br J Neurosurg. 2011;25(5):658-661.
8. McMackin D, Cockburn J, Anslow P, Gaffan D. Correlation of fornix damage with memory impairment in six cases of colloid cyst removal. Acta Neurochir (Wien). 1995;135(1-2):12-18.
9. Pawar D, Chatterjee A, Epari S, Sahay A, Janu A, Krishnatry R, et al. Clinico-radiological characteristics, histopathological features and long-term survival outcomes in central neurocytoma: a single-institutional audit. J Clin Neurosci. 2021;84:91-96.
10. Senova S, Fomenko A, Gondard E, Lozano AM. Anatomy and function of the fornix in the context of its potential as a therapeutic target. J Neurol Neurosurg Psychiatry. 2015;86(4):470-478.
11. Sharma MC, Sarkar C, Karak AK, Gaikwad S, Mahapatra AK, Mehta VS. Intraventricular neurocytoma: a clinicopathological study of 20 cases with review of the literature. J Clin Neurosci. 1999;6(4):319-323.
12. Vitorino Araujo JL, Veiga JCE, Wen HT, de Andrade AF, Teixeira MJ, Otoch JP, et al. Comparative anatomical analysis of the transcallosal-transchoroidal and transcallosal-transforniceal-transchoroidal approaches to the third ventricle. J Neurosurg. 2017;127(1):209-218.
13. Zhang L, Xue J, Liu A, Li X. Adult central neurocytomas: clinical features and long-term treatment outcomes in different age groups. World Neurosurg. 2024;186:e630-e638.