

Minimally invasive surgery of orbital apex

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The common pathologies of orbital apex include bacterial and fungal infections such as invasive rhino-orbital mucormycosis, aspergillosis, sarcoidosis, Sjögren's syndrome, granulomatosis with polyangiitis, idiopathic orbital inflammation, and orbital tumors [1]. The surgical approach for orbital tumors must provide the optimal visualization and maximum safety, especially to the highly vulnerable optic nerve. Endoscopic surgery has offered a less invasive and more precise approach to the medial and inferior orbital apex, without crossing the optic nerve. A review of the literature found that few studies report on a purely endoscopic approach for managing apical lesions.

We present a case series of orbital apex lesions managed purely by the transnasal endoscopic approach. From 2011 to 2015, four patients with inferomedial orbital apex lesions were treated by the endoscopic transnasal approach. All presented with visual acuity deterioration. Complete removal was performed in the two patients with hemangioma and partial removal in one with schwannoma (who had previously undergone a biopsy via external orbitotomy). A biopsy was performed in the patient who presented with bilateral orbital apex inflammatory process. Overall visual acuity improved or remained stable in two patients and decreased in the other two.

We demonstrated that a complete removal of orbital apex tumors could be completed using just a transnasal endoscopic technique. The lack of neurovascular retraction and the absence of skin

incision makes the transnasal endoscopic procedure preferable for inferomedial apical lesions. Nevertheless, vision impairment after the procedure can take place, as seen in two patients who developed vision deterioration. Without the procedure, the patients would have lost their vision entirely due to the disease. No other complications were noted during the 1–8 years of follow-up observations.

In a retrospective chart review, Murchison et al. [2] showed that in three endoscopic orbital apex surgery cases in which intraoperative posterior nasal septectomy was used, the procedure improved visualization and surgical access to the orbital apex and the periorbital skull base. There were no complications noted in these cases. Stokken et al. [3] retrospectively reviewed 18 patients with primary orbital apex lesions and 9 patients with sinonasal lesions predominantly involving the medial orbital apex.

All of the cases were performed endoscopically.

Based on our results and the studies presented here, we believe that the transnasal approach is a valuable tool for surgeons who are experienced with the endoscopic technique.

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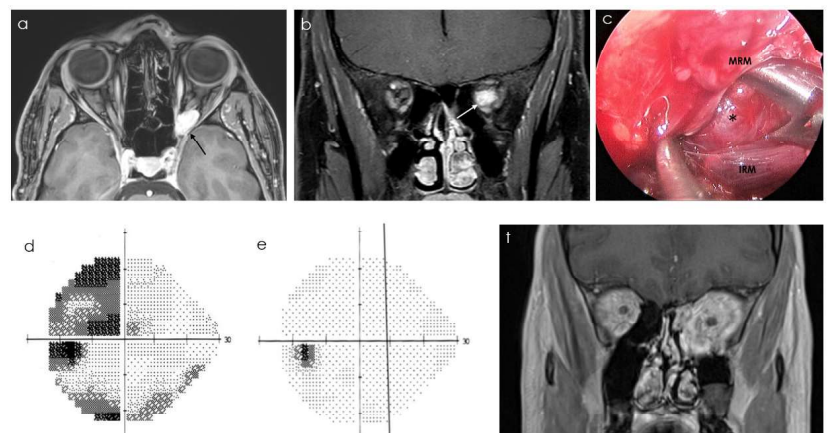
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Figure 1. A patient with left orbital apex cavernous hemangioma



[A] Preoperative MRI, axial T1 sequence with gadolinium: black arrow is pointed to the tumor; **[B]** Preoperative MRI, coronal T1 sequence with gadolinium: white arrow is pointed to the tumor; **[C]** Intraoperative endoscopic view: asterisk shows the tumor; **[D]** Preoperative computerized visual field (grey scale) of the patient's left eye showing visual field defect; **[E]** Postoperative computerized visual field of the patient's left eye showing significant improvement; **[F]** Postoperative MRI, coronal T1 sequence with gadolinium, showing orbital fat prolapse into the adjacent paranasal sinuses

IRM = inferior rectus muscle, MRM = medial rectus muscle, MRI = magnetic resonance imaging