

Case Report

Endoscopic endonasal removal of a cavernous hemangioma of the orbital apex

Marco Locatelli, Giorgio Carrabba, Claudio Guastella¹, Sergio M. Gaini, Diego SpagnoliDepartments of Neurosurgery and ¹Otorhinolaryngology, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, University of Milano, Via Francesco Sforza 35, Milano 20122, ItalyE-mail: Marco Locatelli - marco.locatelli@policlinico.mi.it; *Giorgio Carrabba - giorgio.carrabba@policlinico.mi.it; Claudio Guastella - claudio.guastella@fastwebnet.it; Sergio M. Gaini - sergiomaria.gaini@unimi.it; Diego Spagnoli - dspagnoli@libero.it

*Corresponding author

Received: 7 November 11

Accepted: 18 April 11

Published: 28 April 11

This article may be cited as:Locatelli M, Carrabba G, Guastella C, Gaini SM, Spagnoli D. Endoscopic endonasal removal of a cavernous hemangioma of the orbital apex. *Surg Neurol Int* 2011;2:58.Available FREE in open access from: <http://www.surgicalneurologyint.com/text.asp?2011/2/1/58/80123>

Copyright: © 2011 Locatelli M. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract**Background:** Cavernous hemangioma are the most common benign lesions of the orbit. Their surgical resection is still challenging and several surgical approaches have been proposed.**Case Description:** We present the case of a 59-year-old woman with a cavernous hemangioma of the orbital apex, which was diagnosed incidentally. The hemangioma was extraconal and involved mainly the medial orbital apex; it also extended to the pterygoid fossa, to the middle fossa, to the maxillary and sphenoid sinuses. The surgical resection was performed by a pure endoscopic transphenoidal, transmaxillary, transethmoidal approach, achieving a total removal. The patient had a transient and incomplete paresis of the VI cranial nerve on the left side and did not experience other postoperative complications.**Conclusion:** The endoscopic endonasal approach proved successful in the management of this case and it should be considered in the surgical management of extraconal orbital apex lesions with medial or inferior extension.**Key Words:** Endoscopic resection, hemangioma, minimally invasive, orbit, transethmoidal, transmaxillary, transphenoidal**Access this article online****Website:**
www.surgicalneurologyint.com**DOI:**
10.4103/2152-7806.80123**Quick Response Code:****INTRODUCTION**

Cavernous hemangiomas are the most common benign orbital masses and they are the second most frequent cause of unilateral proptosis.^[4] Like other orbital masses, cavernous hemangiomas can be responsible of various visual disturbances, even if they often present with nonspecific signs and symptoms.^[4]

The posterior orbit contains a number of important and vulnerable structures and because of its complex anatomy,

many different surgical approaches to this region have been proposed.^[1,9] In recent years, the endoscopic transphenoidal approach to the sellar and parasellar areas has gained popularity because of its good results with reduced morbidity and invasiveness.^[2]

In this paper, we report the case of a 59-year-old female with a large extraconal lesion of the medial orbital apex which could be completely resected through a pure endoscopic transphenoidal, transmaxillary, transethmoidal approach.

CASE REPORT

A 59-year-old female was admitted to our department with the incidental finding of an orbital lesion. The lesion was discovered performing a craniofacial CT scan for nocturnal snoring. Interestingly, the patient had presented some episodes of left orbital pain associated with conjunctival chemosis but had never looked for medical attention regarding these symptoms.

The neurological examination was negative; the visual field examination and the test of Lancaster were normal.

A contrasted MRI scan showed a lesion with the involvement of the inferior and medial wall of the left orbit [Figure 1]. The lesion presented a hyperintense signal in T2 and FATSAT sequences and homogeneously enhanced after gadolinium injection on delayed sequences. Notably, the foramen rotundum appeared to be slightly enlarged; thus, the radiological hypothesis was a schwannoma of the second trigeminal branch. A cerebral angiogram showed that the left ophthalmic artery originated directly from the middle meningeal artery by an anastomosis with the lacrimal artery but no pathological blushes were evident.

Surgical procedure

The patient was operated by a pure endoscopic endonasal transphenoidal, transmaxillary, transethmoidal approach [Video 1]. A 0° optic with an 18 cm rigid endoscope (Karl Storz Endoskope®, Tuttlingen, Germany) and neuronavigation system (BrainLab®, Munich, Germany) with CT/MR fused imaging were used. The patient was supine with the head in a neutral position. A nasal septoplasty was performed by the ENT surgeon for a deviation of the nasal septum and to increase the surgical maneuverability of the instruments. Then, uncinectomy,

exeresis of the ethmoidal bulla, and antrostomy were performed in sequence obtaining a wide exposure of the posterior part of the maxillary sinus. A standard bimanual binostrial technique was then adopted with the endoscope held by one of the surgeons and the surgical instruments by the other.

The tumor became visible after the partial removal of the lamina papyracea and exposure of the periorbit by drilling with a high-speed electric drill (Microspeed, Aesculap®, Center Valley, PA) the infero-medial and posterior wall of the left maxillary sinus and the pterygoid process. Neuronavigation confirmed the anatomical landmarks.

The tumor capsule was initially cut from the maxillary to the sphenoid sinus and then dissected from the Tenone's capsule. A well-defined plane between the tumor and next anatomical structures was not always recognizable. Intraoperative pathological examination was positive for the cavernous hemangioma. The tumor was removed using bipolar coagulation and by piecemeal technique. During the removal of a large fragment, profuse bleeding from a drainage vein and probably the cavernous sinus was controlled with hemostatic agents (Spongostan, Ethicon®, Somerville, NJ; Floseal, Baxter® Deerfield, IL). The remaining part of the lesion was finally removed obtaining a total removal.

The cavity previously occupied by the hemangioma was partially filled up with fibrin glue.

Finally, a pedicled flap of the septal mucosa was rotated to the surgical field and two nasal splints were positioned on the septum.

After surgery, the patient presented mild and transient diplopia due to partial paralysis of the VI cranial nerve on the left side. A postoperative CT scan did not show surgical complications. The cavernous hemangioma was the definitive pathological diagnosis.

At 2-month follow-up, the patient neurologic examination was negative and a MRI of the orbit showed the complete removal of the tumor; in particular, no lesions of the left optic nerve and ocular muscles could be demonstrated [Figure 2].

DISCUSSION

Cavernous hemangiomas are vascular lesions which could be defined as well-circumscribed hamartomas consisting of irregular thick- and thin-walled sinusoidal vascular channels.^[3] They are supposed to be low-flow vascular lesions and to increase in size by repeated bleedings.^[3] They are the most common benign, primary intra-orbital neoplasms and like other orbital masses, cavernous hemangiomas can cause different visual disturbances which are strictly dependent on their size and position inside the orbit.^[3,4]

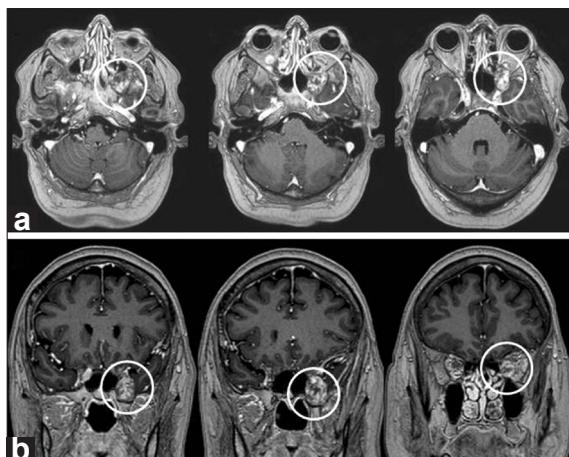


Figure 1: Contrast-enhanced (a) axial and (b) coronal MRI scans showing a lesion (white circle) involving the left orbital apex and located medial to the optic nerve. The lesion also involves the pterygoid fossa, the middle fossa, the maxillary sinus and the sphenoid sinus



Figure 2: Postoperative (a) contrast-enhanced axial T1 scan and (b) without contrast coronal T1 scan confirming the total removal of the orbital apex lesion. Note the nasal septal flap used for the reconstruction of the medial orbital wall

We present the case of a 59-year-old female with a large cavernous hemangioma which occupied the posterior and medial part of the orbit and involved the pterygoid fossa, the middle fossa, the maxillary sinus, and the sphenoid sinus [Figure 1].

The posterior orbit contains essential structures such as the optic nerve, the ophthalmic artery and vein, and the ocular muscles and their nerves which make the surgical removal of orbital lesions in this location extremely challenging. Several craniofacial approaches have been described to reach lesions inside the orbit; these include the lateral orbitotomy, the transconjunctival approach, the supraorbital approach, and the pterional craniotomy.^[9] Briefly, the lateral orbitotomy or the transconjunctival approach is usually indicated for small lesions located laterally or on the base of the orbit. The supraorbital approach allows the resection of lesions located dorsolaterally in the orbit, but similarly to the lateral orbitotomy, it can have a significant cosmetic impact on the patient. The transcranial approaches, such as the pterional, permit the resection of larger lesions even located medially to the optic nerve. Nevertheless, these approaches are more invasive and can bring neurological complications related to brain retraction or other neurosurgical nuances (e.g., intracranial hematomas).

Recently, transnasal endoscopic approaches to the sellar and parasellar region have gained an increasing popularity.^[2,6,7] An evolution of this kind of surgery is represented by the so-called extended or expanded endonasal endoscopic approaches to the skull base.^[2,6,7] The technical improvements and increasing experience are bringing the region of the orbit to be considered a further logical “extension” of this surgical strategy.^[8] Karaki *et al.* have in fact already reported the removal

of an intraconal orbital apex hemangioma using an endoscopic transthemoidal approach.^[5]

In our paper, we present the removal of a large extraconal lesion in the posterior orbit by a pure endoscopic transphenoidal, transmaxillary, transthemoidal approach. The position and the size of the tumor were two relevant parameters which determined our surgical strategy. In fact, an endonasal route could be advantageous considering the medial position of the lesion with respect to the neural and vascular structures of the orbital apex. As a matter of fact, in this way the lesion was approached before encountering the optic nerve and its vascular supply which were beyond the lesion and thus were not manipulated. The absence of vascular blushes at the angiography was another reason in favor of the endoscopic endonasal approach. The surgical operation was carried out without major problems and this minimally invasive approach permitted the total removal of the cavernous hemangioma [Figure 2].

CONCLUSIONS

The lack of neurovascular retraction, the absence of skin incision, and the short hospital stay make the transphenoidal, transmaxillary, transthemoidal endoscopic approach a promising strategy for orbital apex lesions located medially to the optic nerve.

A larger series of patients and long-term follow-ups are required to compare outcomes and complications of this minimally invasive approach to classical approaches.

REFERENCES

1. Brusati R, Goisis M, Biglioli F, Guareschi M, Nucci P, Gianni AB, *et al.* Surgical approaches to cavernous haemangiomas of the orbit. *Br J Oral Maxillofac Surg* 2007;45:457-62.
2. Cappabianca P, Cavallo LM, Esposito F, De Divitiis O, Messina A, De Divitiis E. Extended endoscopic endonasal approach to the midline skull base: The evolving role of transphenoidal surgery. *Adv Tech Stand Neurosurg* 2008;33:151-99.
3. Hejazi N, Classen R, Hassler W. Orbital and cerebral cavernomas: Comparison of clinical, neuroimaging, and neuropathological features. *Neurosurg Rev* 1999;22:28-33.
4. Herter T, Bennefeld H, Brandt M. Orbital cavernous hemangiomas. *Neurosurg Rev* 1988;11:143-7.
5. Karaki M, Kobayashi R, Mori N. Removal of an orbital apex hemangioma using an endoscopic transthemoidal approach: Technical note. *Neurosurgery* 2006;59 Suppl 1:ONSE159-60.
6. Kassam A, Snyderman CH, Mintz A, Gardner P, Carrau RL. Expanded endonasal approach: The rostrocaudal axis. Part I. Crista galli to the sella turcica. *Neurosurg Focus* 2005;19:E3.
7. Kassam A, Snyderman CH, Mintz A, Gardner P, Carrau RL. Expanded endonasal approach: The rostrocaudal axis. Part II. Posterior clinoids to the foramen magnum. *Neurosurg Focus* 2005;19:E4.
8. Kennedy DW, Goodstein ML, Miller NR, Zinreich SJ. Endoscopic transnasal orbital decompression. *Arch Otolaryngol Head Neck Surg* 1990;116:275-82.
9. Schick U, Dott U, Hassler W. Surgical treatment of orbital cavernomas. *Surg Neurol* 2003;60:234-44.