Journal of International Surgery and Clinical Medicine (*JISCM)* 2024, Volume 4, Number 2: 41-44
E-ISSN: 2807-7008

Published By :
Surgical Residency Program
Universitas Syiah Kuala

Intraventricular Meningioma: A Case Series

Andrea Valentino[1*], Wahyudi[1], Jeremia Prastya Pardede[1], Tondi Maspian Tjili[1], Anthar Hadisi[1], Gatot Aji Prihartomo[1], Ade Wirdayanto[1], Ina Farida Rangkuti[2]

[1]Division of Neurosurgery, Department of Surgery Arifin Achmad General Hospital, Faculty of Medicine Universitas Riau, Indonesia;
[2]Departement of Anatomic Pathology, Faculty of Medicine Universitas Riau, Indonesia.

*Corresponding to:
Andrea Valentino;
Division of Neurosurgery, Department of Surgery Arifin Achmad General Hospital, Faculty of Medicine Universitas Riau, Indonesia. [2]Departement of Anatomic Pathology, Faculty of Medicine Universitas Riau, Indonesia
dr_reano@yahoo.com

Received: 2024-08-25
Accepted: 2024-11-06
Published: 2024-12-02

ABSTRACT

Introduction: Intraventricular meningiomas account for approximately 1.5% of meningiomas, 80% of these were localized in the lateral ventricles, 15% in the third ventricle (mostly in the ventricle trigone), and the remaining 5% in the fourth ventricle. This case report aims to highlight clinical findings and difficulty on removal of the tumor intraoperatively.
Case description: We presented 2 cases of Intraventricular Meningioma. Both patient have a chief complaint of chronic headache since 2 years ago. Through the magnetic resonance imaging examination, we found a solid mass at right ventricle trigone with enhance homogenously 7.3 x 5.5 x 6.5 cm on the first patient and 6.8 x 8.4 x 3.2 cm on the second patient. Both patients went through craniotomy tumor removal. The pathology showed a Transitional Meningioma who grade I and KI-67 immunohistochemical staining result: 1-2 % on the first patien and angiomatous meningioma (WHO grade 1) on the second patient. Both patients showed improvement post-surgery
Conclusion: We have successfully performed a total craniotomy tumor removal on the right trigone intraventricular meningioma. However, the primary challenge lies in excising intraventricular meningiomas located in the trigone without causing injury to the geniculocalcarine tracts. Therefore, the surgical approach must be carefully planned based on the tumor's location and intraoperative monitoring as well as surgical strategy to avoid the neurological deficits.

Keywords: intraventricular meningioma, Ventricle trigone, Transitional meningioma.
Cite This Article: Valentino, A., Wahyudi., Pardede, J.P., Tjili, T.M., Hadisi, A., Prihartomo, G.A., Wirdayanto, A., Rangkuti, I.F. 2024. Intraventricular Meningioma: A Case Series. *Journal of International Surgery and Clinical Medicine* 4(2): 41-44. DOI: 10.51559/jiscm.v4i2.61

INTRODUCTION

Meningiomas are the most common type of benign tumors found in the skull, comprising 39.2% of all primary tumors in the central nervous system (CNS).[1] Intraventricular meningiomas (IVMs), although a smaller subset representing 0.5–3% of all meningiomas, constitute a significant proportion (10–15%) of adult intraventricular tumors. Their rarity outside childhood underscores their clinical importance. IVMs typically originate from arachnoid cap cells within the choroid plexus, with around 80% developing in the atrium or trigone of the lateral ventricle, and smaller numbers in the third (15%) and fourth ventricles (5%).[2]

A thorough examination of 625 cases of IVMs highlighted their lower tendency for recurrence compared to meningiomas found outside the brain. Recurrence rates for grade I tumors were 2% (versus 7–25% for extra-axial meningiomas), 14% for grade II tumors (versus 29–52%), and 31% for grade III tumors (versus 50–94%).[3] The mortality rate associated with IVMs stands at 4%, primarily due to postoperative complications, which account for 65% of cases. These complications include surgical site hematomas, tumor hemorrhages, infections, pulmonary embolisms, bronchopneumonia, and abscess formation, rather than tumor progression or recurrence.[4]

Large meningiomas originating from within the ventricles are exceptionally uncommon. These tumors are typically detected using enhanced Magnetic Resonance Imaging (MRI), appearing aslarge spherical masses within the ventricular system, often exceeding 5 cm in diameter.[5] They frequently involve critical regions of the brain and are intricately associated with neurovascular structures. Surgical removal of these tumors poses significant challenges due to limited visibility during surgery, increased cerebral edema, heightened vascularity, and the necessity for more extensive craniotomies.[6] Additionally, patients with these larger meningiomas tend to experience higher rates of peritumoral edema compared to those with smaller tumors.[7] This case report aims to highlight clinical findings and difficulty on removal of the tumor intraoperatively.

CASE DESCRIPTION

The first case was a 37-year-old male patient came to Arifin Achmad General Hospital outpatient clinic with chief complain chronic headache since 2 years ago. He denied any specific triggering factors, such as changes in posture, exertion, or dietary habits. There were no significant contributory factors, such as recent head trauma, systemic infections, or exposure to neurotoxic substances. The family history was unremarkable for neurological disorders, including brain tumors.

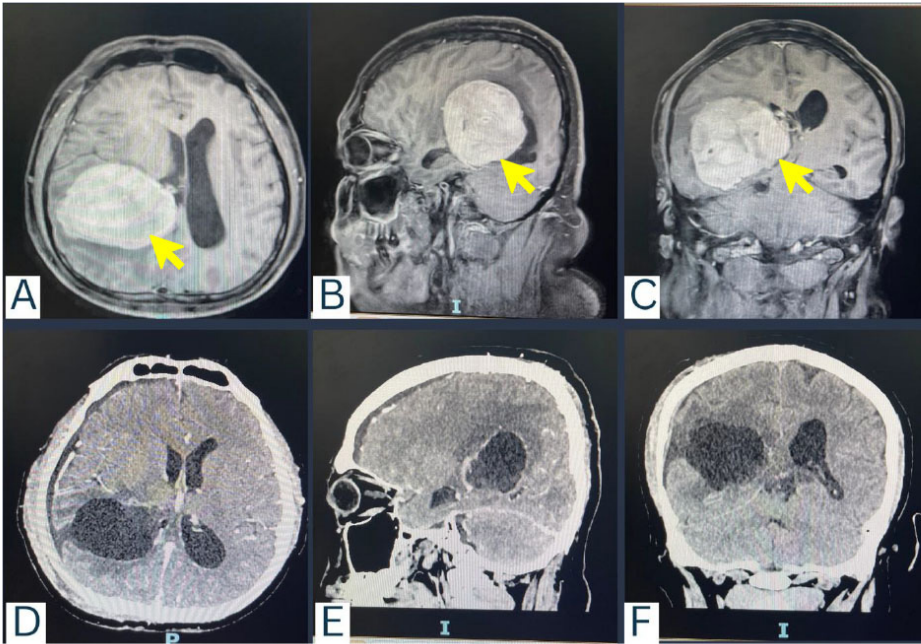

Figure 1. A. Axial, B. Sagital and C. Coronal view T1W sequence of magnetic resonance imaging with contrast showed enhancement of tumor in the right intraventricular trigone (yellow arrow). (D,E,F) MRI after tumor removal

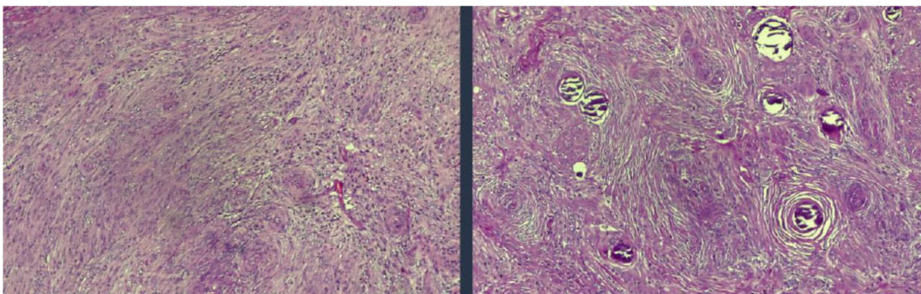

Figure 2. Histopathology result: Transitional Meningioma (WHO Grade 1). K1-67 result: 1-2%.

Physical examination revealed left homonymous hemianopia and normal visual acquity. Brain Magnetic Resonance Imaging (MRI) with contrast showed solid intra axial mass at right ventricle trigone which enhance inhomogeneously, size 7.3 x 5.5 x 6.5 cm, perifocal edema, midline shift 12 mm to the left.

We performed craniotomy tumor removal with horseshoe incision and using Keen's point as corridor through the tumor. Gross total removal was achieved microscopically which attachment to the plexus choroid of the right lateral ventricle. One day observation at intensive care unit then the patient discharged from our hospital 4 days afterward with improvement of visual field, no neurological deficit, no headache and good post operative wound. Pathological examination revealed a Transitional Meningioma (WHO Grade I) and immunohistochemical staining (KI-67) result: 1-2 %.

The second case was a 43-year-old female came to Arifin Achmad General Hospital outpatient clinic with a chief complaint of headache that had persisted for one year. There was a history of contraceptive injections. Physical examination appears normal. A MRI with contrast showed a solid mass at right ventricle trigone with enhance homogenously. Size 6.8 x 8.4 x 3.2 cm, without midline shift.

We performed craniotomy tumor removal with horseshoe incision and using Keen's point as corridor through the tumor. Gross total removal was achieved. After surgery, she was transferred to the intensive care unit for two days and extubated on postoperative day 1. On day five, she was discharged from the hospital without neurosurgical deficits. Histopathology of the tumor showed angiomatous meningioma (WHO grade 1).

DISCUSSION

Meningiomas are primarily non-cancerous brain tumors, constituting 13-26% of all intracranial tumors. They arise from meningothelial cells located in various structures such as the arachnoid villi, arachnoid membrane, tela choroidea, and choroid plexus. Their location within the ventricles explains their rarity, comprising approximately 1-2% of all meningiomas.[8]

There is no specific set of signs or symptoms that uniquely identify intraventricular meningiomas. The most common symptom, found in about 80% of patients, is a non-specific headache. Other symptoms may include disturbances in vision and gait, difficulty with memory, loss of energy, and changes in cognition.[9,10] Seizures present as the initial symptom in 27% of cases [8]. In our case (case 1), the patient initially experienced chronic progressive headaches, followed later by visual disturbances, specifically homonymous hemianopia in the left eye. Otherwise in case 2 the patient have a chronic headache without other neurologic deficits.

Through the brain MRI, we found a solid mass at right ventricle trigone with enhance homogenously 7.3 x 5.5 x 6.5 cm on the first patient and 6.8 x 8.4 x 3.2 cm on the second patient. In the study conducted by Crisuolo and Symon in 400 patients with IVMs, 80% IVMs found to arise within lateral ventricle followed by third in 15% and forth ventricle in 5%.[11] In our case series, all of the IVMs a were found to arise from lateral ventricles. According to various literature, IVMs were found to be more common on the left side. In our case series, all of the patients had right sided IVMs. Radiologically IVMs are well circumscribed lesion without a dural attachment.[11] We didn't find any calcification in our cases.

Radiation therapy has become an alternative for patients with a surgically inaccessible tumor, medically inoperable, or prefers radiation therapy over

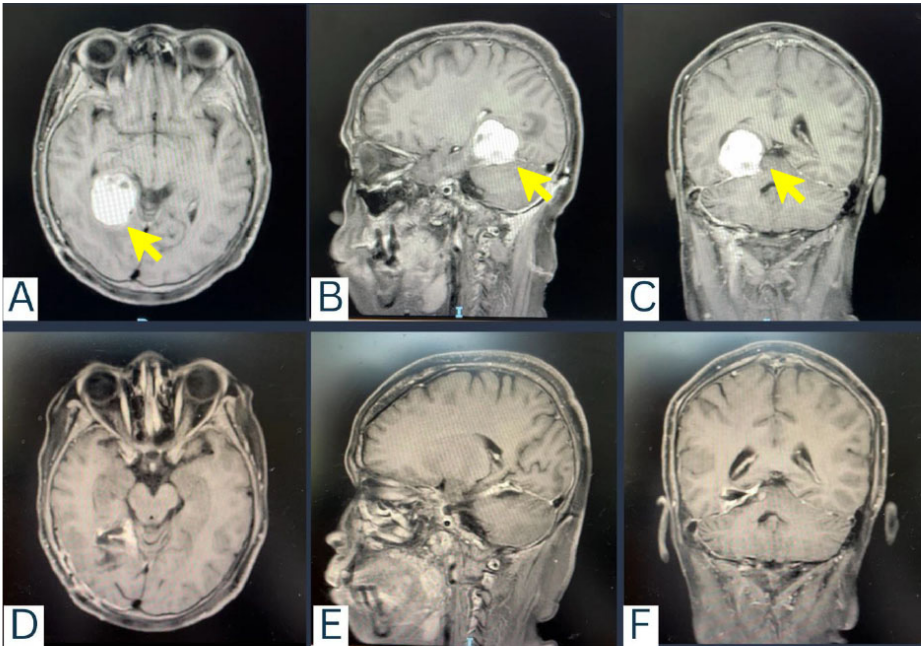

Figure 3. A. Axial, B. Sagital and C. Coronal view T1W sequence of magnetic resonance imaging with contrast showed enhancement of tumor in the right intraventricular trigone (yellow arrow). (D,E,F) 2 weeks after tumor removal.

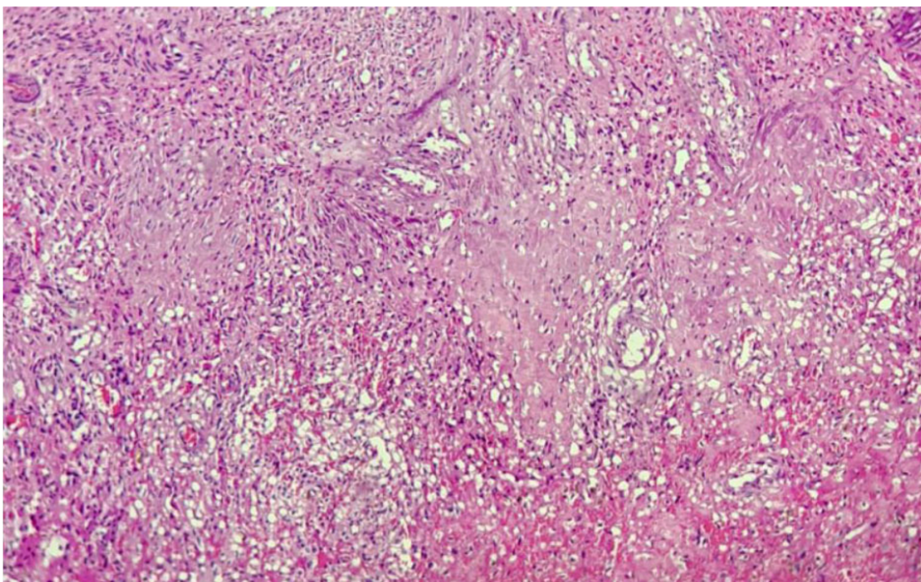

Figure 4. Histopathology result: Angiomatous Meningioma (WHO Grade 1).

surgical intervention. While longer-term follow-up is necessary due to the slow growth and potential for late recurrence of WHO grade I meningiomas, accumulating evidence suggests that primary radiotherapy is an effective treatment option for most imaging-defined meningiomas.[12] According to various literature, the treatment of choice for IVMs is total excision of the tumour. Total excision is relatively challenging owing to its deep location, the proximity of motor, sensory, and language cortex, plus optic radiation and the vascular structures.[11] In our cases, tumor resection was performed microscopically through a Keen's coridor approach using the CUSA (Cavitron Ultrasonic Surgical Aspirator), and the tumor was removed in a piecemeal fashion.

CONCLUSION

Intraventricular meningiomas are a rare form of tumor that typically remain asymptomatic until they grow to a significant size. An MRI brain scan with contrast is the preferred diagnostic tool. The aim of treatment is complete removal of the tumor. However, the primary challenge lies in excising intraventricular meningiomas located in the trigone without causing injury to the geniculocalcarine tracts. Therefore, the surgical approach must be carefully planned based on the tumor's location. The transcortical via parietal approach are the most commonly recommended surgical routes for these cases. Transparietal approach to a dominant hemisphere is an effective way to access tumors in this region to maximize resection while minimizing risk of morbidity.

DISCLOSURES

Conflict of Interest

There is no conflict of interest related to the materials or methods used in this study.

Funding

This article received no specific funding from any funding agency in the public, commercial, or not-for-profit sectors.

Ethic Approval

The authors had obtained written inform consent from the patient and approval from the Department of Surgery of Arifin Achmad General Hospital for the data used in this case report.

Author Contribution

All authors equally did case identification, manuscript drafting, and revision.

REFERENCES

1. Ostrom, Q.T.; Cioffi, G.; Waite, K.; Kruchko, C.; Barnholtz-Sloan, J.S. CBTRUS Statistical Report: Primary Brain and Other Central Nervous System Tumors Diagnosed in the United States in 2014–2018. Neuro Oncol. 2021, 23, 2.
2. Daza-Ovalle, A.; Bin-Alamer, O.; Flickinger, J.; Niranjan, A.; Lunsford, L.D. Outcomes after gamma knife radiosurgery for intraventricular meningiomas. J. Neurooncol. 2022, 160, 23–31
3. Pereira, B.J.A.; de Almeida, A.N.; Paiva, W.S.; de Aguiar, P.H.P.; Teixeira, M.J.; Marie, S.K.N. Natural history of intraventricular meningiomas: Systematic review. Neurosurg. Rev. 2020, 43, 513–523.

4. Ammendola, S.; Simbolo, M.; Ciaparrone, C.; Rizzo, P.C.; Caffo, M.; Pinna, G.; Sala, F.; Scarpa, A.; Barresi, V. Intraventricular Meningiomas: Clinical-Pathological and Genetic Features of a Monocentric Series. Curr. Oncol. 2022, 29, 178–185. [CrossRef] [PubMed]
5. Munjal, S.; Vats, A.; Kumar, J.; Srivastava, A.; Mehta, V. Giant pediatric intraventricular meningioma: Case report and review of literature. J. Pediatr. Neurosci. 2016, 3, 219–222.
6. Narayan, V.; Bir, S.C.; Mohammed, N.; Savardekar, A.R.; Patra, D.P.; Nanda, A. Surgical Management of Giant Intracranial Meningioma: Operative Nuances, Challenges, and Outcome. World Neurosurg. 2018, 110, e32–e41.
7. Haeren, R.H.; Rautalin, I.; Schwartz, C.; Korja, M.; Niemelä, M. Surgery on giant meningiomas in very old patients entails frequent postoperative intracranial hemorrhages and atypical histopathology. J. Neurooncol. 2021, 152, 195–204.
8. Bertalanffy A, Roessler K, Koperek O, Gelpi E, Prayer D, Neuner M, Knosp E. Intraventricular meningiomas: A report of 16 cases. Neurosurg Rev. 2006; 29(1): 30–5
9. Bhatoe HS, Singh P, Dutta V. (2006). Intraventricular meningiomas: A clinicopathological study and review. Neurosurgical Focus, 20(3), E9. https://doi.org/10.3171/foc.2006.20.3.10.12
10. Liu M, Wei Y, Liu Y, Zhu S, Li X. (2006). Intraventricular meningiomas: A report of 25 cases. Neurosurgical Reviews, 29(1), 36–40. https://doi.org/10.1007/s10143-005-0418-1
11. Siddiqui, N. U. F., Ali, N. M. F., Rehmani, N. M. a. K., Khan, N. a. A., Sheeraz, N., Kumar, N. R., & Imran, N. (2021). Intraventricular meningiomas: A case series and literature review. The Professional Medical Journal, 28(11), 1633–1639. https://doi.org/10.29309/tpmj/2021.28.11.6058
12. Day, Samuel E., and Lia M. Halasz. “Radiation Therapy for WHO Grade I Meningioma.” Chinese Clinical Oncology, vol. 6, no. S1, July 2017, pp. S4–S4.

This work is licensed under a Creative Commons Attribution