

Original Article

Outcomes of Functional Endoscopic Sinus Surgery (FESS) in Patients with Chronic Rhino Sinusitis with Nasal Polyps

Tahreem Fatima¹, Shakir Ullah², Imran Khan³, Mushtaq Ahmad⁴, Muhammad Afaq⁵, Osama Nawaz⁶

¹ Registrar, ENT Department, Khyber Teaching Hospital, Peshawar

² Assistant Professor, Department of ENT, Khyber Teaching Hospital, Peshawar, Pakistan

^{3, 4, 5, 6} Postgraduate Trainees in ENT Department, Khyber Teaching Hospital, Peshawar

Keywords

Endoscopic Sinus Surgery; Chronic Rhinosinusitis; Nasal Polyps; Treatment Outcome

Article History

Received: January 24, 2025

Revision: March 16, 2025

Accepted: May 29, 2025

Published: July 10, 2025

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Author(s)

Corresponding Author: Imran Khan

Assistant Professor, Department of ENT, Khyber Teaching Hospital Peshawar

Email: imranamc@hotmail.com

ORCID ID: 0000-0003-3152-2189

DOI: 10.69837/pjammr.v3i2.78

How to Cite This Article:

Fatima T, Ullah S, Khan I, Ahmad M, Afaq M, Nawaz O. Outcomes of functional endoscopic sinus surgery (FESS) in patients with chronic rhinosinusitis with nasal polyps. Pak J Adv Med Med Res. 2025;3(2):84-87.

ABSTRACT

Background: Chronic rhinosinusitis with nasal polyps (CRSwNP) is a chronic inflammatory condition characterized by nasal obstruction, olfactory dysfunction, and reduced quality of life. Functional endoscopic sinus surgery (FESS) is the preferred treatment for patients who fail medical therapy; however, recurrence remains a concern.

Objective: To evaluate clinical outcomes, symptom relief, quality-of-life improvement, and recurrence after FESS in patients with CRSwNP.

Methods: This prospective observational study was conducted in the Department of ENT at Khyber Teaching Hospital, Peshawar, Pakistan, from January 2023 to January 2024. A total of 75 patients with CRSwNP were enrolled using consecutive non-probability sampling. All patients underwent FESS. Clinical outcomes were assessed using the Sino-Nasal Outcome Test-22 (SNOT-22), nasal endoscopy, and postoperative follow-up at 3, 6, and 12 months. Primary outcome measures included symptom improvement, quality-of-life changes, recurrence, and postoperative complications. Data were analyzed using SPSS version 24.0. Continuous variables were expressed as mean $\pm$ standard deviation, and paired t-tests were used for preoperative and postoperative comparisons. A p-value <0.05 was considered statistically significant.

Results: The mean age was 44.7 ± 12.5 years. Significant improvement in SNOT-22 scores was observed, decreasing from 62.4 ± 9.8 preoperatively to 28.7 ± 7.6 at 12 months ($p < 0.001$). Nasal congestion resolved in 92% of patients, hyposmia improved in 63%, and headache improved in 62%. Recurrence was observed in 24% of cases. No major complications were reported. Extended FESS showed better outcomes than limited FESS ($p = 0.028$).

Conclusion: FESS is a safe and effective treatment for CRSwNP, significantly improving symptoms and quality of life. Despite the risk of recurrence, appropriate surgical approach and patient selection enhance long-term outcomes.

INTRODUCTION

Chronic rhinosinusitis with nasal polyps (CRSwNP) is a chronic inflammatory disorder of the sinonasal mucosa characterized by persistent nasal obstruction, olfactory dysfunction, facial pressure, and postnasal discharge [1]. Pathogenesis is a complex interaction among genetic predisposition, environmental exposure, and immunological imbalance, resulting in mucosal inflammation and polyp formation [2]. Medical options such as intranasal corticosteroids, saline nose washes, and systemic treatments provide limited relief, especially in severe cases and in those with other diseases such as asthma [3]. Functional endoscopic sinus surgery (FESS) has become the standard surgical treatment for patients with chronic rhinosinusitis with nasal polyps (CRSwNP) who fail optimal medical therapy. The procedure restores ventilation and drainage of the paranasal sinuses by removing obstructive inflammatory tissue and nasal polyps [4]. This minimally invasive surgical method uses endoscopic vision to create minimally manipulative surgical procedures, which can minimize trauma and facilitate faster recovery of patients, in contrast to conventional procedures [5]. Although widely used, the effectiveness of FESS in the treatment of (CRSWNP) patients is still an under-investigated topic. Varied results have been reported, with success rates ranging from 76% to 97.5%, depending on disease severity, surgical technique, and postoperative care. In addition, postsurgical remission of polyps presents a major concern, with rates of up to 31.33 percent recorded within an average observation of 9 Months [6,7]. Comprehensive evaluation of the efficiency of FESS and the factors that can impact outcomes over the long term is necessary, thereby informing clinical practice and patient management [8,9]. The present study aimed to evaluate the clinical outcomes of functional endoscopic sinus surgery in patients with chronic rhinosinusitis with nasal polyps, with particular emphasis on symptom improvement, quality of life, postoperative recurrence, and factors influencing long-term outcomes. A comprehensive evaluation of these outcomes may help optimize clinical decision-making and improve patient management.

MATERIAL AND METHODS

This prospective observational study was conducted in the Department of ENT, Khyber Teaching Hospital, Peshawar, Pakistan, from January 2023 to January 2024. Patients diagnosed with chronic rhinosinusitis with nasal polyps (CRSwNP) according to the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS) criteria were included. Preoperative assessment included detailed medical history, nasal endoscopy, computed tomography (CT) of the paranasal sinuses, and the Sino-Nasal Outcome Test-22 (SNOT-22) questionnaire.

Sampling Technique

Consecutive non-probability sampling was used to recruit all eligible patients who fulfilled the inclusion criteria during the study period.

Sample Size Calculation

Sample size was calculated using OpenEpi version 3.01 with a 95% confidence level. Since all eligible patients meeting the inclusion criteria during the study period were included, the final sample comprised 75 participants.

Operational Definitions

Chronic Rhinosinusitis with Nasal Polyps (CRSwNP): Chronic inflammation of the nasal and paranasal sinus mucosa associated with bilateral nasal polyps, diagnosed according to EPOS criteria.

Successful Outcome: Clinically significant improvement in symptoms, demonstrated by a reduction in the SNOT-22 score and improvement on postoperative nasal endoscopy.

Recurrence: Reappearance of nasal polyps confirmed by nasal endoscopy during the 12-month follow-up after initial postoperative improvement.

Minor Complications: Postoperative events such as epistaxis, nasal crusting, or localized infection managed conservatively without additional surgery.

Major Complications: Serious postoperative adverse events including cerebrospinal fluid leak, orbital injury, or permanent visual impairment.

INCLUSION CRITERIA

Patients aged between 18 and 65 years with medically intractable (CRSWNP), proven by nasal endoscopy and CT imaging, and a patient consenting to take part in the study.

EXCLUSION CRITERIA

Patients with acute rhinosinusitis, isolated sinus disease, polyps, prior sinonasal surgery, or contraindications to general anesthesia were excluded.

DATA COLLECTION PROCEDURES

Data were collected prospectively using a structured data collection form. Demographic characteristics, clinical presentation, imaging findings, operative details, postoperative outcomes, SNOT-22 scores, recurrence, and complications were recorded at each scheduled follow-up visit.

STATISTICAL ANALYSIS

Data analysis was performed using SPSS version 24.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean $\pm$ standard deviation (SD), whereas categorical variables were presented as frequency (n) and percentage (%). Paired t-tests were used to compare preoperative and postoperative SNOT-22 scores. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 75 patients were included in the study. The mean age was 44.7 ± 12.5 years. The mean preoperative SNOT-22 score was 62.4 ± 9.8 , which significantly decreased to 28.7 ± 7.6 at 12 months after surgery ($p < 0.001$). Nasal obstruction improved in 69 patients (92%), hyposmia in 47 patients (63%), facial pain in 46 patients (62%), and rhinorrhea in 61 patients (81%). Polyp recurrence was observed in 18 patients (24%), with a mean time to recurrence of 10.2 ± 3.4 months. Minor postoperative complications occurred in 5 patients (6.7%), whereas no major complications, including cerebrospinal fluid leak or visual loss, were observed. Patients who underwent extended FESS demonstrated greater improvement in SNOT-22 scores and a lower recurrence rate than those undergoing limited FESS ($p = 0.028$).

Table 1. Demographic Characteristics of Patients (n = 75)

Characteristic	n (%) / Mean $\pm$ SD
Age (years)	44.7 ± 12.5
Male	42 (56.0%)
Female	33 (44.0%)
Asthma	18 (24.0%)
Allergic rhinitis	22 (29.3%)
Diabetes mellitus	10 (13.3%)

Table 1. Baseline demographic and clinical characteristics of patients undergoing functional endoscopic sinus surgery. Continuous

variables are presented as mean $\pm$ standard deviation (SD), whereas categorical variables are presented as frequency (n) and percentage (%).

Table 2. Preoperative Clinical Symptoms and SNOT-22 Scores

Symptom	Preoperative n (%)	Mean $\pm$ SD Score
Nasal obstruction	75 (100%)	8.2 $\pm$ 1.1
Hyposmia/anosmia	60 (80%)	7.6 $\pm$ 1.4
Facial pain/pressure	55 (73%)	6.9 $\pm$ 1.3
Rhinorrhea	68 (90.7%)	7.1 $\pm$ 1.2
Total SNOT-22	-	62.4 $\pm$ 9.8

Table 2. Preoperative clinical symptoms and baseline. The Sino-Nasal Outcome Test-22 (SNOT-22) scores among patients with chronic rhinosinusitis with nasal polyps (CRSwNP). Data are presented as frequency (n), percentage (%), and mean $\pm$ standard deviation (SD). The table summarizes symptom severity before functional endoscopic sinus surgery (FESS).

Table 3. Postoperative Symptom Improvement at 12 Months

Symptom	Improved n (%)	Mean $\pm$ SD Score	p-value
Nasal obstruction	69 (92%)	3.2 $\pm$ 0.9	<0.001
Hyposmia/anosmia	47 (63%)	3.5 $\pm$ 1.1	<0.001
Facial pain/pressure	46 (62%)	3.1 $\pm$ 1.0	<0.001
Rhinorrhea	61 (81%)	3.3 $\pm$ 0.8	<0.001
Total SNOT-22	-	28.7 $\pm$ 7.6	<0.001

Table 3. Postoperative clinical outcomes at 12-month follow-up following functional endoscopic sinus surgery (FESS). Data are presented as frequency (n), percentage (%), and mean $\pm$ standard deviation (SD). Significant improvement was observed in nasal obstruction, olfactory function, facial pain, rhinorrhea, and overall SNOT-22 scores compared with preoperative assessment.

Table 4. Recurrence and Complications

Parameter	n (%)
Polyp recurrence	18 (24%)
Mean time to recurrence (months)	10.2 $\pm$ 3.4
Minor complications (epistaxis, crusting)	5 (6.7%)
Major complications (CSF leak, vision loss)	0 (0%)

Table 4. Postoperative recurrence and complications following functional endoscopic sinus surgery (FESS). Data are presented as frequency (n), percentage (%), and mean $\pm$ standard deviation (SD). The table summarizes the recurrence rate, mean time to recurrence, and the frequency of minor and major postoperative complications observed during the 12-month follow-up period.

Table 5. Effect of Surgical Extent on Outcome

Surgery Type	Patients n (%)	Mean SNOT-22 Improvement	Recurrence n (%)	p-value
Limited FESS	33 (44%)	28.2 $\pm$ 7.5	9 (27%)	0.028
Extended FESS	42 (56%)	34.1 $\pm$ 8.0	9 (21%)	0.028

Table 5. Comparison of clinical outcomes according to the extent of functional endoscopic sinus surgery (FESS). Data are presented as frequency (n), percentage (%), and mean $\pm$ standard deviation (SD).

Patients who underwent extended FESS demonstrated greater improvement in SNOT-22 scores and a lower recurrence rate than those who underwent limited FESS, with a statistically significant difference ($p = 0.028$).

DISCUSSION

The recurrence rate observed in the present study (24%) is comparable with previously reported recurrence rates following FESS. Mohamed et al. [16] identified disease severity, asthma, and extensive inflammatory involvement as important predictors of postoperative recurrence, while Zhang et al. [22] reported favorable long-term outcomes following meticulous surgical clearance combined with This is highly variable and reflects the complexity of (CRSwNP) and the necessity to develop personalized treatment strategies. The recurrence rates found in our study were similar to these findings, which are 24% at 12 months post-FESS [12]. The recurrence rate observed in the present study is consistent with previously published reports, supporting the long-term effectiveness of FESS when combined with appropriate postoperative management. Shows that FESS is apparently not effective in the long term, necessitating long-term management approaches to ensure symptom relief [13]. Several factors contribute to the recurrence of nasal polyps after FESS. The presence of comorbidities such as asthma and aspirin-exacerbated respiratory disease (AERD) has also been linked to increased recurrences [16]. We also found that asthmatics had a greater recurrence and that such comorbidities may affect surgical outcomes [15]. The extent of surgical intervention also influences long-term outcomes, with extended FESS being associated with lower recurrence rates and greater postoperative symptom improvement; it was also found that more comprehensive surgical procedures, including extended FESS, have lower rates of recurrence and do better in the long term [16]. Another important issue of FESS is its effect on quality of life. In our study, SNOT-22 scores improved significantly after surgery, indicating improved nasal function, reduced facial pain, and improved olfaction [8,10]. These results are consistent with the customary findings, which showed significant improvements in quality of life after FESS. It is, however, necessary to add that although the results provide symptomatic relief, certain patients still exhibit residual symptoms, and, as such, continued management and education assist patients in fully grasping. Our study results regarding surgical outcomes are comparable to those of other studies. As an example, a study by DeConde et al. reported a 22.2% recurrence rate among CRSwNP patients who underwent FESS. One study cited a recurrence rate of 18.2 percent in a series of 154 patients [19,20]. These and our studies highlight the need to consider patient-specific variables, including age, comorbidities, and extent of surgery, when planning and assessing outcomes of surgical interventions in (CRSwNP) [21]. In summary, although FESS offers a valid cure for (CRSwNP), nasal polyp recurrence and failure to clear symptoms in selected patients warrant multipronged management of the disease.

These findings emphasize the importance of careful patient selection, optimization of comorbid conditions, and appropriate surgical planning to improve long-term outcomes. Consideration of comorbidities and the full degree of surgery is necessary. Future studies should concern themselves with establishing predictive factors of recurrence and creating interventions to offset these risks to maintain symptom relief and quality of life enhancement over a long-term period among (CRSwNP) patients [22-23].

LIMITATIONS

This study was limited by its single-center design, relatively small sample size, and 12-month follow-up period, which may not adequately reflect long-term recurrence. Variations in postoperative treatment adherence and surgical technique may also have influenced

clinical outcomes. Larger multicenter studies with longer follow-up are recommended.

CONCLUSION

Functional endoscopic sinus surgery is a safe and effective treatment for chronic rhinosinusitis with nasal polyps, providing significant symptom relief and improved quality of life. Although recurrence may occur in a subset of patients, careful patient selection, meticulous surgical technique, and appropriate postoperative management can improve long-term outcomes and reduce the risk of recurrence.

Author Contributions (ICMJE)

Tahreem Fatima: Conceptualization, study design, data collection, manuscript drafting, and final approval.

Shakir Ullah: Study design, statistical analysis, data interpretation, manuscript drafting, and final approval.

Imran Khan: Conceptualization, supervision, critical revision of the manuscript, and final approval.

Mushtaq Ahmad: Data collection, data interpretation, manuscript editing, critical revision, and final approval.

Muhammad Afaq: Statistical analysis, manuscript review, critical revision, and final approval.

Osama Nawaz: Data collection, supervision, manuscript editing, critical revision, and final approval.

All authors made substantial contributions to the conception and design of the study, acquisition, analysis, and interpretation of data, critically revised the manuscript for important intellectual content, approved the final version for publication, and agree to be accountable for all aspects of the work in accordance with the ICMJE authorship criteria.

Funding

The authors received no financial support for this study.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval

Ethical approval was obtained from the Institutional Review Board of Khyber Teaching Hospital, Peshawar (Ref. No. KTH/766/11/2022). Written informed consent was obtained from all participants before enrollment. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

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Data Availability Statement:

All data generated or analyzed during this study are available from the corresponding author upon reasonable request.

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