

# Endoscopic Endonasal Management of Orbital Pathologies



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## KEYWORDS

• Endoscopic assisted • Endonasal approach • Skull base • Orbit • Optic nerve • Paranasal sinuses

## KEY POINTS

- Endoscopic endonasal techniques are able to reach the medial orbital structures as well as the orbital apex region without skin incision and brain retraction.
- The endoscopic endonasal management of orbital pathologic conditions may include the complete removal of the lesion or only a tissue sampling for diagnostic purposes.
- The lateral limit of the transnasal approach is represented by the course of the optic nerve that must not be crossed.
- Endonasal approaches can be used in combination with superior/inferior eyelid approaches to manage complex lesions involving the orbit, the superior/inferior orbital fissure, and the anterior/middle skull base (multiportal surgery).

## INTRODUCTION

External approaches to the orbit are well established, including transconjunctival, transcranial, or lateral orbitotomies, depending on the localization of the lesion. Among these, orbitozygomatic craniotomy is generally used for lesions that extend intracranially and into the orbit and is used for exposure of the optic nerve and canal.<sup>1</sup>

The transnasal endoscopic route, initially developed for treating inflammatory sinus disease, has emerged in the last decades as a minimally invasive corridor to approach adjacent anatomic areas such as ventral skull base, orbit, and orbital apex regions.<sup>2</sup> What is paramount for the application of endoscopic transnasal approaches to the

orbit is the close anatomic relationship between the paranasal sinuses and the orbital content, summarized in the concept of sino-orbito-cranial interface.<sup>3</sup> In this respect, endoscopic visualization from the transnasal route has provided surgeons the possibility of reaching the medial orbital structures as well as the orbital apex region without skin incision, major bony work, or brain retraction.

Given these facts, endoscopic endonasal orbital and optic nerve decompressions have become accepted treatments for thyroid eye disease<sup>4</sup> and traumatic optic neuropathy that is unresponsive to steroids.<sup>5</sup> The endoscopic endonasal technique is widely used as well for ophthalmologic procedures such as drainage of subperiosteal abscesses and dacryocystorhinostomy. Recently, some

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studies concerning the endoscopic endonasal biopsy, debulking, or even radical resection of tumors involving the orbit also have been reported, expanding the indications for such endonasal approaches.<sup>6,7</sup> Herein are described the anatomic principles, indications, technical nuances, and limitations of the endoscopic endonasal approaches for the management of selected orbital pathologic conditions.

## INDICATIONS AND CONTRAINDICATIONS

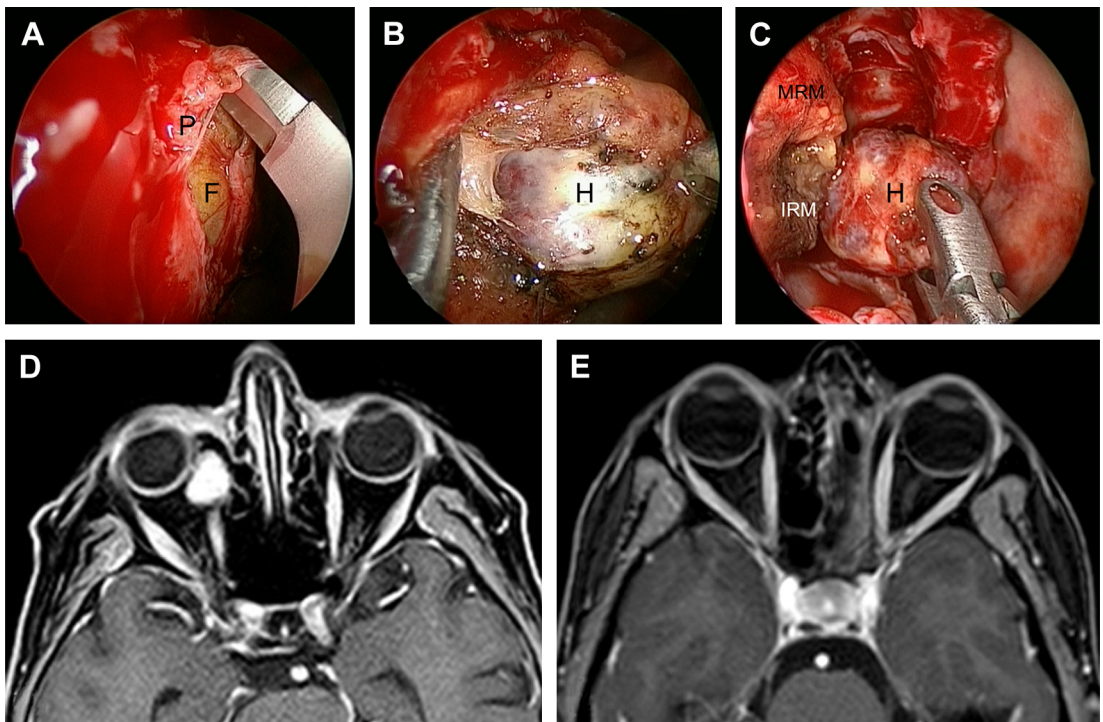
Endoscopic endonasal technique allows reaching adequately the medial compartments (**Fig. 1**). The lateral limit of the transnasal approach is represented by the course of the optic nerve that must not be crossed. Thus, tumors that are localized to the superior and lateral compartments of the orbit are contraindicated for a pure endoscopic endonasal approach.<sup>8</sup> When dealing with orbital lesions, the intents of surgery can be not only the radical removal but also the partial removal (to decompress the orbit), the drainage of the mass (in the case of cyst, abscess, or hematoma), or the tissue sampling for diagnostic purposes. The current indications and contraindications for this minimally invasive approach are detailed in **Table 1**.

## SURGICAL TECHNIQUE

### *Preoperative Planning*

Nasal endoscopy is useful to explore the sinonasal spaces in close relation with the orbit that will be approached transnasally. Ophthalmologic evaluation (including visual acuity, pupillary reactions, visual fields, ocular motility, and color discrimination) and cranial nerves function examination are important as well to assess the preoperative conditions.

Radiological studies with computed tomographic (CT) scan and contrast-enhanced MRI are mandatory for the evaluation of the sino-orbito-cranial interface. Probably the coronal views are the most important perspective to analyze when dealing with intraorbital lesions. Radiological examinations allow the precise evaluation of the site, size, and extent of the lesions and in some cases can provide preoperative diagnosis. Imaging scans give information on anatomic details (Onodi cell pneumatization, anterior and posterior ethmoidal arteries position, supraorbital cell pneumatization, position of the lesion in respect to extraocular muscles, and optic nerve course) that can influence the surgical procedure. Based on patients' features, evolution of the disease, and its radiological appearance, surgery has to be planned with diagnostic or curative intent.



**Fig. 1.** Endoscopic endonasal resection of an extraconal cavernous hemangioma inferomedially placed in the orbit. (A) Periorbit incision; (B) hemangioma dissection from intraorbital fat and muscles; (C) transnasal removal of the lesion; (D) preoperative contrast-enhanced MRI; (E) postoperative contrast-enhanced MRI. F, intraorbital fat; H, hemangioma; P, periorbit.

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