

Revision endoscopic sinus surgery for bilateral nasal polyposis

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Background

Nasal polyps have an incidence of 4% in all of the population. Apart from the surgery performed, some patients will present with recurrence. Recurrence ranged from 4 to 60% in nasal polyps (NP), with a median of 20%, across all studies reviewed over a maximum of 2 years.

Objective

The aim was to review cases of recurrent bilateral nasal polyposis in terms of the incidence of local factors contributing to recurrence.

Patients and methods

This prospective study included 50 adult patients (males and females) experiencing recurrent BNP after previous functional endoscopic sinus surgery. The patients were recruited from the outpatient clinic, Otorhinolaryngology Department, Kobry El-Kobba Military Hospital. The mean age of primary disease was 39 years. There were significant differences between endoscopic and computed tomography (CT) findings according to the presence of different local factors contributing to recurrence of NP, in the form of lateralized middle turbinate, residual infected air cells, scarred frontal recess, middle meatal anastomosis stenosis, retained uncinata process, and retained agar nasi cells. The detection rate of endoscopy was higher than the CT scan.

Results

The most frequent finding was lateralized middle turbinate (74.0%) followed by residual infected air cells and scarred frontal recess (60.0% for each). Middle meatal anastomosis stenosis was found in 40.0% of cases. Retained agar nasi cells was found in 48.0% of cells, whereas retained uncinata process was found in only 36.0% of cases.

Conclusion

There were significant differences between endoscopic and CT findings according to the presence of different local factors contributing to recurrence of NP, in the form of lateralized middle turbinate, residual infected air cells, scarred frontal recess, middle meatal anastomosis stenosis, retained uncinata process, and retained agar nasi cells. The detection rate of endoscopy was higher than the CT scan.

Keywords:

endoscopic, nasal, polyposis, sinus

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Introduction

Nasal polyposis is a disease of the mucous membranes in the nose and the paranasal sinuses that develops as a reaction to a variety of stimuli including allergens and various microbes. The prevalence of nasal polyposis is estimated to be between 1 and 4% of the general population [1].

Nasal polyps are growths in the shape of tear drops which developed in the nose and paranasal sinuses especially the middle meatus and osteomeatal complex. It is always associated with allergies or long-lasting infections such as fungal sinusitis. It commonly presents with rhinorrhea, sneezing, anosmia/hyposmia, and post-nasal discharge. It can be associated with hypertrophied or atrophied turbinates or deviated nasal septum. As a symptomatic treatment, nasal steroids with oral antihistamine are efficiently used. Short-term systemic steroid courses can also be used. In resistant and refractory cases, surgery can be considered the most effective way to improve the patient's quality of life [2].

If an aggressive medical treatment for nasal polyposis failed to improve the quality of life of patients, Functional Endoscopic Sinus Surgery (FESS) is considered as a treatment of choice in cases of nasal polyps and chronic sinusitis with improvement in quality of life in 85% of patients with a mean follow-up time of 31.7 years [3].

The main concept of FESS is to remove tissues obstructing the osteomeatal complex and to facilitate the drainage but with conserving the anatomy. The use of the rigid fiberoptic nasal telescope will allow to focus on the important areas such as osteomeatal complex using a monitor and a small camera attached to the eyepiece of the endoscope. Using microdebriders, pathological tissue can be removed with preserving the

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normal mucosa. Microdebriders remove the pathologic tissue while preserving normal mucosa [4].

FESS is considered the most popular procedure for treatment of chronic sinusitis and nasal polyps with success rate of 76–98% and failure rate of 2–24% for primary FESS according to literatures, and the patients may require a revision FESS for management of their sinusitis.

Principles of RESS are the same as those of primary FESS. RESS can be more difficult because of distorted anatomy, a tendency to bleed, and scarring. Although the efficacy and safety of RESS for treating recalcitrant sinusitis has been reported to be comparable to those of primary FESS, many factors can affect the outcome of RESS. In this study, we report our experience with RESS [5].

The aim of the work was to review cases of recurrent bilateral nasal polyposis in terms of the incidence of local factors contributing to recurrence.

Aim

The aim was to review cases of recurrent bilateral nasal polyposis in terms of the incidence of local factors contributing to recurrence.

Patients and methods

This study included 50 adult patients (male and female) with recurrent bilateral nasal polyposis after previous FESS. Patients were selected from the outpatient clinic of Otorhinolaryngology Department, Kobry El-Kobba Military Hospital, in the period between January and September 2019.

Inclusion criteria

Patients enrolled in the study showed signs of bilateral chronic and/or recurrent nasal obstruction from sinonasal polyposis of different grades that is refractory to medical treatment with history of one or more previous FESS and were defined by their clinical history, physical examination, and radiographic findings, especially nonatopic patients with no nasal allergy history.

Exclusion criteria

The following were the exclusion criteria:

- (1) Patients with primary nasal polyposis.
- (2) Patients with chronic sinusitis.
- (3) Patients with known history of asthma.
- (4) Patients with allergic fungal sinusitis.

The study was approved by the Local Ethics Committee on research involving humans of Benha Faculty of Medicine. A written informed consent was obtained for all participants in the study. All patients were subjected to full history taking and complete clinical examination

Results

This study was done on 50 adult patients (males and females) experiencing recurrent bilateral nasal polyposis after previous functional endoscopic sinus surgery. Mean age was 46 years, with standard deviation of 7 years. Regarding sex, most were males (80.0%), and only 20% were females. Mean BMI was 28.6, with SD of 1.3. Mean age of primary disease was 39 years, with SD of 7 years.

Mean duration from the first operation till revision was 1.9 years, with standard deviation of 0.9 years. Overall, 84.0% showed a positive family history. No history of bronchial asthma was reported in all patients (Table 1).

The most frequent finding was lateralized middle turbinate (74.0%) followed by residual infected air cells and scarred frontal recess (60.0% for each). Middle meatal antrostomy stenosis was found in 40.0% of cases. Retained agar nasi cells were found in 48.0% of cells, whereas retained uncinata process was found in only 36.0% of cases (Fig. 1).

There were significant differences between endoscopic and computed tomography (CT) finding according to presence of different local factors contributing to recurrence of BNP, in the form of lateralized middle turbinate, residual infected air cells, scarred frontal recess, middle meatal antrostomy stenosis, retained uncinata process, and retained agar nasi cells ($P < 0.001$) (Table 2).

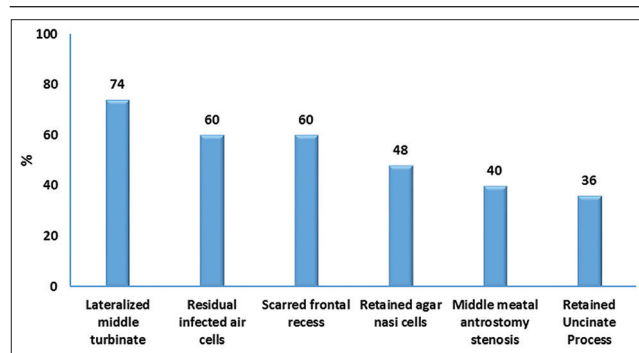
Table 1 General characteristics in the study population

General characteristics	n (%)
Age (years)	
Mean±SD	46±7
Sex	
Males	40 (80.0)
Females	10 (20.0)
BMI	
Mean±SD	28.6±1.3
Age of onset of primary disease (years)	
Mean±SD	39±7
Duration from the first operation till revision (years)	
Mean±SD	1.9±0.9
Family history	
Yes	42 (84.0)
History of bronchial asthma	
Yes	0

Table 2 Clinical findings in the whole study population

	Total	Endoscopy [n (%)]	CT [n (%)]	P
Lateralized middle turbinate	37	37 (100)	12 (32.4)	0.001
Residual infected air cells	30	30 (100)	20 (66.7)	0.001
Scarred frontal recess	30	30 (100)	20 (66.7)	0.001
Middle meatal antrostomy stenosis	20	20 (100)	6 (30)	0.001
Retained uncinat process	18	18 (100)	8 (44.4)	0.001
Retained agar nasi cells	24	24 (100)	11 (45.8)	0.001

CT, computed tomography.

Figure 1

Clinical findings in the whole study population.

Discussion

The current body of epidemiological evidence suggests that males are affected by NP more than females and adults more than children [6].

In the present study, the mean age of the included patients was 46 ± 7 years, and the majority were males (80.0%). The mean age of primary disease diagnosis was 39 years.

In line with our findings, Jahromi and Pour [6] reviewed the epidemiological data from the charts of 297 patients with NP who were operated on in a referral hospital in Mashhad. NPs affect men (60.3%) more frequently, at a mean age of 39.5 years.

Likewise, Toledano Muñoz *et al.* [7] investigated the epidemiologic data in 165 patients with NP. The condition was more common in men (63%), with a mean age of 46.5 years.

Al-Barasi [8] included 23 patients with NP in which the majority were men in the age range from 25 to 56 years.

The current body of evidence suggests that there exists a hereditary factor for development of NP. Nasal polyps are often determined to run in families, suggesting a hereditary or a shared environmental factor [9].

In the present study, 84% of the patients showed a positive family history. However, other studies reported lower prevalence of family history. Rugina and colleagues [10] reported that more than half of

224 patients with nasal polyp (52%) had a superb own circle of relatives' history. However, the examination by Greisener *et al.* [11] showed that only 14% of the patients had their own circle of relatives with records strongly suggesting hereditary elements for the pathogenesis of nasal polyps.

The exact causes of such difference between our findings and abovementioned studies are not clear. However, this difference can be explained by the variations in the characteristics and demography of the included patients, as well as method of assessment. The difference in sample size may be another cause.

Previous reports demonstrated the time from the first operation till revision surgery rate varies between 12 and 60 months [12]. In the present study, the mean duration from the first operation till revision was 1.9 ± 0.9 years.

In agreement with our findings, DeConde *et al.* [13] conducted a prospective cohort study on patients undergoing FESS for resistant NP between August 2004 and February 2015. Approximately 363 patients with NP who underwent FESS involving polypectomy were enrolled. The average duration till recurrence was 14.3 ± 7 months.

Likewise, Akhtar *et al.* [14] performed a retrospective examination on 192 patients operated for nasal polyps in a clinic set-up between 2001 and 2007. A total of 36 (19%) patients developed recurrent nasal polyps during the follow-up period. The median time to recurrence was 14 ± 6.3 months.

Bakhshae *et al.* [15] conducted a prospective study on 62 patients with recurrent NP. The recurrence occurs within the first 2 years after the operation.

Previous reports indicated that multiple factors, both anatomic and systemic, may predispose to failure of ESS like scarred middle meatal antrostomy, oversized antrostomy, retained uncinat process, scarred frontal recess, and recurrent polyps [16].

In the present study, the most frequent anatomic finding was lateralized middle turbinate (74.0%)

followed by residual infected air cells and scarred frontal recess (60.0% for each). Middle meatal antrostomy stenosis was found in 40.0% of cases. Retained agar nasi cells were found in 48.0% of cells, whereas retained uncinata process was found in only 36.0% of cases.

In concordance with our findings, Bassiouni *et al.* [17] conducted a retrospective chart review of consecutive postoperative follow-up appointments (November 2009 to May 2011) for patients who had had full-house ESS. Approximately 151 patients underwent endoscopic follow-up via video endoscopy from 2009 to 2011. The lateralized middle turbinate was found in more than 50% of the patients.

Valdes *et al.* [18] also found lateralized middle turbinate to be the most common finding (48% of revision cases) in patients undergoing revision FESS.

However, the frequencies of different anatomic variants presented in our study are slightly different than previously reported within the literature. For example, Bewick *et al.* [23] aimed to highlight the most frequent findings of patients with NP who require RESS. A retrospective review was conducted on patients who needed RESS at a tertiary institution over a 3-year period. Over 3 years, the study involved 75 patients who underwent RESS, i.e., 28% of all ESS performed in the unit. The most frequent finding was a residual uncinata process in 64% of the patients ($n=48$); other findings included a maxillary antrostomy not based on the natural ostium of the maxillary sinus in 47% ($n=35$), an oversized antrostomy in 29% ($n=22$), resected middle turbinates in 35% ($n=26$), middle meatal stenosis in 15% ($n=11$), synechia in 29% ($n=22$), and osteitic bone that required drilling in 13% ($n=10$).

Similarly, Gore *et al.* [19] aimed to identify the structures that are incompletely dissected during the primary FESS and also structures associated with mucosal thickening in patients undergoing RESS for persistent or recurrent CRS through a retrospective review of patients undergoing RESS. The most frequent findings were residual anterior and posterior ethmoid cells or septations, found in 65% of sides and 75% of patients. In addition, residual anterior ethmoid agger nasi cells, unopened sphenoid, and residual uncinata process were found in 52, 51, and 46% of sides, respectively. A large percentage of the patients demonstrated residual ethmoid cells present on the lamina papyracea and skull base, with a lower number found posterior to the middle turbinate basal lamella.

Mechor and Javer [20] aimed to determine the most common findings in patients undergoing revision ESS. The findings of 73 cases of revision ESS from July

2006 to March 2007 presenting to the St. Paul's Sinus Centre were recorded and then presented. There were many common findings at revision ESS, including residual uncinata process, persistent septal deviation, nonphysiologic maxillary antrostomies, incomplete ethmoidectomy, and partial or total resection of the middle and superior turbinate, resulting in the formation of the uniturbinate.

Ramadan [21] evaluated surgical causes of failure in children after ESS. A retrospective review of children who had ESS at a tertiary children's referral center between 1993 and 2005 for chronic rhinosinusitis was conducted. A deviated septum and a mucocele were the cause of failure in 17 and 13% of the patients, respectively.

The exact causes of such difference between our findings and abovementioned studies are not clear. However, this difference can be explained by the variations in the characteristics and demography of the included patients, as well as method of dysphagia assessment. The difference in sample size may be another cause.

Once the decision is made to perform a revision endoscopic procedure, it is imperative in the preoperative period to review each patient's anatomy, the amount of disease, and underlying comorbidities. CT scan and nasal endoscopy are the best modalities to use to assess the remnant bony partitions and areas of scarring that are obstructing the natural ostium of each sinus [22,23].

Conclusion

In our study, there were significant differences between endoscopic and CT findings according to presence of different local factors contributing to recurrence of NP, in the form of lateralized middle turbinate, residual infected air cells, scarred frontal recess, middle meatal antrostomy stenosis, retained uncinata process, and retained agar nasi cells. The detection rate of endoscopy was higher than the CT scan.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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