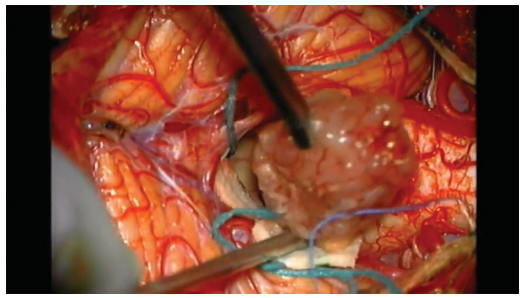
Microsurgical Resection of the IV Ventricle Subependymoma: 2-Dimensional Operative Video



Mirza Pojskić, MD[*‡], Vincent N. Nguyen, MD[§], Frederick A. Boop, MD[§¶], Kenan I. Arnautović, MD, PhD[§¶]

[*]Department of Neurosurgery, University of Marburg, Marburg, Germany; [‡]Medicinski fakultet Osijek, Sveučilište Josip Juraj Strossmayer, Osijek, Croatia; [§]Department of Neurosurgery, University of Tennessee Health Science Center, Memphis, Tennessee; [¶]Semmes Murphey Neurologic & Spine Institute, Memphis, Tennessee

Watch now at https://academic.oup.com/ons/article-lookup/doi/10.1093/ons/opz387

Correspondence: Kenan Arnautović, MD, PhD, Semmes Murphey Neurologic & Spine Institute, 6325 Humphreys Blvd, Memphis, TN 38120, USA. Email: kenanarnaut@yahoo.com

In this video, we demonstrate microsurgical resection of IV ventricle subependymoma. To the best of our knowledge, this is the first video case report of a microsurgical resection of subependymoma of the IV ventricle in the peer-reviewed English literature.

Subependymomas are benign central nervous system tumors, typically arising in ventricular spaces, mostly in the IV and lateral ventricles.[1-3] They are isointense on T1 and hyperintense on T2-weighted magnetic resonance imaging (MRI) with minimal or no enhancement.[4] Microsurgery remains the mainstay treatment. Complete tumor resection is possible and curative with excellent prognosis.[1,5-7] Although the clinical course appears benign, the inability to diagnose them radiographically with certainty and the possibility of an alternative malignant lesion support a low threshold for early and safe resection.[8]

A 39-yr-old man presented with severe headache and balance problems. Pre- and postcontrast neuroaxis MRI revealed a centrally located IV ventricle lesion without hydrocephalus. The aim of the surgery was complete tumor resection. Surgery was performed in the prone position by the senior author (KIA) with intraoperative neurophysiology monitoring. A small suboccipital craniotomy and C1 posterior arch removal was done. After opening the dura and arachnoid membrane, the tumor was identified and meticulously dissected from the adjacent posterior inferior cerebellar artery and the floor of the fourth ventricle and from brain stem white matter at the tumor-neural tissue interface to avoid brainstem interference. Histological analysis revealed subependymoma (World Health Organization Grade I). Postoperative pre- and postcontrast MRI revealed complete resection. Headache and balance problems completely resolved; the patient was neurologically intact.

The patient provided written consent and permission to publish his image.

KEY WORDS: Microsurgery, Resection, IV ventricle, Subependymoma, Tumor

Operative Neurosurgery 19:E66–E67, 2020 DOI:10.1093/ons/opz387 **Received,** July 26, 2019. **Accepted,** October 7, 2019. **Published Online,** December 7, 2019.

Disclosures

The authors have no personal, financial, or institutional interest in any of the drugs, materials, or devices described in this article.

REFERENCES

1. Jain A, Amin AG, Jain P, et al. Subependymoma: clinical features and surgical outcomes. *Neurol Res*. 2012;34(7):677-684.
2. Varma A, Giraldi D, Mills S, Brodbelt AR, Jenkinson MD. Surgical management and long-term outcome of intracranial subependymoma. *Acta Neurochir (Wien)*. 2018;160(9):1793-1799.
3. Bi Z, Ren X, Zhang J, Jia W. Clinical, radiological, and pathological features in 43 cases of intracranial subependymoma. *J Neurosurg*. 2015;122(1):49-60.
4. Ragel BT, Osborn AG, Whang K, Townsend JJ, Jensen RL, Couldwell WT. Subependymomas: an analysis of clinical and imaging features. *Neurosurgery*. 2006;58(5):881-890; discussion 881-890.

5. Kandenwein JA, Bostroem A, Feuss M, Pietsch T, Simon M. Surgical management of intracranial subependymomas. *Acta Neurochir (Wien)*. 2011;153(7):1469-1475.
6. Nowak A, Marchel A. Surgical treatment of intraventricular ependymomas and subependymomas. *Neurol Neurochir Pol*. 2012;46(4):333-343.
7. Jallo GI, Zagzag D, Epstein F. Intramedullary subependymoma of the spinal cord. *Neurosurgery*. 1996;38(2):251-257.
8. D'Amico RS, Praver M, Zanazzi GJ, et al. Subependymomas are low-grade heterogeneous glial neoplasms defined by subventricular zone lineage markers. *World Neurosurg*. 2017;107:451-463.

Acknowledgments

The authors wish to thank Andrew J. Gienapp (Neuroscience Institute, Le Bonheur Children's Hospital and Department of Neurosurgery, University of Tennessee Health Science Center, Memphis, Tennessee) for copy editing, preparation of the manuscript for publishing, and publication assistance.

COMMENT

Subependymomas are histologically benign lesions that account for only 0.2%-0.7% of central nervous system tumors. Incidentally found asymptomatic subependymomas can be safely surveyed however; symptomatic lesions should be treated with microsurgical resection. The authors do a good job describing the necessary maneuvers to safely remove a lesion from the floor of the fourth ventricle. The risk of growth following gross total or subtotal resection is very low thus one should not risk neurologic deficit when dealing with a tumor very adherent to critical neurovascular structures.

Sanjay Patra
Grand Rapids, Michigan