

*Research Article*

## Endoscopic Endonasal Sinus Surgery in Management of Antrochoanal Polyp

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### Abstract

**Purpose:** To evaluate the role Of Endoscopic Endonasal Sinus Surgery (EESS) in management of antrochoanal polyp. **Patients and methods:** This study was conducted at the ENT Department at Minia University Hospital and included 20 patients with antrochoanal polyps attending the E.N.T. outpatient clinic, between January 2016-October 2016. The patients underwent complete history and clinical examination, diagnostic endoscopy, radiological assessment of the lesion: CT scanning (coronal & axial views) and operative technique. The operative techniques were EESS in 11 cases (55%) and EESS plus partial inferior turbinectomy with septoplasty in 9 cases (45%). Endoscopic and radiological follow up ranging from 5 months to 12 months(variable periods). **Results:** In the current study, according to Salam and Cable<sup>[1]</sup> classification which used a graded suction tip For the measurement of ostial size (For maxillary sinus ostium) Our 20 patients were of (Grade 4)due to pressure of ACP on maxillary ostium but postoperative, they were (Grade 1) widely patent after large middle meatal antrostomy which helps in prevention of recurrence. **Conclusion:** Our data show that Endoscopic Endonasal Sinus Surgery with large middle meatal antrostomy is the ideal tool for management of antrochoanal polyp and helps in prevention of recurrence.

**Key words:** Antrochoanal polyp - Endoscopic Endonasal Sinus Surgery - Middle meatal antrostomy - Partial inferior turbinectomy - Septoplasty.

### Introduction

All antrochoanal polyps originated from the maxillary sinus arising from the posterior wall followed by the inferior wall, lateral wall, natural ostium, and medial wall in order of decreasing frequency<sup>[2]</sup>.

The etiology of the antrochoanal polyp is not well understood<sup>[3]</sup>.

The antrochoanal polyps different from chronic inflammation associated polyps of the maxillary sinus only in a few minor features; Slightly longer duration of the process, lower incidence of maxillary ostial nasal obstruction, presence of cyst in the polyp stroma, thickened basement membrane, lower incidence of squamous cell metaplasia, and higher proportion of migrating cells in nasal smears<sup>[4]</sup>.

Antrochoanal polyps are displayed on CT as soft tissue masses that fill and expand the maxillary antrum,pass without bone destruction through the natural or accessory maxillary ostium to the nasal fossa between the middle

turbinate and the lateral nasal wall and grow posteriorly until they reach the choana<sup>[5]</sup>.

The endoscopic approach for Killian polyps appears to be at least as effective as the alternative procedures ,endoscopic approaches are particularly suitable for recurrent cases also in children<sup>[6]</sup>.

Recently, powered instrumentation in endoscopic sinus surgery is increasingly used. Gendeh reported excellent outcomes and minimal morbidities by means of powered instrument dissection of antrochoanal polyps also combining transcanine approaches<sup>[7]</sup>.

### Patients and methods

This study was conducted at the ENT department at Minia University Hospital and included 20 patients with antrochoanal polyp who attended the E.N.T. outpatient clinic at the Hospital in the period from January 2016 to October 2016.

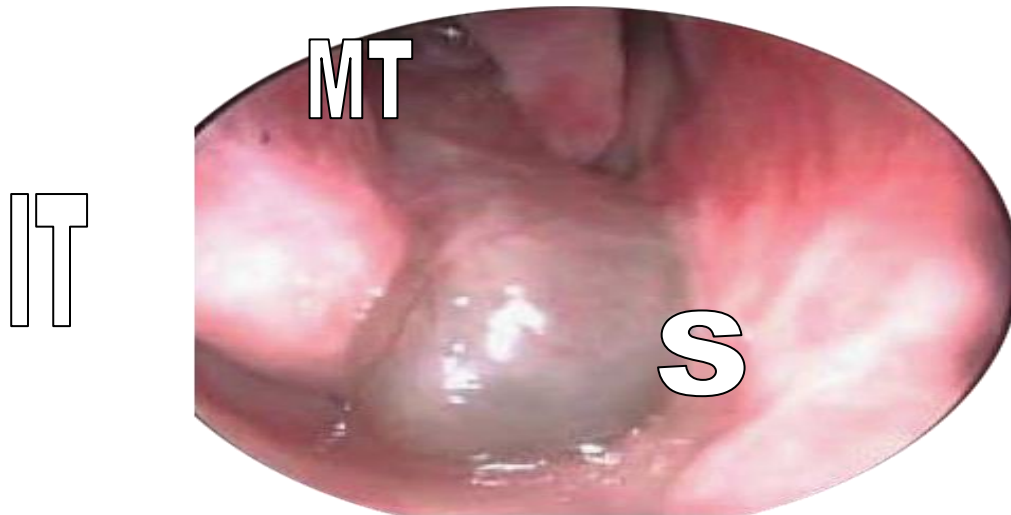
The studied twenty patients underwent the complete history and clinical examination, diagnostic endoscopy, radiological assessment of the lesion.

**Technique:**

operative technique and follow up ranging from 5 months to 12 months(variable periods). The diagnostic endoscopy used was the 4mm with 0 or 30 degree nasal endoscope (Karl

storz). In narrow nasal cavity and some hidden parts, 2.7mm telescope (Karl storz)was used . The inferior turbinate size was evaluated pre-operative and postoperative according to the grading system described by Yanez and Mora (without then with use of local nasal decongestant) [8].

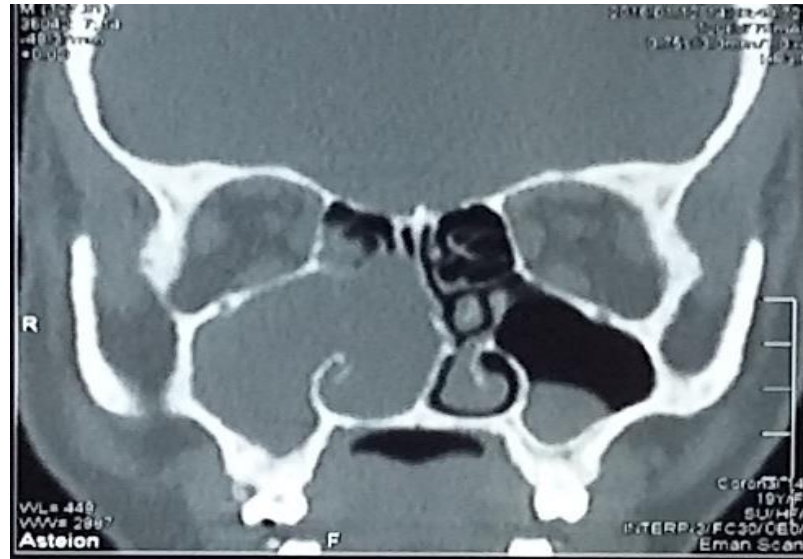
Pre operative endoscopic and radiological evaluation of antrochoanal polyp in fig. [1] [2] [3].



**Fig. (1): Pre-operative endoscopic view showing the polypoid nasal part of Rt.Acp extending to the Rt. Choana.(S=septum,IT=inferior turbinate,MT=middle turbinate)**



**Fig. (2): CT scan axial view showing opacification of right maxillary sinus by right Acp. extending to nasopharynx.**



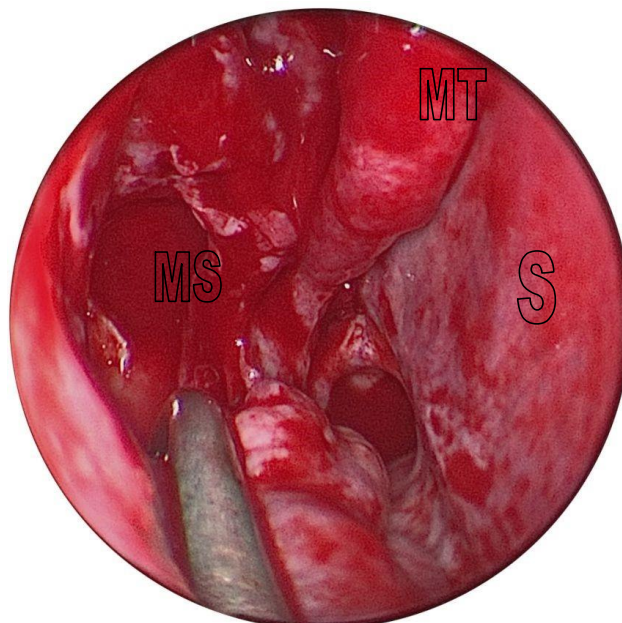
**Fig. (3):** CT scan coronal view showing opacification of right maxillary sinus and right nasal cavity by Acp.+deviated nasal septum to the left+hypertrophied left inferior turbinate .(NB.no bone erosion of the right maxillary sinus)

Endoscope was directed toward the middle meatus,this provided an excellent view of the nose and allowed recognition of anatomic or pathologic anomalies e.g deviated septum, change of mucosal coloration, width, patency of the nasal choana and side of polyp occupation.

All cases were subjected to endoscopic sinus surgery Messerklinger technique<sup>[9]</sup>.

A lateralized or paradoxically curved middle turbinate requires medialisation with a free elevator .

With observation through a 0 4-mm endoscope, the nasal component and the cystic antral part should be removed en bloc where possible. An uncinectomy and large middle meatal antrostomy are created using a sickle knife to access the maxillary portion.(fig.4)



**Fig. (4):** Immediate postoperative view showing wide middle meatal antrostomy with exploration of the posterolateral wall of maxillary sinus after complete removal of Acp (S= septum, MT= Middleturbinate & MS= Maxillary sinus)

If ethmoidectomy is required, it is easier to do it after polypectomy. Maintenance of ethmoidal bulla is helpful as a reminder of the junction of the medial and inferior orbital walls and may prevent inadvertent entry into the orbit during superior widening of the accessory ostium. The hemostasis was secured by putting ribbon gauze soaked in ephedrine (1:1000) packing and maintained by inserting a merocele nasal pack.

Follow up of our patients for variable periods ranging between 5-12 months and another postoperative CT scan is done after 4-6 months to detect if any recurrence occurs. Endoscopic examination of both middle meatus on both sides if it stenosed or not and the size of it and is classified according to Salam and Cable<sup>[1]</sup>.

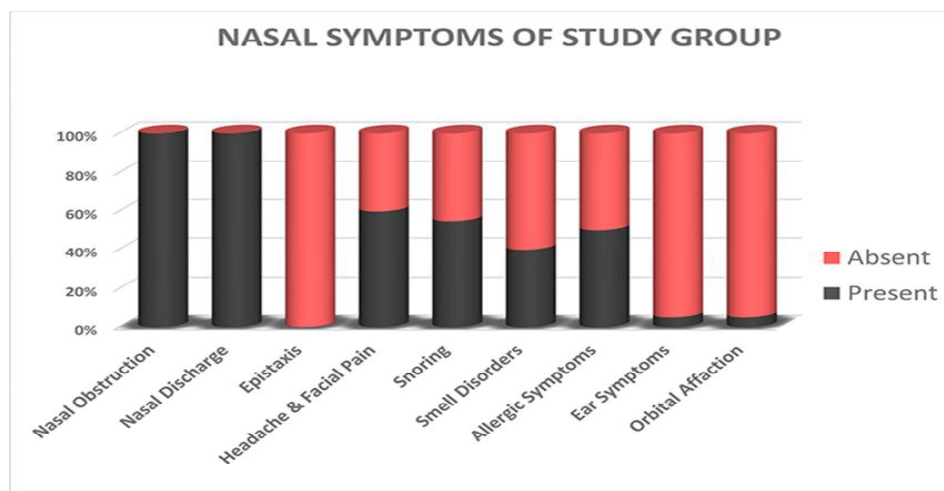
**Results**

Table (1) showing the personal characters of the study group.

**Table (1):** Personal characters of study group: (NO. of cases =20)

| Variable  |                    |          |
|---|--------------------|----------|
| <u>Age</u><br>Range<br>Mean ±SD                 | 12-39<br>22.9 ±7.8 |          |
|   | <b>No.</b>         | <b>%</b> |
| <u>Sex</u><br>Male<br>Female                    | 8<br>12            | 40<br>60 |
| <u>Family history</u><br>-ve<br>+ve             | 14<br>6            | 70<br>30 |
| <u>Past history of recurrence</u><br>-ve<br>+ve | 18<br>2            | 90<br>10 |
| <u>Habits</u><br>No<br>Smoker                   | 17<br>3            | 85<br>15 |

The nasal symptoms of the study group is shown in Fig (5)



**Fig. (5)** Nasal symptoms of the study group (N=20)

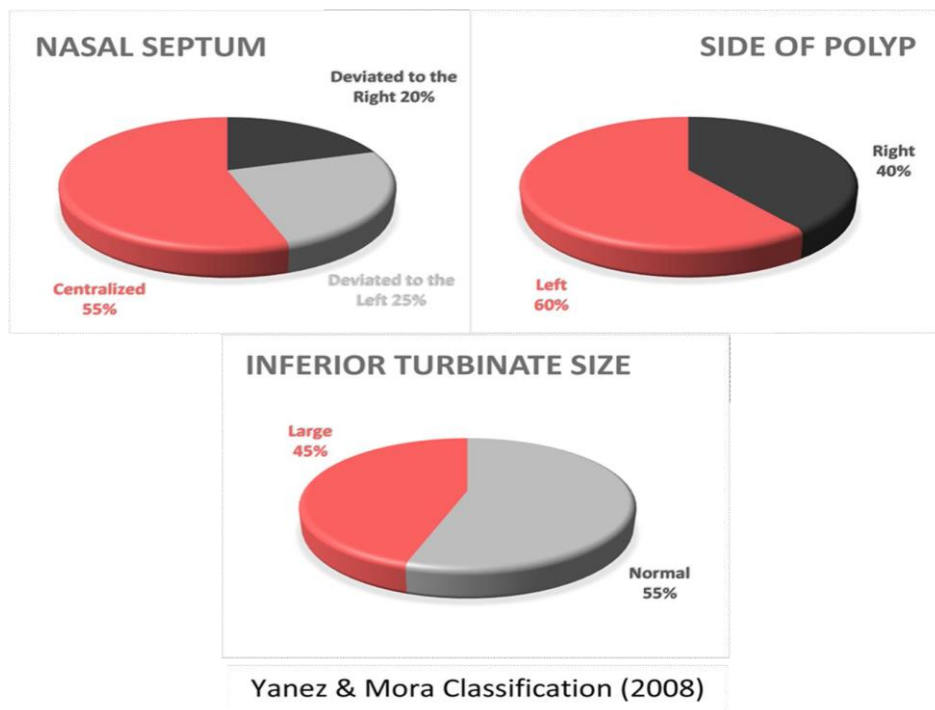
**Endoscopic Examination :**

It revealed a unilateral antral cystic mass in 20 patients(100%) (fig.6) with left side predominance was 12 patients (60%) noticed and right sided affection in 8 patients(40%).



**Fig. (6): ACP.consists of cystic antral part (CA), polypoidal nasal part (N) and nasopharyngeal extension (NP)**

The nasal septum was markedly deviated to right side in 4 cases (20%), to left side in 5 cases (25%) and centralized in 11 cases (55.%), so septoplasty was done in 9 patients associated with ESS.(Fig.7)



**Fig. (7): Endoscopic Examination.**

Table (2)

| Variable  | No.            | %   |
|---|----------------|-----|
| <u>Side</u>   |                |     |
| Rt  | 8              | 40  |
| Lt  | 12             | 60  |
| <u>Septum</u>   |                |     |
| Central   | 11             | 55  |
| Rt  | 4              | 20  |
| Lt  | 5              | 25  |
| <u>Inferior turbinate Size acc.to Yanez &amp; Mora (2008) Grade 1</u> | 11             | 55  |
| Grade 2   | 0              | 0   |
| Grade 3   | 9              | 45  |
| <u>Shape of polyp</u>   | All spherical  | 100 |
| <u>Color</u>  | All Gray white | 100 |
| <u>Mass</u>   |                |     |
| Cytic   | 0              | 0   |
| Polypoid  | 20             | 100 |
| <u>Discharge</u>  | All mucoid     | 100 |
| <u>Consistency</u>  | All soft       | 100 |
| <u>Mobility</u>   | All mobile     | 100 |

The radiological findings in the study group are shown in Table

Table (3): CT findings

| Variable                                | No. | %   |
|---|-----|-----|
| <u>Maxillary Sinus Opacity</u>          |     |     |
| Present                                 | 20  | 100 |
| Absent                                  | 0   | 0   |
| <u>Soft Mass</u>                        | 9   | 45  |
| <u>Choana in Nasopharynx</u>            | 11  | 55  |
| <u>Septum</u>                           |     |     |
| Central                                 | 11  | 55  |
| Rt.                                     | 4   | 20  |
| Lt.                                     | 5   | 25  |
| <u>Inferior turbinate size(grade 3)</u> | 9   | 45  |

#### Condition of MMA:

Nasal endoscopy is used to assess middle meatus condition by endoscopic examination of both middle meatus on both sides if it stenosed or not and the size of it and is classified

according to Salam and Cable classification which used a graded suction tip For the measurement of ostial size (For maxillary sinus ostium) and defined as follows:

**Grade 1:** widely patent (more than 8 mm).

- Grade 2:** patent (5 to 8 mm).
- Grade 3:** stenosed (less than 5 mm).
- Grade 4:** blocked by mucosal disease.

We considered an antrostomy as stenosed when its diameter was less than 5mm. Although an appropriate size for the antrostomy is not determined, this diameter is suggested by many

authors assessing antrostomy size as adequate.<sup>[1]&[10]</sup>.

Our patients were of (Grade 4) due to pressure of ACP on maxillary ostium but postoperative, they were (Grade 1) widely patent after large middle meatal antrostomy which helps in prevention of recurrence.

**Table (4):** Follow up

| Variable   | No. | % |
|--|-----|---|
| <b>Follow up</b><br><b>From Jan. to Oct. (nearly 10 months)</b><br><b>No recurrence 0%</b> | 0   | 0 |

This table shows that no recurrence of Antrochoanal polyp after wide MMA

**Discussion**

Endoscopically in our study, the cystic antral parts and polypoidal nasal part were encountered in all patients (100%), this result supported by Berg and his associates<sup>[11]</sup> who provided evidence that the ACP developed from an expanding intramural cyst protruding through the maxillary ostium into the nasal cavity. Thereafter, the cyst assumed a more polypoidal appearance. An obstructed osteomeatal unit might create a negative pressure difference that tried to evacuate the maxillary sinus mucosa.

Polypoid transformation occurred as the polyp entered the nasal environment; however as long as the meatus remain obstructed, forces remained which allowed further growth of ACP. However our results were against series of Kamel<sup>[12]</sup> who reported that the antral part of the polyp was cystic in only 5 patients and polypoid in 17 patients. There was controversy concerning the nature of the antral part of the polyp whether it was cystic or polypoid.<sup>[11],[12] and [13]</sup>

In Stammberger's study, the point of origin in the maxillary sinus was almost always from the posterior wall in the vicinity of the maxillo-ethmoidal angle. A second point of attachment was at the posterior inferior part of the exit ostium<sup>[14]</sup>.

The feature that distinguished ACP from other similar lesions is the long stalk which was attached to one of the antral walls. The stalk usually passed through a large accessory ostium in the posterior fontanelle, the membranous postromedial wall of the maxillary sinus<sup>[15]</sup>.

In our study, we could not distinguish whether it passed through the main or the accessory ostia due to inflamed tissues<sup>[16]</sup>.

Radiographically in our cases, the ipsilateral sinus antrum was opacified and a soft tissue mass could be seen extending through the medial wall of the sinus filling half of the nasal cavity and nasopharynx in 11 patients and stopped in choana in 9 patients. These results agree with<sup>[15],[16],[17],[18],[19] and [20]</sup>.

It was generally recommended that in order to avoid recurrence after polyp removal, the antral part of the polyp should be removed. There was controversy concerning the route of removal of the antral part.

Some studies recommended a combined approach (ESS and TS or ESS and CL) to diminish the recurrence rate after ACP removal. On the other hand, combination of ESS with mini-Caldwell left the physiology of the sinus intact as sinus ostium opened via uncinctomy and antrostomy<sup>[21]</sup>.

An inferior meatal naso-antral window had been advocated by *Ned*, didnot always allow sufficient exposure of the antral walls even after resection of the anterior half of inferior turbinate as modified by Ophir and Marshak<sup>[25]</sup>. Intranasal adhesions and troublesome hemorrhage were sometimes encountered<sup>[25],[26] and [27]</sup>.

In ESS, instrumentation by forceps and visualization with endoscopes were usually performed through the enlarged sinus ostium. The nasal component could easily be removed endoscopically. A maximal maxillary antrostomy allowed a full view of the sinus component and usually the stalk which had a variable location within the sinus. The usage of curved Blakesley's forceps, Hiwise forceps and combined transcanine and middle meatal antrostomy was made in difficult cases where the ACP was attached by the broad base to the antral mucosa or when it was attached in a difficult and inaccessible location such as the anterior or the inferior portion of the maxillary sinus<sup>[19],[22] and [23]</sup>.

Their technique allowed complete removal of the base of the ACP with preservation of the intact mucous membrane around the ACP origin without stripping the adjacent intact mucous membrane. 20 patients showed improvements in their endoscopic findings during the follow-up period; only two patients showed recurrence of an ACP with an overall improvement rate of 90.9%<sup>[19] and [23]</sup>.

Their study found no significant complications associated with this technique. Lee and Huang reported a success rate of 76.9% in ACPs managed by the transnasal endoscopic approach compared with 100% with the combined endoscopic and transcanine approach. Franche and his associates reported a recurrence rate of 6.9% in their 29 patients with ACP managed by the endoscopic transnasal approach<sup>[19],[28] and [29]</sup>.

Natasha and her colleagues<sup>[16]</sup> describe their endoscopic technique in some detail and report creating a large middle meatal antrostomy to remove the ACP and then removal of any mucosal remnant at the site of origin with angled endoscopes along with antral curettes and angled forceps<sup>[15],[16],[23] and [30]</sup>.

In our study, the nasal and antral part of ACP were removed endoscopically the same as previous studies we handled before. The antral part was removed via wide maxillary ostium. Although it was previously stated that the disease eliminated eventually by polypectomy combined with curettage of the antrum to remove almost all the diseased sinus mucosa<sup>[13],[22],[23] and [25]</sup>.

Using the endoscope and angled instruments in our study ensured complete removal of the polyp and any associated pathologic findings through the wide maxillary ostium and offered preservation of the healthy sinus mucosa. This result was in agreement with<sup>[12],[16],[20],[22] and [29]</sup>.

Among our patients, the nasal septum was markedly deviated to right side in 4 cases (20%), to left side in 5 cases (25%), so septoplasty was done in 9 patients associated with ESS, and the inferior turbinate size described by Yanez and Mora (was grade 3 large turbinate touching the septum) in 9 patients (45%), so endoscopic partial turbinectomy was done in 9 patients associated with ESS<sup>[8]</sup>.

During endoscopic removal of the ACP in our patients, excision of the uncinate process was done and connect natural maxillary ostium with accessory ostium (large middle meatal antrostomy) to ensure complete clearance of the sinus from any remnants to prevent recurrence. This was agree with by Stammberger's study (1991(c))<sup>[14]</sup> that showed the stalk of the polyp pass from the maxillary sinus through an accessory ostium in the posterior fontanelle<sup>[14],[19] and [22]</sup>.

It may not be necessary to remove the uncinate process in order to respect the polyp in Kamel series showed that the excision of the uncinate process was performed in only 7 patients and in his other patients, the uncinate process was atrophied most probably due to pressure atrophy by the polyp<sup>[12]</sup>.

The uncinate process when necessary should be resected in its entirety; residual process superiorly or inferiorly could contribute to stenosis of either the frontal recess or maxillary



ostium. This maneuver is important because it allows complete exposure of the middle meatus and the natural ostium which will ultimately be connected to the accessory ostium to prevent recirculation-induced recurrent maxillary sinusitis and possibly recurrence of polyp<sup>[15],[16] and [22]</sup>.

No recurrence rate in our study, this came in agreement with Kamel<sup>[12]</sup> and Cook and his associates<sup>[34]</sup> reported no recurrent in their series<sup>[12],[16] and [34]</sup>. But Lorry and their colleagues<sup>[15]</sup> reported a recurrence rate (3%) and Hong and his associates reported that over all improvement rate of 96,4% (27 of 28 patients) was observed<sup>[15] and [33]</sup>.

We believed that the success of our procedure was due to our very large middle meatal antrostomy which was sufficient to see all the walls of the sinus with the help of angled endoscopes, this in agreement with these researches<sup>[19],[20],[22],[31] and [32]</sup>.

### Conclusion

Endoscopic Endonasal Sinus Surgery with large middle meatal antrostomy is the ideal tool for management of antrochoanal polyp and helps in prevention of recurrence.

### Conflict of interest:

None

### Funding Sources:

This study was supported by personal funds and funds from Minia University.

### Ethical approval:

“All procedures performed in this study followed the 1964 Helsinki declaration and its later amendments and was approved by the local research ethics committee at Minia Faculty of Medicine. Informed consent was obtained from all the study participants.

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