

# Outcome of Functional Endoscopic Sinus Surgery in Adult Patient with Sinonasal Polyposis

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## Abstract

**Background:** Nasal polyps are a common condition. Their etiology remains unclear. Surgical treatment has been refined significantly over the past 20 years with the advent of endoscopic sinus surgery. **Objectives:** The objective of this study was to assess the efficacy of functional endoscopic sinus surgery in an adult patient with sinonasal polyposis, by measuring the improvement in symptoms during 6 months of follow-up. Furthermore, record complications and recurrence of nasal polyps. **Patients and Methods:** A prospective study was conducted between November 2018 to January 2021, which included (39) patients whom attended the Outpatient Otorhinolaryngological Department of AL-Karkh General Hospital and AL-Yarmouk Teaching Hospital and suffered from sinonasal polyposis. This study included patients above 18 years (of either sex) with bilateral nasal polyposis and whom medical treatment failed. Those patients were evaluated by history taking, clinical examination, and computer tomography scan of the nose and paranasal sinuses. All patients had functional endoscopic sinus surgery and visual analog scale assessments was done (both pre- and postoperatively), which followed up for up to 24 weeks. **Results:** About 79.5% of the patient get improvement in nasal blockage and (66.7%) for hyposmia, (90.5%) for nasal discharge, and (80%) for both headache and postnasal drip associated with significant improvement of symptoms score 24 weeks postoperative to preoperative score for nasal block, hyposmia, nasal discharge, and facial pain, except postnasal drip showed no significant difference. The most frequent complication was a recurrence of polyps, followed by synechiae and minor epistaxis. No major complication was recorded. **Conclusion:** Endoscopic sinus surgery for sinonasal polyposis is an efficient surgical procedure for nasal polyposis, because it provides an approximate field of vision and illumination, good access, and is associated mostly with minor complications.

**Keywords:** Functional endoscopic sinus surgery, sinonasal polyposis, visual analog scale

## INTRODUCTION

Nasal polyps are defined as a pearly white (translucent to pale gray), freely mobile, painless, smooth surface that pedunculated in the nasal cavity with a grape-like appearance.<sup>[1]</sup>

Nasal polyposis is a nasosinus disease characterized clinically by the occurrence of multiple mostly bilateral polyps. It is thought to be a multifactorial disease that leads to an abnormal mucosal reaction involving the mucous membrane of the nose and the paranasal sinuses, it should be regarded to be chronic rhinosinusitis (CRS) subtype (it is a part of the spectrum of CRS).<sup>[2]</sup>

Nasal polyps originate in the upper part of the nose around the openings to the ethmoidal sinuses. The polyps protrude into the nasal cavity from the middle and superior meatus.<sup>[3]</sup>

The prevalence rate of nasal polyposis is about (1%–4%) which increases with age, greatest between 40 and 60 years of age.

The male:Female ratio is about 2:1 and up to (14%) of patients with nasal polyps have a positive family history.<sup>[3,4]</sup>

The disease is well-known to recur despite recent advances in medical and surgical management. The polyp recurrence rate depends on the type of disease; it is high in patients with nonsteroidal anti-inflammatory drug intolerance and asthma, and low in cystic fibrosis.<sup>[3,5]</sup>

Nasal polyps are associated with (CRS) for various etiologies. It is frequently associated with allergic fungal

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rhinosinusitis (>80%), Samter's triad, nonatopic asthma and rhinitis, and some genetic immune diseases.<sup>[6]</sup>

The initial aims of the treatment of nasal polyps are to relieve the nasal blockage and rhinitis symptoms and to improve sinus drainage, whereas the final target is to eliminate nasal polyps and sinus pathology and to prevent recurrences. Treatment can be either medical and/or surgical. Medical treatments which are (1) avoidance of the allergen, and (2) pharmaceutical treatment consisting of intranasal and systemic corticosteroids, antihistamine, and possibly, leukotriene antagonists may have an additional effect in selected patients; recently antibiotics such as macrolides have been suggested to have therapeutic activity based on their anti-inflammatory properties. Surgical polypectomy with perioperative medical treatment indicated when the blockage is still the problem in spite of medical treatment including (a) traditional intranasal polypectomy and (b) endoscopic polypectomy which had multiple approaches;

- Messerklinger approach, (anterior to posterior) approach,
- Wigand (posterior to anterior) approach,
- Schaefer hybrid technique, and
- Computer-assisted technique (navigation system).<sup>[7-13]</sup>

## PATIENTS AND METHODS

### Setting and study design

A prospective study, conducted between November 2018 to January 2021 in the Otorhinolaryngological Department of AL-Karkh General Hospital and AL-Yarmouk Teaching Hospital, enrolled (39) selected patients according to inclusion criteria.

### Ethical consideration

The current study was established according to the ethical approval obtained from the hospital, all patients have been asked to provide written acceptance consent was obtained after an explanation aims and nature of the study.

### Inclusion and exclusion criteria

This study included patients whom attended to the outpatient and suffered from bilateral nasal polyposis, above 18 years old (of either sex), with failure of conservative medical treatment for at least 6 weeks. While the exclusion criteria were unfit for surgery, sever septal deviation, and suspected poor follow-up patients.

### Sampling

Selected only those who fitting inclusion criteria and visiting consultancy days on Monday and Thursday during study time.

### Procedure

After 6 weeks of medical therapy of topical steroid (budesonide) and systemic corticosteroid (prednisolone tablet 20 mg in divided doses daily) if there were no contraindications, also antibiotics such as clarithromycin or doxycycline, analgesia, antihistamine, and alkaline nasal wash may include.

All included patients submitted to:

1. Detailed history taking;
  - The symptoms, that subjectively assessed, were nasal blockage, smelling disturbance, rhinorrhea, postnasal drip, and headache/facial pain. The symptoms severity was scored using modified visual analogu scale (VAS) (10 cm line); with zero indicating no problem, 1–3 = mild, 4–6 = moderate, 7–9 = severe, and 10 indicating the “worst thinkable or most troublesome”
  - Previous medical treatments or comorbidities such as asthma, Samter's triad, granulomatous diseases, previous surgical attempts, and postoperative management
  - Family history is also necessary to determine if a genetic predilection (i.e. immunodeficiency, cystic fibrosis) may exist.
  - Social history is important to ascertain potential exposure to noxious substances either at home or in the workplace (i.e. tobacco) that may influence surgical outcomes.
2. Detailed examination including; anterior rhinoscopy, and endoscopical nasal examination, throat, and ear examination was done.
  - Endoscopic assessment was done mostly by 4 mm zero or 30° Hopkins rod and sometimes by 2.7 mm rigid endoscope or flexible endoscope which is used after anesthetizing the area by 4% xylocaine spray and ephedrine nasal spray. It provided excellent illumination and good access for better examination of the nasal cavity and middle turbinate and middle meatus. The preoperative endoscopic assessments include; grading of nasal polyps using a five-stage polyp grading system as shown in Table 1, the presence of nasal discharge and edema, examination of the nasal mucosa, and assessment of anatomical abnormalities if present.
3. All patients were subjected to computer tomography (CT) scan for nose and paranasal sinuses with axial and coronal views.
4. Routine investigations were done, such as complete blood count, clotting time and bleeding time, general urine examination, chest X-ray, electrocardiography other relevant investigations.
5. Surgical procedure (functional endoscopic sinus surgery);

**Table 1: Endoscopic grading of nasal polyps**

Grade	Description
0	Absence of polyps
1	Does not extend beyond the middle turbinate edge
2	Does not extend beyond the superior margin of the inferior turbinate
3	Does not extend beyond the middle of the inferior turbinate
4	Does not touch the floor of the nose
5	Touches floor

- Patients were taken up for the surgery (functional endoscopic sinus surgery) under general anesthesia with orotracheal intubation and pharyngeal pack in reverse-Trendelenburg position and with nasal endoscopic guidance (0°, 30°, 45°, and 70°; 4 mm diameter and 180 mm length) and camera display system, 10% xylocaine with 0.1% xylometazoline-soaked cotton pledges inserted into nasal cavities for 15–20 min before beginning of the surgical procedure
  - The extent of surgery was based on the findings in preoperative CT scan of paranasal sinuses which included polypectomy, uncinectomy, middle meatal antrostomy, anterior and posterior ethmoidectomy, widening of sphenoid sinus, and clearance of frontal sinus
  - At the end of the operation, polyvinyl acetate (Merocel) packs in the middle meatus were inserted for 5 days. Then, the patients were discharged to home.
6. Postoperative follow-up; all patients received parental antibiotic for 5 days till nasal packing was removed with Analgesia. After removing the packing, oral antibiotic is initiated for further days or more as needed. Alkaline nasal douching was also advised. the patients also received steroid nasal sprays and antihistamines in the postoperative period. Systemic corticosteroid for a week (prednisolone tablet 10 mg in divided doses) was given if there is no contraindication. All patients attended the consultant clinic every week in the first postoperative month and every month after that for months. Postoperative local care was restricted to remove crusts, division of adhesions, and polyp which were performed under endoscopic guidance and for prescription of further medications. Assessment for symptomatic improvement subjectively was done using the symptom (VAS) score and endoscopic assessment by 12 weeks and 24 weeks, looking for crustation, discharge, nasal mucosa condition (edematous, congestion), and any evidence of nasal polyps formation of whatever size was considered as recurrence. All the patients were asked to phone or return at any time if there was any problem related to their conditions for further assessment and follow-up.

### Statistical analysis

The data had been managed and analyzed with computer software (SPSS) version 24 (IBM, Chicago, Illinois, USA).

- The Chi-square test was used to define the association between the categorical variable.
- A confidence level of 95% with a  $P \leq 0.05$  was considered statistically significant.

## RESULTS

The present study enrolled (39) patients, (22) were male with percentage of (56.4%), whereas female patients were (17) with (43.6%), and the age ranged from (18–65) years with mean age of (40.2) years and standard deviation ( $\pm 13.1$ ).

Table 2 shows the associated comorbid conditions of the patients who were included in this study.

The most common preoperative symptoms were nasal blockage and hyposmia that presented with all (39) patients of this study with percentage of (100%), other preoperative symptoms included nasal discharge that occurred in (21) patients with (53.85%), headache which presented in (10) patients with percentage of (25.64%), whereas only (5) patients suffered from postnasal drip with (12.82%).

On endoscopic examination, all of the patients (39) who have bilateral nasal polyps come from the middle meatus with percentage of (100%), whereas (8) patients with (10.2%) come from other sites such as sphenoid and posterior ethmoid sinus.

In the current study, there was a general improvement of symptoms after 24 weeks of the operation, about (79.5%) of patient showed improvement in nasal blockage and (66.7%) for hyposmia, (90.5%) for nasal discharge, and (80%) for both headache and postnasal drip but for postnasal drip, there was no significant difference of VAS score from the preoperative score.

As shown in Table 3, the present study found that there was a significant statistical improvement of both nasal block and hyposmia between preoperative and 24 weeks postoperative scores, with  $P < (0.0001)$ .

From a statistical view regarding nasal discharge, the current study showed significant overall improvement after 24 weeks postoperatively, with  $P = 0.0015$ .

Furthermore, for headache, there was significant improvement statistically, after 24 weeks postoperatively, with  $P = 0.0315$ .

While for postnasal discharge, this study presents no significant improvement postoperatively as  $P = (0.1722)$ .

In the current study, the most common complication of functional endoscopic sinus surgery (FESS) was polyp's recurrence (38.4%), followed by synechiae (18%) and minor bleeding (12.8%), as shown in Table 4.

## DISCUSSION

This study showed a high percentage of improvement for symptomatic patients after endoscopic sinus surgery with polypectomy.

**Table 2: Frequencies of associated conditions**

Associated condition	Number of patients (%)
Asthma	6 (15.38)
Allergic rhinitis	8 (20.51)
Other allergies	4 (10.26)
NSAIDs intolerance	3 (7.6)
Family history of asthma	5 (12.82)
Family history of nasal polyposis	12 (30.77)
Smoking	13 (33.33)

NSAIDs: Nonsteroidal anti-inflammatory drugs

**Table 3: Preoperative and 12 weeks and 24 weeks postoperative symptoms distribution**

Symptom	Preoperative, n (%)	12 weeks postoperative, n (%)	P (after 12 weeks)	24 weeks postoperative, n (%)	P (after 24 weeks)
Nasal block	39 (100)	29 (74.35)	0.0014	8 (20.51)	<0.0001
Hyposmia	39 (100)	30 (76.92)	0.0018	13 (33.33)	<0.0001
Nasal discharge	21 (53.85)	13 (33.33)	0.2896	2 (5.12)	0.0015
Postnasal drip	5 (12.82)	8 (20.51)	0.8789	1 (2.56)	0.1722
Facial pain	10 (25.64)	5 (12.82)	0.1493	2 (5.12)	0.0315

**Table 4: Complications of functional endoscopic sinus surgery operations (during 24 weeks)**

Complication	Number of patients (%)
Recurrence	15 (38.4)
Synechia	7 (18)
Bleeding	5 (12.8)
Orbital complication	2 (0.05)
Periorbital ecchymosis	2 (0.05)

- For nasal blockage: It showed (79.5%) improvement in nasal blockage after 24 weeks with statistically significant improvement of VAS symptomatic score, this could be attributed to the removal of polyps, which bears the brunt of inspiratory airflow. The period between 12 and 24 weeks shows a significant deterioration in nasal patency, this may be due to the increase in nasal discharge as found in endoscopic follow-up, mostly due to climate disturbance during this period that predisposes allergic rhinitis or nasal infection. Basilio *et al.*<sup>[14]</sup> found that (76.6%) improvement in nasal obstruction after 6 months, which is similar to the present study results, but Hiwa<sup>[15]</sup> mentioned that (90%) improvement of nasal obstruction after 6 months
- For hyposmia: About (66.7%) of patient had improvement in their hyposmia after 24 weeks with overall significant improvement of VAS score, but there was nonsignificant improvement between 12 weeks till 24 weeks which perhaps, may be related to the increase in nasal blockage and indicates that hyposmia is mostly conductive due to obstruction of airway passages to the olfactory cleft. Basilio *et al.*<sup>[14]</sup> had improvement of hyposmia in (68.7%) in his study. Hiwa<sup>[15]</sup> got (95%) improvement of hyposmia and this variation may be due to the surgical technique adopted by the surgeon, type of medical treatment, and the cause of nasal polyposis
- For nasal discharge: The current study stated that (90.5%) improvement for nasal discharge after 6 months, with significant improvement of VAS score statistically. Hiwa<sup>[15]</sup> found (78%) of his patients improved from nasal discharge which is less than this study
- For Headache: In the present study, (80%) of patients with headache get improved after 6 months, with an overall significant improvement of VAS score. However, before 24 weeks, there were no significant improvements in headache and may be due to recurrent nasal mucosal inflammation which affected on headache improvement.

Basilio *et al.*<sup>[14]</sup> reported that (83%) of patients improved like this study results, whereas Hiwa<sup>[15]</sup> found that (89%) had pain relieved

- For postnasal drip: (80%) of patients with postnasal drip showed some sort of improvement compared to symptomatic pre-operative patients, but there was no significant improvement using VAS score. Perhaps, may be due to the allergy-mediated contribution to postnasal drip or excessive awareness of the patients. About (68.7%) in Basilio *et al.*<sup>[14]</sup> study were improved, but only (20%) get benefit in Hiwa<sup>[15]</sup> study.

In the study of Damm *et al.*<sup>[16]</sup> the overall improvement after surgery was (85%), whereas Bhattacharyya,<sup>[17]</sup> described improvement in (100%) of patients, especially in facial pain, congestion, nasal obstruction, rhinorrhea, and headache. Mackay and Lund.<sup>[18]</sup> reported that (85%) good overall improvement of facial pain and headache were assessed as better as (93.4%).

The current study reported (18%) of patient develop synechia after 24 weeks of follow-up period and other patients that developed adhesion bands that released during the follow-up period were cured. This is also approximate to Shumon *et al.*<sup>[19]</sup> research result, as he found that (16.65%) develop synechia.

There are few patients (12.8%) who developed mild epistaxis, no major bleeding occurred during operative or postoperative periods. Hiwa<sup>[15]</sup> research and Shumon *et al.*<sup>[19]</sup> study showed that (15%) and (20%), respectively, developed minor bleeding, and none of them had major bleeding during their researches.

Five percent of cases developed Peri-orbital ecchymosis after lamina papyrtia breach, which is similar to Hiwa<sup>[15]</sup> result (5%), and slightly more than Shumon *et al.*<sup>[19]</sup> result (3.3%).

Major complications were not occurred in the present study, this result goes with Shumon *et al.*<sup>[19]</sup> and Hiwa<sup>[15]</sup> studies. Major complications during endoscopic polypectomy are rare and need large study as in Stammberger and Wolf<sup>[20]</sup> study who reported two cases of cerebrospinal fluid (CSF) leak in 4000 cases. Wigand<sup>[21]</sup> also reported on 220 patients undergoing complete ethmoidectomy mainly for polyposis, reported (CSF) leaks in two (0.9%) and one case of an orbital hematoma (0.5%).

In this study recurrence of polyposis occurred with (38.4%) at 6 months, all of them developed small polyps and medical treatment was recommended (no revision surgery

was recommended). Mahmud *et al.*<sup>[22]</sup> found recurrence rates at 6 months after surgery were (25%). Dalzie *et al.*<sup>[23]</sup> mentioned (50%) polyp recurrence at 6 months postoperatively.

## CONCLUSION

Endoscopic sinus surgery for sinonasal polyposis is an efficient treatment for nasal polyposis because it provides an approximate field of vision and illumination, and good access, with rare major complications. The most frequent complication was a recurrence of polyps (after 6 months of follow-up) which was about (38.4%), mostly in patient with a history of allergic rhinitis followed by a history of asthma and previous polypectomy. Nasal polyposis is a mucosal disease, that surgical intervention alone stills not enough to cure it, so searching for new medications or techniques is mandatory.

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## Conflicts of interest

There are no conflicts of interest.

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