

How I do it: direct transnasal endoscopic posterior ethmoidectomy with the intact bulla technique

Reda Kamel^a, Hesham Mansour^b

Departments of ^aRhinology, ^bENT, Cairo University, Cairo, Egypt

Correspondence to Reda Kamel,
87 Manial Street, Manial, Cairo 11451, Egypt
Mobile: 002 01222137172
e-mail: rhinology@redakamel.com and
rkamel55@hotmail.com

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In lesions affecting both anterior and posterior ethmoids where surgery is indicated, total ethmoidectomy as part of functional endoscopic sinus surgery is the state of the art. In solo posterior ethmoid lesions, there is still controversy in terms of the most direct and least destructive approach. In these cases, it is not justified to disturb the integrity of the bulla ethmoidalis and/or the middle turbinate. In this article, a novel approach to the posterior ethmoid is presented that does not disrupt the integrity of the ostiomeatal complex.

Keywords:

endoscopic, ethmoidectomy transnasal, posterior ethmoids

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Introduction

The anterior and posterior ethmoid sinuses are embryologically distinct structures that are separated by the basal lamella of the middle turbinate [1].

Chronic rhinosinusitis is unlikely to be present in the posterior ethmoids without anterior ethmoid disease. However, the posterior ethmoids may be the source of polypoid disease or benign and malignant neoplasms [2].

Functional endoscopic sinus surgery is now a well-established technique for the treatment of rhinosinusitis that does not respond to medical treatment [3].

A minimally invasive sinus technique uses an anatomically based approach that preserves the mucosa and turbinate tissue, leaves the primary birth ostia undisturbed, and decreases operative morbidity. Surgery is tailored according to the extent of disease [4].

The aim of this work is to present a novel technique to approach the posterior ethmoids while preserving the anatomical configuration and physiological integrity of the ostiomeatal complex area.

Technique

This technique is indicated in solo posterior ethmoid sinus disease (Fig. 1). The nasal cavity and middle meatus are decongested with 1:1000 adrenaline-soaked cotton pledgets. Using a 0° endoscope, the middle turbinate is gently displaced medially to expose the bulla ethmoidalis medial wall (Fig. 2). The suction tip is placed between the middle turbinate and the bulla ethmoidalis to proceed and hit the basal lamella (Fig. 3). The retrobullar recess is usually identified in between the posterior wall of the bulla ethmoidalis and the basal lamella. The coronally

oriented vertical basal lamella is penetrated at its inferior and medial aspect just superior to the horizontally oriented third part of the middle turbinate and posterior to the sagittally oriented first part (Fig. 4). This is a direct passage into the posterior ethmoids. The opening of the basal lamella is then widened carefully laterally and superiorly, using the straight mushroom forceps, toward the lamina papyracea and fovea ethmoidalis, respectively. The posterior ethmoid air cells are then cleared and the pathology is then removed (Fig. 5). Care is exercised to clear the corner between the yellow lamina papyracea laterally, the white fovea ethmoidalis superiorly, and the bulging blue anterior wall of the sphenoid sinus posteriorly. The superior turbinate is an important landmark and should be carefully identified and preserved.

Discussion

Surgical procedures for ethmoidectomy involve intranasal (including endoscopic), transantral, and external approaches. The external approach requires an external incision. Optic nerve damage and diplopia can occur from a trochlear injury [5].

Jansen first described the transantral approach to the ethmoid labyrinth at the end of the 19th century. Horgan described his technique in 1926 [6].

The efficacy of functional endoscopic sinus surgery in the treatment of chronic rhinosinusitis and nasal polyps has been well established and the results reported are excellent [7].

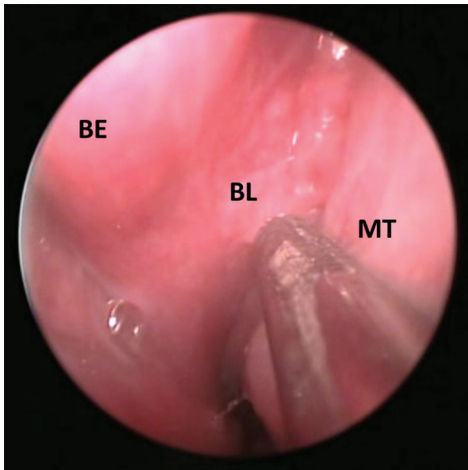
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Figure 1



Computed tomographic scan showing isolated right posterior ethmoiditis.

Figure 3

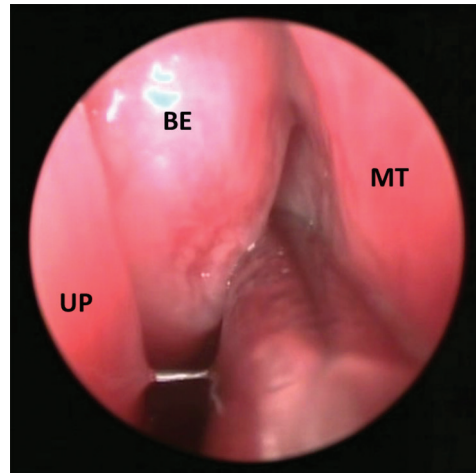


The suction tip points to the inferior and medial aspect of the basal lamella (BL) between the middle turbinate (MT) and the bulla ethmoidalis (BE).

Two techniques were introduced in the 1980s: one introduced by Messerklinger and Stammberger, who used the anterior-to-posterior approach, and the other developed by Wigand, who performed posterior-to-anterior dissection [8,9].

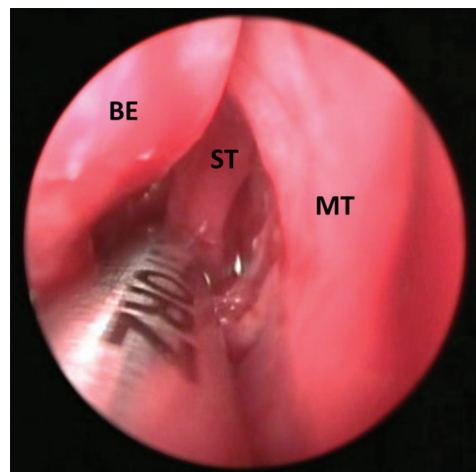
In the anterior-to-posterior approach, the surgery begins with an anterior ethmoidectomy and is extended posteriorly depending on the diseased sinuses. In the majority of cases, especially in chronic rhinosinusitis with polyps, both the anterior and the posterior ethmoids are affected by the disease. In such cases, the posterior ethmoid is easily and directly approached through the basal lamella after removal of the diseased bulla ethmoidalis [8]. Adhesions of the middle turbinate to the lateral nasal wall occur relatively frequently after endoscopic sinus surgery [10].

Figure 2



The middle turbinate (MT) is gently medialized to expose the bulla ethmoidalis (BE). The suction tip is directed to the basal lamella (middle coronal third of MT) behind the BE. UP, uncinate process.

Figure 4



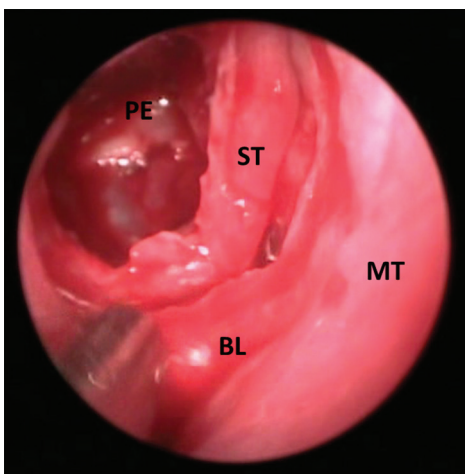
The coronally oriented vertical basal lamella of the middle turbinate (MT) is penetrated at its inferior and medial aspect. The superior turbinate (ST) could be visualized through the wide window created in the basal lamella. Bulla ethmoidalis (BE) sagittally oriented first part of the MT.

The posterior-to-anterior technique involves resection of the middle turbinate, cannulation of the sphenoid ostium, or removal of the anterior wall of the sphenoid sinus, and total ethmoidectomy beginning from posterior [11].

The disadvantage of this procedure is that a patient with limited or isolated sinus disease has to undergo surgery of the entirety of the sphenoid, ethmoid, and maxillary sinus. Also, there is a high possibility of middle turbinate damage and/or risk of development of postoperative adhesions.

In the combined approach to the paranasal sinuses, ethmoidectomy is performed in two directions. The anteroposterior exenteration of the inferior two-thirds

Figure 5



The posterior ethmoid (PE) cavity after removal of the polyps and suction of the pus. BL, rim of the basal lamella; MT, middle turbinate; ST, superior turbinate.

of ethmoid cells directs the procedure away from the skull base and permits termination of the dissection at the basal lamella of the middle turbinate or the face of the sphenoid. The residual superior cells are removed in a retrograde manner using an angled endoscope [12].

When only the posterior ethmoid is affected by the disease, for example, posterior ethmoiditis (Fig. 5), polyps, mucopyocele, inverted papilloma, or others, there is still considerable controversy on the best approach for treatment. The best approach is the most direct and least destructive, and treatment of the disease effectively and safely. The authors believe that in such solo posterior ethmoid lesions, there is no justification to disrupt the integrity of the healthy bulla ethmoidalis, with possible postoperative ostiomeatal complex adhesions and blockage and/or middle turbinate subluxation with the use of the anterior approach.

Also, there is no justification to disrupt the middle and superior turbinates and/or the sphenoid sinus with the use of the posterior approach.

The posterior ethmoid may be approached directly between the middle and the superior turbinates. However, this approach does not offer sufficient space or access, even with angled telescopes, to handle the diseases effectively and safely.

For solo posterior ethmoid lesions, direct transnasal endoscopic posterior ethmoidectomy with an intact bulla technique is suggested as a safe, direct, and effective technique. In this technique, the middle turbinate and bulla ethmoidalis are preserved, avoiding postoperative ostiomeatal complex adhesions and blockage. There is a wide access to posterior ethmoid

air cells and good landmarks, namely, the skull base, orbital apex, and the sphenoid sinus anterior wall.

The limitations of this technique include too large middle turbinate or huge bulla ethmoidalis. In such cases, shaving of the lateral aspect of the middle turbinate and/or partial resection of the medial aspect of bulla ethmoidalis is performed. In case of absent retrobullar recess, resection of the posterior wall of the bulla is performed with the basal lamella. In case of a sphenothmoidal cell (Onodi cell), more care is needed.

However, possible orbital and/or cranial complications should be kept in mind and in case of failure to achieve complete exposure and removal of the disease, one should be ready to perform a complete anterior and posterior ethmoidectomy.

- (1) In solo posterior ethmoid lesions, it is not justified to disrupt the integrity of the bulla ethmoidalis and/or the middle turbinate.
- (2) A novel approach to the posterior ethmoid is presented without disrupting the integrity of the ostiomeatal complex.

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Conflicts of interest

There are no conflicts of interest.

References

- 1 Schaefer SD, Li JCL, Chan EK, Wu ZB, Branovan DI. Combined anterior-to-posterior and posterior-to-anterior approach to paranasal sinus surgery: an update. *Laryngoscope* 2006; 116:509–513.
- 2 Kizhner V, Setzen M, Krespi YP. Transantral balloon dilation plus posterior ethmoidectomy. *Laryngoscope* 2011; 121:1108–1111.
- 3 Eweiss AZ, Ibrahim AA, Khalil HS. The safe gate to the posterior paranasal sinuses: reassessing the role of the superior turbinate. *Eur Arch Otorhinolaryngol* 2012; 269:1451–1456.
- 4 Catalano PJ, Strouch M. The minimally invasive sinus technique: theory and practice. *Otolaryngol Clin N Am* 2004; 37:401–409.
- 5 Kimmelman CP, Weisman RA, Osguthorpe JD, Kay SL. The efficacy and safety of transantral ethmoidectomy. *Laryngoscope* 1988; 98:1178–1182.
- 6 Horgan JB. The surgical approach to the ethmoidal cell system. *J Laryngol Otol* 1926; 41:510–521.
- 7 Ye J, Yu H, Draf W, Zheng C, Wang D. Technique and results of the anterior-to-posterior-to-anterior approach in revision endoscopic sinus surgery. *ORL J Otorhinolaryngol Relat Spec* 2009; 71:257–262.
- 8 Stammberger H. Endoscopic endonasal surgery-concepts in the treatment of recurring rhinosinusitis: part II. Surgical technique. *Otolaryngol Head Neck Surg* 1986; 94:147–156.
- 9 Draf W, Weber R. Endonasal micro-endoscopic pansinusoperation in chronic sinusitis I. indications and operation technique. *Am J Otolaryngol* 1993; 14:394–398.
- 10 May M, Levine HL, Master SJ, Schaitkin B. Complications of endoscopic sinus surgery: analysis of 2108 patients-incidence and prevention. *Laryngoscope* 1994; 104:1080–1083.
- 11 Lawson W. The intranasal ethmoidectomy: an experience with 1077 procedures. *Laryngoscope* 1991; 101:367–371.
- 12 Schaefer SD. An anatomic approach to endoscopic intranasal ethmoidectomy. *Laryngoscope* 1998; 108:1628–1634.