

# Role of bi-portal endoscopic approach to frontal sinus in managing frontal sinus diseases

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## Background

In spite of recent evolution of endoscopic frontal sinus surgery, some cases are still challenging due to the difficulty to reach the lateral frontal sinus even with Draf type III. This study aims to highlight the bi-portal approach to the frontal sinus disease.

## Materials and methods

This study is a prospective study that was conducted on four patients with mean age of 56 years. Two cases were presented with allergic fungal sinusitis, one case showed an inverted papilloma and a single case of granulomatous fungal sinusitis. All patients underwent bi-portal surgery which entailed endoscopic frontal sinus surgery either Draf IIb or III plus as an external approach through the upper eyelid.

## Results

Complete removal of the disease with no major postoperative complications, with no detection of recurrence during the 12–30-month-follow-up period.

## Conclusion

Bi-portal frontal sinus approach is an easy noninjurious technique with very little cosmetic drawbacks allowing rhinologists to access the whole aspects of the frontal sinus, especially the lateral part.

## Keywords:

bi-portal, endoscopic, eyelid, frontal sinus

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## Introduction

Frontal sinus surgeries have been recently upgraded from open trephine or osteoblastic flap surgeries to endoscopic transnasal surgery due to modern advances in sinus endoscopy with angled view and specific instruments for frontal sinus surgery. This evolution aimed to decrease cosmetic troubles and shorten the postsurgery recovery time [1–3]. Unfortunately, there are still some situations that need more exposure to avoid leaving a residual disease; such situations include mucopyocele and inverted papilloma and fungal sinusitis or other lateral frontal sinus disease. Approach to the lateral frontal sinus still presents a challenge even with the Draf III approach [4].

## Aim

We have tried in this study to highlight the bi-portal approach to the frontal sinus surgery. We have elucidated the surgical techniques with summarizations of its benefits and its role to expand the role of the endoscopic approach to frontal sinus.

## Materials and methods

This study has been approved by ethical committee of ENT department. This study is a prospective

study conducted on four female patients aged from 48 to 63 years presented with frontal sinus disease at Otolaryngology Department of Cairo University, Egypt, between 2016 and 2019. All patients were subjected to computed tomography scan on the frontal sinus with coronal, axial, and sagittal views. Also, all patients were asked to sign a written informed consent (Fig. 1).

All patients underwent bi-portal endoscopic frontal sinus surgery for unilateral frontal sinus disease. This technique includes two parts.

The first part is the endoscopic transnasal frontal sinus surgery which entailed medialization of the middle turbinate and ethmoidectomy, followed by Draf IIb in three patients and Draf III in a single patient. Draf IIb includes opening the frontal sinus between the lamina papyracea laterally and the septum medially [5]. On the other hand, the Draf III technique includes an additional step which removal of the interfrontal sinus bony septae [5].

The second part is an external approach through the upper eyelid, steps started with infiltration of saline/

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adrenaline 1: 200 000 concentration and a horizontal incision parallel to the lid skin crease was made using scalpel size 11 just lateral to the mid-pupillary line for a length of 10–15 mm; a self-retained retractor was applied; dissection was carried out parallel and superior to muscle fibers to reach the periosteum with preserving the supraorbital artery and nerve. The periosteum was incised and the bone was drilled to reach the frontal sinus. Then the frontal sinus remnant lesion or disease was removed using endoscopy and instruments through this port. After finishing the periosteum was closed using Vicryl 3-0 and the skin was closed by Prolene 5-0 Fig. 2.

**Results**

We have carried out four cases by the bi-portal frontal sinus approach shown Table 1. Two cases had allergic fungal sinusitis: one of them was a recurrent case, the third patient had an inverted papilloma, and the fourth one had chronic granulomatous fungal sinusitis. All patients have shown no short-term or delayed complications apart from mild local edema and mild ptosis just for few days which was improved by medical treatment. We have followed up the patients by endoscopic examination weekly and by computed tomography scan after 6 months and 1 year postoperatively with no clear disease recurrence (Fig. 3, 4 and Table 1).

**Discussion**

Kennedy *et al.* [6] had concluded that endoscopic frontal sinus surgery failed to reach superior and lateral

lesions of the frontal sinus in a study published in 1989 which entailed performing an endoscopic frontal sinus surgery for cases of frontal mucoceles.

Draf and Weber have published a modern concept regarding endoscopic approaches to the frontal sinus in 2001. These approaches include removal of mucosal disease of the ostium (Draf type I) and removal of frontal sinus floor from lamina papyracea to the middle turbinate (Draf type IIa) and removal of frontal sinus floor from the lamina papyracea to the nasal septum including removal of the middle turbinate (Draf type IIb) and resection of the frontal sinus floor on both sides with interfrontal septectomy (Draf type III), thereby giving an access to the lateral frontal sinus [5]. However, when the frontal sinus disease is beyond the endoscopic operative field an external open approach is required if the lesion requires complete removal.

Batra *et al.* [7] have reported the ‘above and down’ procedures in 2005, above means the external trephine approach and below means endoscopic endonasal technique. They applied this technique on 22 cases with a variety of pathologies (mucocele-frontal sinus-inverted papilloma-osteoma-fibrous dysplasia). Knipe *et al.* [8] have reported a combination of endoscopic frontal sinus surgery and transblepharoplasty approach to eradicate frontal sinus disease. They applied their study on five cases of mucoceles, two of those patients showed recurrence after 5 months.

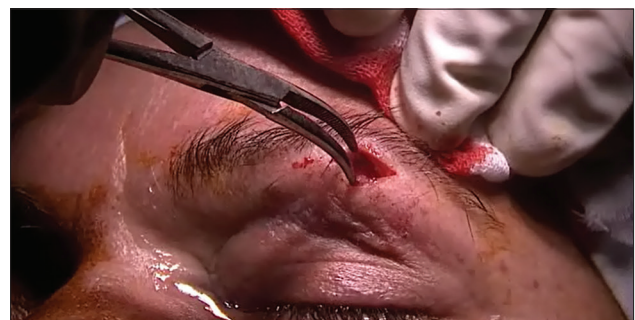
In this study, we performed four cases of ‘bi-portal endoscopic’ approach with a mean age of 56 years having allergic fungal sinusitis, inverted papilloma, and

**Figure 1**



Preoperative computed tomography scan of the patient.

**Figure 2**



Incision of the external port.

**Table 1 Details of this study cases**

	Case 1	Case 2	Case 3	Case 4
Sex	Female	Female	Female	Female
Age	64	55	48	52
Pathology	Recurrent allergic fungal sinusitis	Allergic fungal sinusitis	Inverted papilloma	Granulomatous fungal sinusitis
Types of Draf	Draf IIb	Draf IIb	Draf III	Draf IIb
Complications	No	No	No	No
Follow-up	30 months	22 months	17 months	1 year

granulomatous fungal sinusitis. On the other hand, a study by Kopelovich *et al.* [9] have published the same surgical approaches for three patients with a mean age of 61 years and had mucocoeles and inverted papilloma. Four cases of inverted papilloma have been surgically operated by the same technique by Albathi *et al.* [10]. They reported successful removal of the disease and no recurrence after a follow-up period of 7–53 months.

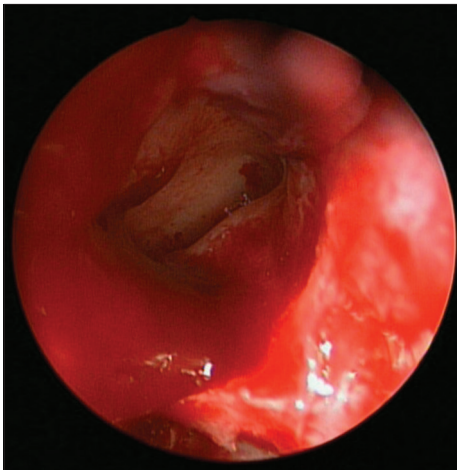
Another study by Makary *et al.* [11] have been conducted on seven cases with the same pathological entity like the Kopelovich study; both studies had declared the success of this combined approach to achieve extended access to the lateral frontal sinus which helped in the eradication of the disease. Hicks *et al.* [12] have published a case report that entailed a single female patient with frontal osteoblastoma with

second mucocoele; They carried out the same technique with additional removal of some orbital roof bone to achieve complete removal of the lesion. We have collected the data of different similar previous studies in Table 2.

**Conclusion**

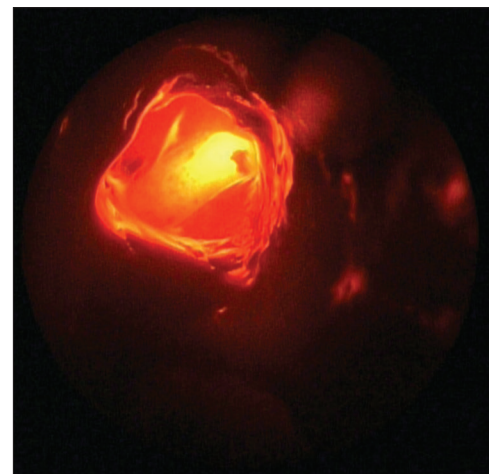
However, this study’s limitation is the lack of large number of cases with more pathological entities, but we can declare that bi-portal frontal sinus approach is an easy minimally invasive technique with very little cosmetic drawbacks allowing rhinologists to access the whole aspects of the frontal sinus especially the lateral part helping entire removal of the frontal sinus disease when compared to endoscopic approach only which

**Figure 3**



Frontal sinus endoscopic view through the external port.

**Figure 4**



Transillumination of the frontal sinus after removing the pathology, an external port view.

**Table 2 Comparison between different studies**

References	Number of cases	Mean age	Pathology	Achievement	Follow-up time	Major complications
Current study	4	56	Allergic fungal sinusitis Inverted papilloma Granulomatous fungal sinusitis	Successful removal of the disease	12-30 months	None
Batra <i>et al.</i> [7]	22	49	Mucocoeles  Frontal sinusitis Inverted papilloma Osteoma Fibrous dysplasia	Successful removal of the disease	Mean 16 months	None
Knipe <i>et al.</i> [8]	5	N/A	Mucocoeles	Two cases showed recurrence	5 months	None
Kopelovich <i>et al.</i> [9]	3	61	Mucocoeles  Inverted papilloma	Successful removal of the disease	10-16 months	None
Albathi <i>et al.</i> [10]	4	64	Inverted papilloma	Successful removal of the disease	7-53 months	None
Makary <i>et al.</i> [11]	7	60	Mucocoeles  Inverted papilloma	One mucocoele case showed recurrence	7-67 months	None
Hicks <i>et al.</i> [12]	1	N/A	Osteoblastoma with mucocoele	Successful removal of the disease	1 year	None

N/A, not available.

sometimes has limited access to lateral part of the sinus and also when compared to the old osteoplastic flap technique alone which resulting in serious cosmetic troubles.

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Nil.

**Conflicts of interest**

There are no conflicts of interest.

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