Case Report

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Endoscopic resection of an entirely intracavernous cavernoma

Abstract: Cavernomas account for <2% of all tumours of the cavernous sinus. Given the complex anatomical configuration of the cavernous sinus with the immanent proximity of cranial nerves, vessels and the hypothalamo-pituitary system, the clinical presentation of a cavernous sinus cavernomas can be variable and its surgical treatment highly demanding. We present the first case of a strictly intracavernous cavernoma that has been radically resected through a transnaso-sphenoidal endoscopic approach.

Keywords: Cavernoma; cavernous sinus; endoscopy; skull base.

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Introduction

Cavernomas account for <2% of all tumours of the cavernous sinus [1]. Given the complex anatomical configuration of the cavernous sinus with the immanent proximity of cranial nerves, vessels and the hypothalamo-pituitary system, the clinical presentation of a cavernous sinus cavernoma can be highly variable. Symptoms typically arise from compression of intracavernous cranial nerves and comprise diplopia from opthalmoparesis and neuropathic ocular pain. Endocrinopathies and exophthalmos, though less frequent, are also described [2, 5, 7, 9].

Conventionally, the treatment of this extremely rare pathology has been mainly radiosurgical or surgical by open craniotomy [4, 6]. The surgical treatment of lesions extending into the cavernous sinus is technically demanding and associated with high peri-interventional morbidity [3, 8–10].

Fraser et al. reported the first transnaso-sphenoidal gross total resection of a cavernoma with involvement of the cavernous sinus in 2008 [1]. However, they described the entity of a sellar cavernoma with extension into the cavernous sinus. We present the first case of a strictly intracavernous cavernoma that has been radically resected through a transnaso-sphenoidal endoscopic approach.

Case report

Clinical presentation

A 39-year-old female presented with a history of diplopia due to a complete palsy of the right abducens nerve. Visual acuity was normal and there were no apparent symptoms that could have been related to a secretive dysfunction of the pituitary (mood changes, cardiac arrhythmias, flush, disturbed libido).

Magnetic resonance imaging (MRI) revealed a mass in the right cavernous sinus with marked contrast enhancement and a signal suggestive for a cavernoma in the non-contrast enhanced sequences. Partial encasement of the right internal carotid artery (ICA) and displacement of the abducens nerve towards lateral was noted (Figure 1). Laboratory findings for all pituitary hormones were within normal range.

Technique of the intervention

The procedure was performed in interdisciplinary cooperation involving rhinosurgeons and neurosurgeons, as it is routine for transnasal endoscopic interventions of the anterior skull base at our institution.
For the preoperative assessment of special anatomical features of the nasal cavity and paranasal sinuses, a preoperative computed tomography (CT) scan of the head was acquired. Electrophysiological recordings (SSEP/MEP) or a direct stimulation of cranial nerves was not performed during the procedure. The patient was placed supine with slight extension of the head. A Mayfield fixation was used for immobilisation of the patient’s head. The use of an intraoperative CT in our institution’s Brain-suite (BrainLab, Feldkirchen, Germany) required special consideration regarding the position of the anaesthetist, length of the respiratory tube and cuff tube.

The stereotactic neuronavigation system was then installed and surface registration performed. Preoperatively, gauze swabs soaked with tetracaine 1% and epinephrine 1/100,000 were placed in the nasal cavity to reduce mucosal swelling and bleeding. Disinfection of the nose, perinasal skin and eyes was completed using chlorhexidine. Both eyes of the patient were spared from sterile draping in order to detect any exophthalmus in case of intraorbital bleeding. A biportal transnasal, transtethmoidal and transsphenoidal approach to the sella and medial cavernous sinus was performed.

Removal of the bony covering of the medial cavernous sinus was achieved by the use of a high-speed drill and rongeurs. The cavernoma could be easily identified after removal of the bone (Figure 2).

The tumour was removed by the use of curettes and sharp dissection towards the intracavernous part of the carotid artery under endoscopic view. After macroscopic tumour removal and haemostasis with Flow Seal (Baxter, Vienna, Austria) an intraoperative, contrast enhanced CT scan was performed, which did not show remaining tumour material or a relevant bleeding.

Closure of the medial wall of the cavernous sinus was achieved by the use of a biodegradable sponge coated with thrombin and fibrinogen. Endonasal packing was not necessary.

Postoperative course

Postoperative MRI demonstrated no residual tumour (Figure 3) and the patient’s symptoms of diplopia underwent near-complete restitution. Histologic findings were typical for a cavernoma with abundant flat endothelial

Figure 1 Preoperative imaging. Contrast enhanced T1-TOF axial (left) and T2 coronal (right) magnetic resonance imaging sequences.

Figure 2 Endoscopic view of the medial cavernous sinus after bone removal. Cavernoma (C), sellar floor (SF), carotid (CP) and optic (OP) protuberances are visible.

Figure 3 Postoperative imaging. Contrast enhanced T1-TOF axial (left) and T2 coronal (right) magnetic resonance imaging sequences.

Figure 4 Hematoxylin and eosin stain showing large blood-filled endothelial vacuoles (left), and immunohistochemical staining with anti-CD31 antibody showing marked positivity (right).
cells surrounding large blood-filled vacuoles, and highly positive in CD31 immunohistochemical staining (Figure 4).

**Conclusion**

A transnasal, transetmoidal/transsphenoidal endoscopic resection of lesions in the cavernous sinus can be a feasible and safe treatment option. Careful preoperative evaluation of imaging regarding the extension of the lesion towards the intracavernous contents, that is, the cranial nerves and the ICA, as well as the neighbouring structures, such as the pituitary gland and the optic pathway, is mandatory to prevent possible complications.

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**References**


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