Exploring Vidian Nerve Schwannomas, a case report and literature review.

Maryam Aljawi, MD[1]; Maryam Aljneibi, MD[1]; Mohamed Elhammady, MD[2]; Florian Roser, MD[2]; Mahdi Shkoukani, MD[1]

[1]Department of Otolaryngology head and neck surgery, [2]Department of Neurosurgery. Cleveland Clinic Abu Dhabi

Abstract

Objective: To present a case of a Vidian nerve schwannoma resected through endoscopic endonasal surgery through a trans-pterygoid approach.
Case: A 45-year-old woman who presented with vision changes and dryness of the eye. MRI showed a large homogenous contrast enhancing mass in the sphenoid sinus with bone remodeling of the skull base.
Procedure: She underwent transsphenoidal endonasal excision of the mass by the otolaryngology and neurosurgery team. Intraoperatively, the mass in the lateral recess of the sphenoid was difficult to access and a trans-ptyregoid approach was used for better exposure. Complete resection of the tumor was achieved.
Follow up: Final surgical pathology came back as schwannoma. Further review of the preoperative MRI concluded the mass to be of a Vidian nerve origin. She was evaluated by ophthalmology at 1 month and 6 months postoperatively and had stable optic neuropathy with no progression in symptoms.

Introduction

Vidian nerve schwannomas are exceedingly rare, with only a limited number of cases documented in the medical literature. Diagnosing these tumors can be particularly challenging due to their paucity and the broad differential diagnosis associated with anterior skull base lesions. The surgical management of Vidian nerve schwannomas is further complicated by the challenging anatomical location of the tumor, which is often situated in the lateral recess of the sphenoid sinus. Although Vidian nerve schwannomas are benign in nature, their growth can result in significant morbidity due to the mass effect they exert on surrounding critical structures, such as the optic nerve. Early diagnosis and appropriate surgical intervention are essential to prevent long-term complications and preserve patient quality of life. Historically, open approaches through the pterygopalatine fossa were employed; however, these have largely been replaced by extended endoscopic skull base techniques. Endoscopic approaches are now considered the gold standard for their ability to provide excellent exposure while minimizing patient morbidity and surgical complications.

Case presentation

We report the case of a 45-year-old woman who presented with complaints of vision changes and dryness in her eye. Magnetic resonance imaging (MRI) revealed a large, homogeneously contrast-enhancing mass located in the sphenoid sinus, accompanied by evidence of bone remodeling at the skull base.
The patient underwent a transsphenoidal endonasal excision of the mass, performed collaboratively by the otolaryngology and neurosurgery teams. Intraoperatively, the tumor was found to be located in the lateral recess of the sphenoid sinus, a region that posed significant challenges for access. To overcome this, a transpterygoid approach was employed, providing better surgical exposure. Complete resection of the tumor was successfully achieved.
Final histopathological analysis of the excised tissue confirmed the diagnosis of schwannoma. Subsequent detailed review of the preoperative MRI suggested that the mass originated from the Vidian nerve.
Postoperatively, the patient was closely monitored by ophthalmology. At follow-ups conducted one month and six months after surgery, she demonstrated stable optic neuropathy without any progression of her symptoms.

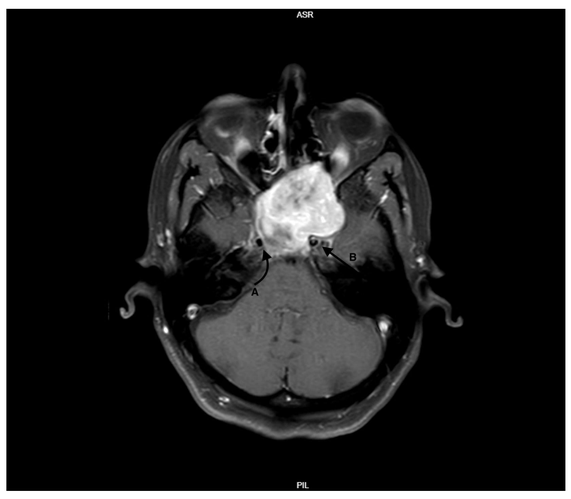

Figure 1. Preoperative MRI axial image

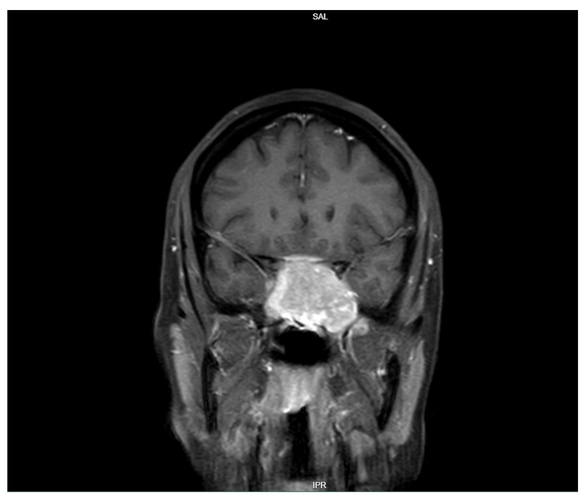

Figure 2. Preoperative MRI coronal image

Discussion

Head and neck schwannomas are not uncommon. They most commonly arise from the vestibular nerve, accounting to around 51%. Followed by the trigeminal nerve accounting for 8%. The diagnosis of schwannomas is typically made histologically. However, this could be predilected on preoperative imaging with certain characteristics including iso or hypo-intensity on T1 images, hyperintensity on T2 images and enhancement with contrast. The MRI scan is also helpful in determining the origin of these tumors with features such as bone remodeling and enlargement of the bony canals of the affected nerve. Vidian nerve schwannomas are a rare entity with only previous 11 cases reported in the literature to our knowledge summarized in table 1. All previously reported cases of Vidian nerve schwannoma presented with unspecific symptoms including headaches. Or symptoms secondary to compression of other cranial nerves including hypoesthesia, vision changes or hearing loss. There are no evident abnormalities, such as decreased lacrimation or nasal mucosal dryness, that have led to the investigation and diagnosis of Vidian nerve tumors. The standard treatment is surgical resection, which is also the gold standard for diagnosis to obtain histopathologic confirmation. Previously, open approaches were utilized for surgical access due to the difficulty in reaching areas such as the lateral recess of the sphenoid and the pterygopalatine fossa, as well as the potential challenges associated with the need to ligate internal maxillary artery branches in those regions. Historically, approaches such as the maxillary swing or a combination of a Caldwell-Luc or Denker's approach were the standard treatment. However, the endoscopic endonasal approach has now largely replaced open procedures in experienced hands, minimizing morbidity and shortening hospital length of stay.

Cases	Author	Age	Gender	Tumor size	Clinical presentation	Management	Outcome
1	Cheong et al., 2006	13	F	12mmx10mm	Headache and unilateral facial palsy	EES	N.A
2	Honda et al., 2008	49	F	N.A	Unilateral hearing loss and serous otitis media	Maxillary swing with endoscopic assistance	No recurrence in 1 month
3	Hackman et al., 2011	49	M	10mmx14mm	Occipital headache	Observation	N.A
4	Hackman et al., 2011	58	M	N.A	Unilateral palate pain and lip numbness	EES	N.A
5	Wu et al., 2012	78	F	N.A	Unilateral oculomotor palsy and CSF leak	EES	No recurrence in 24 months
6	Hong et al., 2014	41	M	28mmx16mm	Occipital headache	EES	N.A
7	Yamasaki et al., 2015	49	F	20mmx14mm	Asymptomatic	Radiation thearpy	N.A
8	Fortes et al., 2019	60	F	N.A	Unilateral facial hypostheisa	EES	No recurrence in 3 months
9	Masroor et al., 2018	54	F	41mmx36mm	Periorbital pressure and oculomotor plasy, visual field defect	EES	No recurrence in 28 months
10	Tanaka et al., 2021	21	F	44mmx36mm	Hypolacrimination	EES	No recurrence in 5 months
11	Bang et al., 2024	58	F	N.A	Headache and left eye dryness	EES	No recurrence in 8 months

Conclusion

Vidian nerve schwannomas are difficult to diagnosis due to the unspecific presenting symptoms. Radiologic charactaristics can presume the diagnosis of a schwannoma. Surgical resection is the mainstay of treatment. Endoscopic endonasal approach has improved visualization of different regions of the anterior skull base and have allowed full resection with minimal morbidity and short hospital stay.

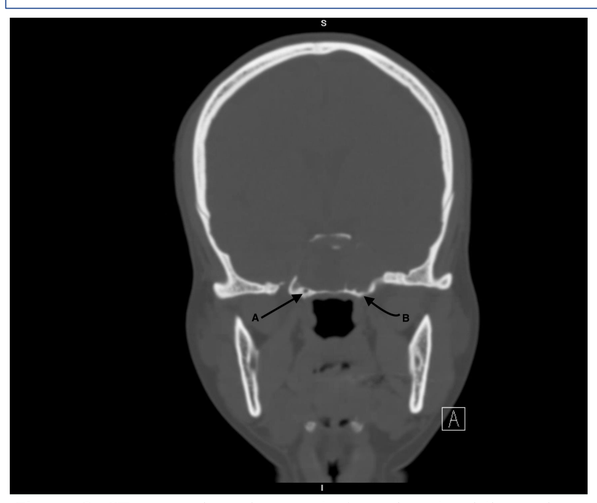

Figure 3. CT coronal cut bone window showing bilateral Vidian canals

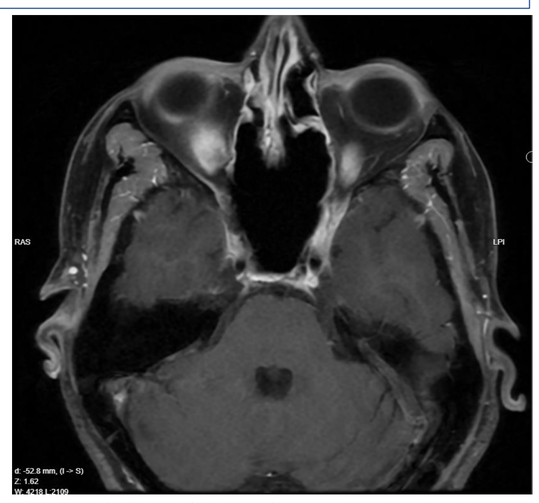

Figure 4. MRI Axial 6 months post tumor resection

Contact

Mahdi Shkoukani, MD
Cleveland Clinic Abu Dhabi
shkoukm@clevelandclinicabudhabi.ae

References

1. Cheong, J. H., Kim, J. M., Bak, K. H., Kim, C. H., Oh, Y. H., & Park, D. W. (2006). Bilateral vidian nerve schwannomas associated with facial palsy. Case report and review of the literature. Journal of neurosurgery, 104(5), 835–839. https://doi.org/10.3171/jns.2006.104.5.835
2. Honda, K., Asato, R., Tanaka, S., Endo, T., Nishimura, K., & Ito, J. (2008). Vidian nerve schwannoma with middle cranial fossa extension resected via a maxillary swing approach. Head & neck, 30(10), 1389–1393. https://doi.org/10.1002/hed.20793
3. Hackman, T., Rickert, C. G., Getz, A. E., & Uppaluri, R. (2011). Endoscopic surgical management of vidian nerve schwannoma. The Laryngoscope, 121(2), 241–244. https://doi.org/10.1002/lary.21285
4. Wu, S. W., Chen, W. L., Chen, W. L., & Chen, M. K. (2012). Transnasal endoscopic resection of vidian nerve schwannoma accompanied by sphenoid mucopyocele and oculomotor palsy: a case report. B-ENT, 8(3), 207–211.
5. Hong, H. P., Yoon, S. W., Park, M. J., & Jung, S.-C. (2014). A case of vidian nerve schwannoma: Resection by endoscopic sinus surgery. Korean Journal of Otorhinolaryngology-Head and Neck Surgery, 57(1), 50. https://doi.org/10.3342/kjorl-hns.2014.57.1.50
6. Yamasaki, A., Sedaghat, A. R., Lin, G. C., Curry, W. T., Shih, H. A., & Gray, S. T. (2015). A Rare Finding of Schwannoma of the Vidian Canal: A Case Report. Journal of neurological surgery reports, 76(1), e48–e51. https://doi.org/10.1055/s-0034-1544112
7. Fortes, B., Beer-Furlan, A., Balsalobre, L., Vellutini, E., & Stamm, A. (2019). Endoscopic endonasal access for the treatment of Vidian nerve schwannoma: a case report. Brazilian journal of otorhinolaryngology, 85(5), 670–672. https://doi.org/10.1016/j.bjorl.2016.04.015
8. Masroor, F. A., Gilde, J., & Liang, J. (2018). Vidian Nerve Schwannoma: A Rare Skull-Base Neoplasm Presenting with Ocular Manifestations: A Case Report and Literature Review. The Permanente journal, 22, 18–021. https://doi.org/10.7812/TPP/18-021
9. Tanaka, C., Kikuchi, M., Matsunaga, M., Omori, K., & Nakagawa, T. (2021). Endoscopic Endonasal Surgery of a Large Vidian Nerve Schwannoma With Preparation for Avoiding Major Vascular Injury. Cureus, 13(3), e14230. https://doi.org/10.7759/cureus.14230
10. Bang, J. H., Jin, S. H., Kim, S. J., & Lee, K. H. (2024). Vidian Nerve Schwannoma Extending Into the Foramen Rotundum in a Female Patient: A Case Report. Journal of rhinology : official journal of the Korean Rhinologic Society, 31(3), 184–188. https://doi.org/10.18787/jr.2024.00028