

# Application of Transnasal endoscopic prelacrimal recess approach to the maxillary sinus in Recurrent Antrochoanal Polyp. A long Term Follow up Review

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**Background & Aim of the work:** Antrochoanal polyps (ACPs) are polypoidal benign lesions arising from the maxillary antrum mucosa, extending through the sinus ostium into the nasal cavity. Endoscopic sinus surgery with middle meatal antrostomy has become the most popular approach in ACP treatment. This approach, a minimally invasive and effective method, provides complete removal with negligible complications. The transnasal prelacrimal recess approach is a novel surgical technique for the treatment of sinonasal tumors. This approach provides an extended surgical view and allows direct access to the maxillary sinus to resect tumor, and therefore reduces recurrence. The aim of this work is to evaluate the long term surgical outcomes and possible complications of prelacrimal recess approach for treatment of antrochoanal polyps.

**Patients and Methods:** In this work, 30 patients with recurrent antrochoanal polyp underwent surgery with a transnasal endoscopic prelacrimal recess approach, were included in our study. The approach is evaluated for the ability to visualise the origin of the polyp in the maxillary cavity, complications and the long term follow up for the rate of recurrence.

**Results:** Transnasal prelacrimal recess approach was successful in 86.67% of the patients (26/30), as 4 patients were successfully treated with wide endoscopic middle meatal antrostomy. 23.3% of patients (7/30) suffered from postoperative epiphora, 13.3% (4/30) suffered from epistaxis, 16.7% of them (5/30) had cheek edema, and 10% of patients (3/30) suffered from synechia formation between the lateral nasal wall and septum. 2 patients (6.67%) had temporary cheek numbness which improved within 3 months. None of them had nasal obstruction or nasal stenosis postoperatively, all of them had the flap healed and all of them had the inferior turbinate preserved. During the long follow-up period (18 months) no recurrence had developed.

**Conclusion:** After a long term follow up, transnasal endoscopic prelacrimal recess approach was found to be safe and effective surgical procedure for treatment of recurrent antrochoanal polyp, which allows for complete exposure and removal of the antral part of the polyps to prevent recurrence without major complications.

**Keywords:** Prelacrimal Recess Approach, Antrochoanal Polyp, Recurrent ACP.

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## Introduction

Antrochoanal polyps (ACPs) are polypoidal benign lesions arising from the maxillary sinus antrum and they extend into the nasal cavity. ACPs usually have two components and these are the cystic and solid polypoidal parts. [1]

They most commonly occur in children and young adults, and they are almost always unilateral. The etiopathogenesis of ACPs is unclear, yet. Nasal obstruction and nasal discharge are the most common presenting symptoms. Nasal endoscopy and CT are the main diagnostic techniques. [2]

The treatment in ACPs is essentially surgical, simple polypectomy alone or combined with open surgical techniques, Caldwell Luc procedure were the previously preferred methods for surgically treating ACPs. In recent years, endoscopic sinus surgery (ESS) became the more preferred surgical procedure. [3]

Endoscopic sinus surgery with middle meatal antrostomy has become the most widespread approach in ACP treatment. This approach, a minimally invasive and effective method,

provides complete removal with insignificant complications. [4]

Enlargement maxillary ostium is a common procedure to remove antrochoanal polyps. However, postoperative recurrence was reported to be relatively high. [5]

So, traditional endoscopic sinus surgery approaches alone may not be enough because of the inaccessibility to the stalk of the polyp in the sinus wall and narrow intranasal structures (nasal cavity, ostia, and middle meatus). The recurrence rate with simple polypectomy is high. To decrease recurrence of ACP, the maxillary stalk of the polyp should be resected. [6]

The transnasal endoscopic prelacrimal recess approach is an innovative technique for the treatment of sinonasal lesions. This approach provides a wide and clear surgical exposure and allows for easy access to the maxillary sinus antrum to resect neoplasm and adjacent structures together, and therefore minimizes recurrence. [7]

Prelacrimal recess is a concavity in the medial, anterosuperior

part of the maxillary sinus. It is located in front of the eminence of the lacrimal passages on the medial wall of maxillary sinus. [8]

Transnasal prelacrimal recess approach allowed complete removal of the antral part of the antrochoanal polyp tissue without traditional open surgical techniques. [9]

**Aim of the study:** The aim of this work is to evaluate the long term surgical outcomes and possible complications of transnasal endoscopic prelacrimal recess approach for treatment of recurrent antrochoanal polyps.

## Patients and Methods

### Patients

This is a prospective study conducted on 30 patients presented to Beni Suef University Hospital outpatient clinic diagnosed to have antrochoanal polyp during the period from February 2016 to June 2018.

### The inclusion criteria were:

1. Patients aged above 12 years and below 70 years old.
2. Recurrent cases of Antrochoanal Polyp.

### Exclusion criteria were:

1. Patients aged below 12 years or above 70 years old.
2. Patients with uncontrolled systemic diseases or coagulopathy.
3. Patients with sinonasal polyposis.

## Methods

### Preoperatively all patients were subjected to:

1. Full history taking and Otorhinolaryngol examination including nasal endoscopy.
2. Computed tomography scan for nose and paranasal sinuses coronal and axial views. The distance from anterior maxillary wall to the nasolacrimal bony canal (the width of lacrimal recess) was measured, at the level of the inferior turbinate attachment to the lateral wall of the nasal cavity to assess the favorable anatomical condition for Transnasal prelacrimal recess approach.

### Surgical technique

- All patients were underwent previous surgery under general anesthesia. Maxillary antrotomy had been performed.
- The operation was done under hypotensive general anesthesia using transnasal endoscopy. The nasal cavity was decongested using cottonoids soaked with adrenaline 1/10000 solution for 10 to 15 minutes. A solution of xylocaine and adrenaline 1/200,000 was used to infiltrate the lateral nasal wall, middle turbinate and inferior turbinate.
- Visualization was facilitated by the use of 0° and 30° rod lens endoscopes attached to a high definition camera and monitor (Storz Endoscopy, Germany).
- The choanal part of the polyp that was extending from the maxillary sinus to the choana and nasopharynx was resected through the nasal cavity. The previously performed middle meatal antrotomy was widened. Then, transnasal endoscopic prelacrimal recess approach was performed to give endoscopic view and to handle the origin inside the maxillary sinus.
- Saline with xylocaine and adrenaline was injected along a vertical line anterior to the inferior turbinate. A c-shaped incision was made with a scalpel no. 15 in the mucosa of the lateral wall along the anterior margin of the inferior turbinate. The mucoperiosteal flap of the lateral nasal wall was separated from the medial maxillary wall bone.
- After elevation of the mucoperiosteal flap the prelacrimal recess was drilled out using a cutting burr which is used

to create a window in the most anterior part of the medial wall of maxilla, then the nasolacrimal duct was recognized.

- A 0 degree nasal endoscope was introduced through the created prelacrimal window to visualize all walls of the maxillary sinus cavity and to recognize the origin of the antrochoanal polyp.
- Manipulation of the origin of the antrochoanal polyp was done through the prelacrimal window in case we cannot remove it through the middle meatal antrotomy. After clearing the area of polyp origin, the mucoperiosteal flap over the lateral nasal wall was repositioned and maintained with Merocel nasal tampon medially.

### Postoperative care and follow up

Nasal pack was removed after one day. Postoperatively all patients received oral broad spectrum antibiotics for 7 days, alkaline nasal wash for at least one month. All patients were subjected to complete Otorhinolaryngeal examination after 1 week of surgery and then every week for one month then every month for 18 months. Postoperative follow up was done for 18 months including nasal endoscopy and CT scans.

## Result

### I. Patients' characteristics:

Patients' ages ranged from 14 years to 55 years with mean age  $\pm$  SD was  $37.57 \pm 9.3$  years. Regarding gender, (30%) were males, and (70%) were females. Most (53.33%) of patients had Lt-sided affection, and (10%) had deviated septum to the same side.

### II. Clinical presentation:

Regarding clinical presentation, all patients had unilateral nasal obstruction and rhinorrhea, (90%) had snoring and (60%) had headache. The duration of operations ranged from 40 minutes to 60 minutes. The mean time  $\pm$ SD =  $52.1 \pm 6.4$ .

### III. Findings during the operation:

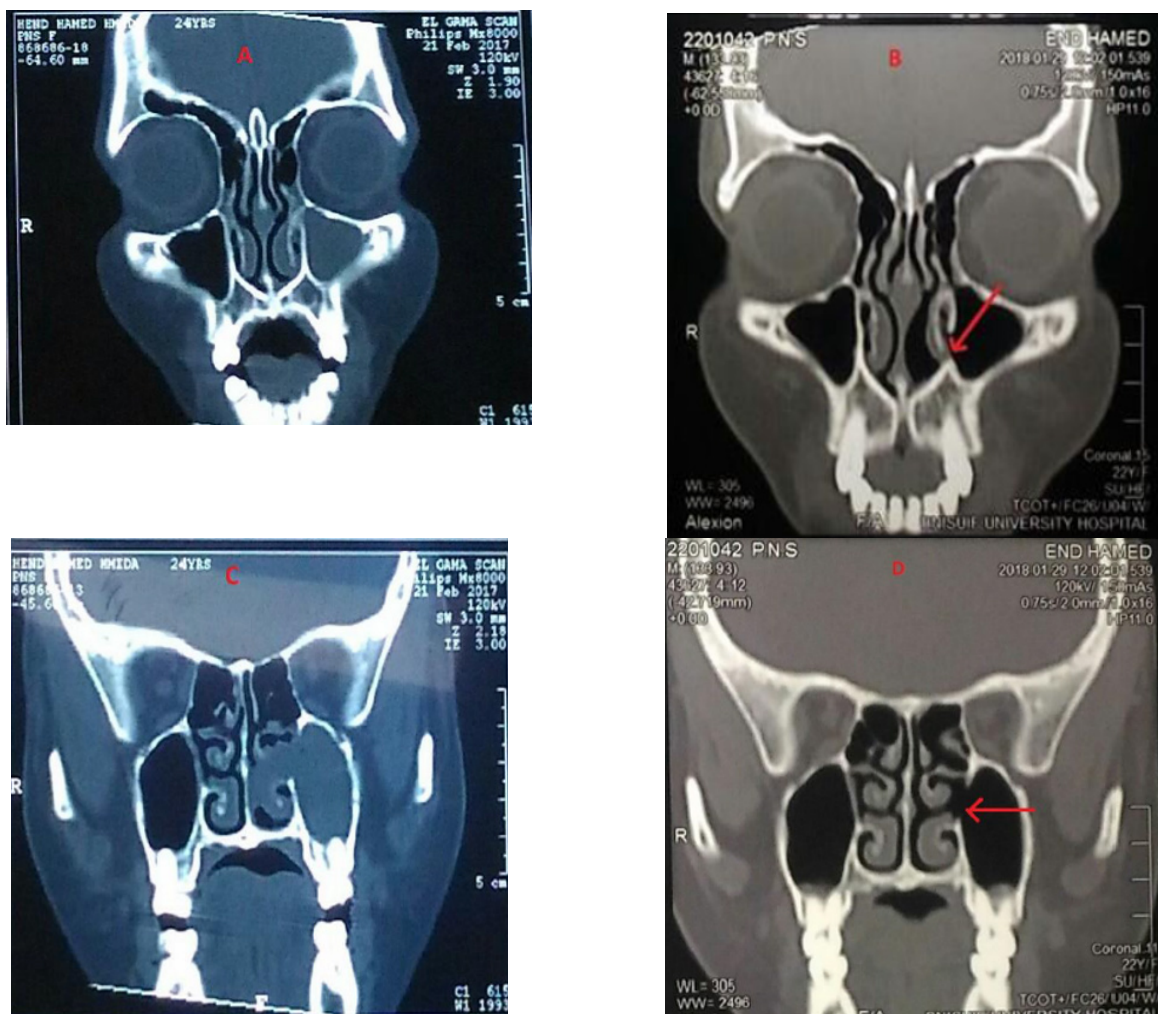
Regarding site of protrusion of the polyp, (65%) had natural ostium, (35%) had accessory ostia. Regarding origin within the maxillary sinus, (13.33%) were at posterior wall, (56.67%) were at inferior wall, and (30%) were at lateral wall.

Middle meatal antrotomy succeeded to remove the polyp completely in 4 patients only (13.33%). In the other 26 patients (86.67%), residual tissues of the polyp were founded within the maxillary sinus and the transnasal prelacrimal recess approach succeeded to remove it completely.

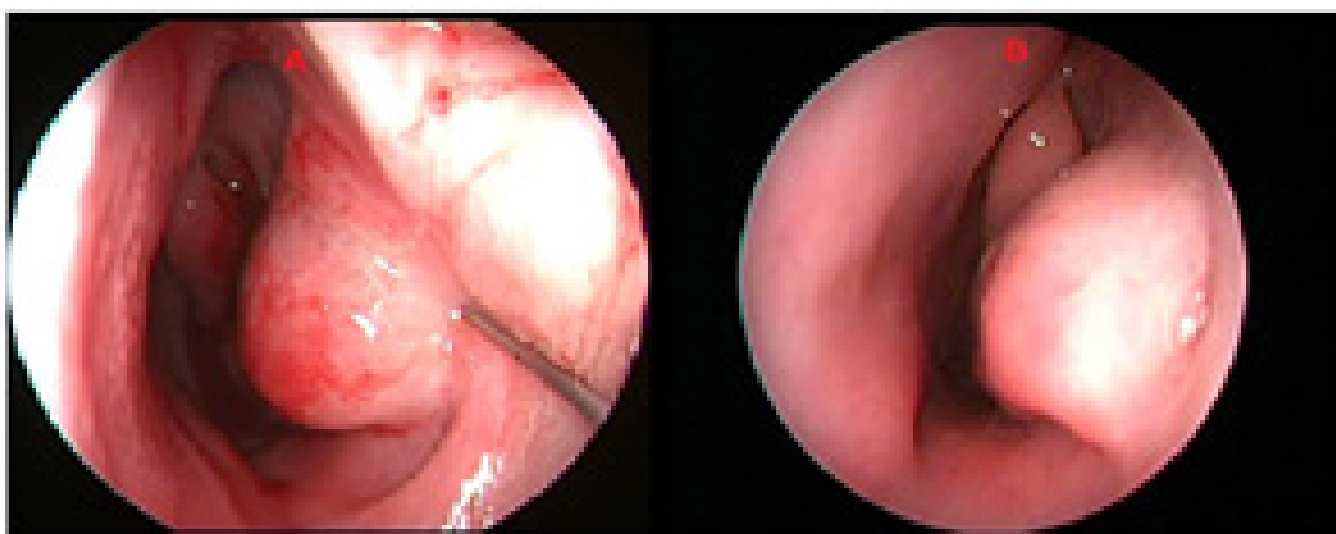
### IV. Post-operative complications:

Regarding post-operative complications, during the early postoperative follow up period, 7 patients (23.33%) had temporary epiphora that resolved within 10 days without treatment and all patients had crustations which all fall within one month with the use of alkaline nasal wash. 4 patients (13.33%) had postoperative epistaxis, and only 5 patients (16.67%) had temporary cheek edema. 3 patients (10%) developed synechia formation between the lateral nasal wall and septum. 2 patients (6.67%) had temporary cheek numbness which improved within 3 months postoperatively. **(Table 1).**

No patient developed recurrence during the long term follow up period which was for 18 months **(Table 1).**



**Fig 1: A, C. Preoperative CT (same patient).  
 B. Postoperative CT (The red arrow shows the site of the prelacrimal approach).  
 D. Postoperative CT (The red arrow shows the site of middle meatal antrostomy) (same patient).**



**Fig 2: A. Preoperative picture of the inferior turbinate.  
 B. postoperative picture of the healed flap.**

**Table 1: Post-operative complications**

Variable	Frequency	Percent
Epiphora	7	23.33%
Epistaxis	4	13.33%
Cheek edema	5	16.67%
Synechia	3	10%
Cheek Numbness	2	6.67%
Delayed healing of the flap	0	0%
Nasal stenosis	0	0%
Synechia	3	10%
Nasal obstruction	0	0%

## Discussion

Antrochoanal polyps (ACPs) are polypoidal benign lesions arising from the maxillary antrum mucosa extending through the sinus ostium into the nasal cavity. They represent about 4-6% of all intranasal polyps in the general population. Antrochoanal polyps are almost always unilateral, although there are few cases of bilateral ACPs in the literature. [2]

The management of this disease is essentially surgical. The Caldwell-Luc operation has been practiced for nearly 100 years. The Caldwell-Luc approach offers good visualization and ensures complete removal of the polyp and the associated antral mucosa. However, the Caldwell-Luc operation may have possible adverse effects including cheek anesthesia, cheek swelling and carries risks to the developing teeth in children. [9]

Endoscopic sinus surgery with middle meatal antrostomy has become the most popular approach in ACP treatment. This approach, a minimally invasive and effective method, provides complete resection with insignificant complications. [4]

However, endoscopic sinus surgery alone may be inadequate because of the unreachability to the stalk of the polyp in the maxillary antrum and narrow intranasal structures (as nasal cavity, ostia, and middle meatus). To prevent recurrence of ACP, the maxillary stalk of the polyp should be removed. [6]

To prevent recurrence, some authors used transnasal endoscopic sinus surgery joined with other approaches as transcanine, mini Caldwell- Luc, wide Middle Meatal Antrostomy and Modified Medial Maxillectomy, as these combined approaches allow better visualization of the maxillary sinus and accordingly complete resection of the antral part of the polyp. However, these combined approaches cannot avoid the previously mentioned complications of the traditional open techniques. [11]

The prelacrimal recess approach is an innovative surgical technique for the treatment of sinonasal neoplasms. This approach provides a wide and clear surgical view and allows easy access to the maxillary antrum to remove neoplasms and adjacent structures together, and therefore reduces recurrence. [12]

This study was developed to evaluate the long term surgical outcomes and possible complications of transnasal endoscopic prelacrimal recess approach for treatment of recurrent antrochoanal polyps.

In our study middle meatal antrostomy succeeded to completely remove the antral portion of the polyps from only

4 cases (13.33). In 26 cases (86.67%) residual part of the polyp was found in the maxillary sinus after middle meatal antrostomy. The transnasal endoscopic prelacrimal recess approach allowed good visualization of the maxillary antrum with complete removal of the antral part of these polyps. 13.33% of the polyps (4 patients) were found originating from the posterior wall of the maxillary sinus, 56.67% from inferior wall (17 patients) and 30% from lateral wall (9 patients).

This agrees with the results of the study of Comoglu and co-workers in 2016 where the transnasal endoscopic prelacrimal recess approach was successful in 83% of the patients (10/12) and 17% of the polyps (2/12) were resected using the middle meatal antrostomy. The antral part of the antrochoanal polyps was found to be located anteromedial in 16.6%, anterolateral in 33.3%, lateral in 25%, and in the posterior wall of the maxillary sinus in 16.6% of all polyps. [9]

In our study only 20 % of cases (4/20) had short-term epiphora, 15% had postoperative epistaxis and 10% had cheek edema. None of them had nasal obstruction, nasal stenosis or adhesions. The flap healed completely in all patients and the inferior turbinate was preserved.

Also, in the study of Comoglu and co-workers in 2016, no cases encountered epiphora postoperatively. 25% of patients (3/12) had synechia formation between the lateral nasal wall and septum just superior to the inferior turbinate. One of them needed surgical treatment under local anesthesia. They did not find any other complication with the prelacrimal approach. [9]

In the study of Zhou and co-workers in 2013 on 19 patients to assess the prelacrimal recess approach to the maxillary sinus, they found neither epiphora nor other postoperative complications. The mucosa healed well and inferior turbinate was preserved in all patients. [12]

In our study, the prelacrimal recess approach was successful in complete removal of the antral part of the polyp without traditional open surgical techniques. No recurrence occurred to any of the patients during the follow up period which was for one & half years.

In the study of Ozer and co-workers in 2008 on 42 patients with antrochoanal polyps. They performed FESS for 15 patients, transcanine sinuscopy combined with ESS for 14 patients and the Caldwell-Luc approach combined to ESS for 13 patients, they found recurrence in 3 patients after FESS alone, yet they found no recurrence after combined FESS and transcanine sinuscopy or the Caldwell Luc approach [10]. Also, in the study of Atighechi and colleagues in 2009 on 40 patients with antrochoanal polyps, 19 underwent an endoscopic endonasal surgery for removal of polyps, and the other 21 underwent endoscopic surgery with mini-Caldwell operation. Out of 19 cases in the ESS group, 4 had recurrences, while they had no recurrence in the mini-Caldwell group during the follow up period which was a minimum of 12 months with a mean of 29.2 months. [11]

In the study of Zhou and co-workers in 2013 on 17 patients with different pathologies in the maxillary sinus, they used the prelacrimal recess approach for their treatment. No recurrence was seen in 16 patients. Only one inverted papilloma patient had a local recurrence in the maxillary sinus. The follow-up ranged from 7 to 60 months. [12]

In the study of Comoglu and co-workers in 2016 on 12 patients with recurrent antrochoanal polyps, they found no

recurrence during the follow up period that ranged from 8 to 21 months. [9]

The limitations of our study are that: Children were excluded from this study, although the incidence and recurrence are higher in children. This is because safety of this novel approach and its effect on the maxillary sinus growth is not well researched.

Small sample size is also limitation of this study. Better assessment of the approach safety and efficacy to prevent recurrence could be achieved by more studies with larger sample size.

Finally, the prelacrimal recess is not a constant landmark as it may be absent in some people so these approaches cannot be generalized in all cases with antrochoanal polyps.

### Conclusion

In conclusion, the accurate identification of the origin of the antrochoanal polyp and a sufficient returning of maxillary sinus ventilation can inhibit recurrence.

Although endoscopic sinus surgery considered being the gold standard intervention for treatment of antrochoanal polyp, in cases of revision cases, a transnasal endoscopic prelacrimal recess approach could ensure complete excision of the polyp. Also, transnasal endoscopic prelacrimal recess approach is a safe procedure. It allows better accessibility and visualization of the maxillary sinus and accordingly gives better results in the prevention of recurrence of these polyps without use of traditional open techniques and without major postoperative complications.

We recommend for further studies with larger scale of patients including children for better assessment of the approach. Also, this approach needs to be studied for different pathologies of the maxillary sinus.

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