Introduction

Schwannomas, or neurilemmomas, are benign, slow-growing tumours arising from Schwann cells of the peripheral nerve sheath and originating from the neuroectoderm. Schwannomas of the sinonasal tract are rare. About 25%-45% of all schwannomas occur in the head and neck region, but the sinonasal tract is rarely involved. We report on an extremely rare case of vidian nerve schwannoma accompanied by mucopyocele with symptoms of oculomotor palsy and CSF leakage. An exclusively endoscopic endonasal approach was performed to excise the tumour and the dural defect was repaired. To our knowledge, this is the first time a vidian nerve schwannoma has been excised in an exclusively endoscopic approach. We first review the literature and then discuss the benefits for patients undergoing this type of operation.

Case report

A 78-year-old woman had a history of hypertension and type 2 diabetes mellitus. She presented with dizziness and left orbital pain over the previous four days. Left nasal clear discharge over a period of six months was also noted, but she had paid no attention to it. She visited the neurosurgeon at the regional hospital first and, after a computerised tomography (CT) scan, she was transferred to our tertiary referral medical centre. At the department of neurosurgery, the neurological examination revealed left-eye extra-ocular muscle limitations on the medial, upper, and lower sides; left eyelid ptosis developed during hospitalisation. She was referred to the Department of Otorhinolaryngology-Head and Neck Surgery for surgery. The anterior rhinoscopy and sinoscopy showed that cerebrospinal fluid (CSF) was leaking from the left sphenoid orifice.

The CT scan of the brain without contrast showed an isodensity mass with intratumoural calcification occupying the left retro-maxillary area and the entire left sphenoid sinus, accompanied by

Transnasal endoscopic resection of Vidian Nerve Schwannoma accompanied by sphenoid mucopyocele and oculomotor palsy: a case report


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Abstract. Transnasal endoscopic resection of Vidian Nerve Schwannoma accompanied by sphenoid mucopyocele and oculomotor palsy: a case report. Schwannomas are rare tumours arising from the peripheral nerve sheath. Nearly half of all schwannomas occur in the head and neck region, but the sinonasal tract is rarely involved. We report on an extremely rare case of vidian nerve schwannoma accompanied by mucopyocele with symptoms of oculomotor palsy and CSF leakage. An exclusively endoscopic endonasal approach was performed to excise the tumour and the dural defect was repaired. To our knowledge, this is the first time a vidian nerve schwannoma has been excised in an exclusively endoscopic approach. We first review the literature and then discuss the benefits for patients undergoing this type of operation.
the destruction of its lateral wall (Figure 1). Magnetic resonance imaging (MRI) showed a mass consisting of two components in the left pterygopalatine fossa and sphenoid sinus. The left cavernous sinus and left orbital apex were also involved (Figures 2A, B). The medial component showed hypo-intensity on the T1-weighted images, isointensity on the T2-weighted images, and enhancement on the T1-Gd images. The lateral component showed hyper-intensity on the T1-weighted images, isointensity on the T2-weighted images, and hyperintensity on T1-fat saturation images.

**Result**

Endoscopic surgery revealed a well-defined solid tumour accompanied by a mucopyocele expanding to the cavernous sinus without direct invasion and infiltration. CSF leakage was also observed before removal of the tumour. The tumour with mucopyocele was therefore easily removed without massive bleeding in the cavernous sinus area. To repair the dural defect, a middle turbinate rotation flap was created. First, the lateral mucosa of the middle turbinate was elevated backward. Second, the concha of middle turbinate was dissected from the medial side mucosa and then removed. Finally, we cut the superior attachment between the middle turbinate and skull base, the posterior-based flap was created and rotated to cover the dural defect only. Gelfoam and Rhinocele were then applied to support the flap. The intra-operative blood loss was only 20 mL. No post-operative complication such as central nerve system infection was observed. The patient’s left cranial nerve III palsy and left eyelid ptosis recovered immediately after surgery. The MRI was performed post-operatively (Figures 2C, D) and no tumour recurrence or CSF leakage was observed at two-year follow-up.

Histopathologically, the images showed a well-demarcated tumour composed of compactly arranged bland spindle cells with long oval nuclei arranged in fascicles. Alternating hyper- and hypocellular areas were observed (Figure 3A). Nuclear palisading was occasionally present. Mitotic figures were not observed. Immunohistochemically, the tumour cells were positive for the S-100 protein (Figure 3B), negative for desmin, glial fibrillary acidic protein, and epithelial membrane antigen. The Ki-67 proliferation index was not increased. The pathological diagnosis was schwannoma.

**Discussion**

Schwannomas are benign tumours that may occur throughout the body's peripheral nerve system. They are most frequently involved in the head and neck region, and...
Endoscopic resection of skull base schwannoma

Cranial nerve VIII is the most common site. However, only 4% of the head and neck schwannomas occur in the sinonasal tract; the nose and ethmoid sinuses are most often involved and the sphenoid sinuses least involved. In our patient, the vidian nerve schwannoma occupied the unusual site of the sphenoid sinus, with expansion into the cavernous sinus and a skull base extension, causing a CSF leak.

A mucocoele in the paranasal sinus is a benign, mucus-containing cyst lined with a pseudostratified ciliated columnar epithelium. When a mucocele is infected, a mucopyocele is produced. The aetiology may be infective disease, trauma, or tumours of the sphenoid sinus. In our case, the schwannoma mass may have obstructed the mucous flow of the

Figure 2
A: Axial T1-weighted MRI showed two components in the tumour, a hypointense medial component (arrow) and a hyperintense lateral component (arrowhead). B: T2-weighted MRI showed isointense medial and lateral components. C: T1-weighted MRI and D: T2-weighted MRI showed complete removal of the mass without tumour recurrence.
sphenoid sinus and subsequently induced a mucopyocele. The obstruction caused a slow expansion of the mucopyocele and, when it grew and attached to the bony wall, the increased pressure resulted in bony erosion and intracranial extension. CSF leakage eventually occurred.

Depending on the location and extension of the schwannomas, numerous different symptoms and signs can present. When the tumours involve the sphenoid sinus, especially with orbital apex or cavernous sinus extension, cavernous sinus syndromes such as retrobulbar pain, chemosis, proptosis, ophthalmoplegia, increased intraorbital pressure, and decreased visual acuity may present. Even third, fourth, or sixth cranial nerve palsies may occur.

It is generally presumed that schwannomas of the nose and paranasal sinuses originate in the ophthalmic and maxillary branches of the trigeminal nerve and autonomic ganglia. In our patient, the symptoms of left eyelid ptosis, and extra-ocular muscle limitations to the medial, upper, and lower sides indicated left cranial nerve III palsy. The tumour involved the sphenoid sinus, the pterygoid canal and the cavernous sinus, and this was demonstrated by the CT scan and MRI images. The patient’s cranial nerve III palsy recovered post-operatively; the nerve was located at the rim of the tumour and the palsy may have been caused by tumour compression. The vidian nerve is formed by the junction of the great petrosal nerve and the deep petrosal nerve, which carry the parasympathetic nerve fibres and the sympathetic nerve fibre respectively. It continues through the pterygoid canal and enters the pterygopalatine fossa to join the pterygopalatine ganglion and communicate with the nasal cavity via the sphenopalatine foramen. The vidian nerve is located close to the orifice of the sphenoid sinus and may be influenced by a retro-obstructive inflammatory change to the sphenoid sinus if a neoplasm occurs on it. The evidence suggested that the tumour in our case originated from the vidian nerve.

The MRI characteristics for schwannomas are isointensity to hypointensity on a T1-weighted image and mostly hyperintensity on a T2-weighted image. After contrast injection, schwannomas are enhanced on a T1-Gd image. The small tumours usually have a solid and homogeneous appearance, whereas the large ones often have a cystic change or haemorrhage change, and show a heterogeneous pattern. Histopathologically, schwannomas are well encapsulated and do not entrap the nerve axon. The tumour can usually be completely resected with surgical preservation of the nerve. The two typical patterns of schwannoma are characterised as Antoni type A and Antoni type B. Antoni type A is composed of compact, spindle-shape cells arranged in interlacing fascicles with nuclear palisading. Antoni type B is less cellular in a loose matrix with myxoid or microcystic changes. S-100 protein has been found immunohistochemically in schwannomas.

In the past, approaches to the central skull base usually required extradural craniotomy and lateral rhinotomy. Honda et al. described in detail the advantages and dis-
advantages of the various approaches to the central skull base. Transmandibular approaches are limited to lesions in the parapharyngeal space, whereas transcranial approaches expose the upper part of the infratemporal fossa excellently, apart from the petrous apex. With the development of advanced instruments, an endoscopy can now provide a clear visual field, illumination, and magnification to approach and evaluate the lesions. In addition to the advanced instruments, endoscopic surgeons have acquired more experience and explored new techniques. Many surgeons now consider the endoscopic endonasal approach to be the treatment of choice for benign tumours in the sinonasal tract and skull base and even for malignant tumours with dural repair for CSF leak. However, the accurate assessment of tumour size, margin and adjacent structures prior to surgery is crucial.

Conclusions
Vidian nerve schwannoma is extremely rare and our report relates to a unique case accompanied by a mucopyocele. We conclude that the exclusively endoscopic excision with dura repair is a curative method, which cuts down the length of the operation, reduces wound-related complications, shortens hospital stay, and produces an overall better cosmetic outcome.

References

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