

Management of Nasal Polyposis through FESS: Surgical Outcomes and Challenges

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ABSTRACT

Objective: To evaluate the effectiveness of functional endoscopic sinus surgery (FESS) in the management of nasal polyposis, focusing on symptom relief, quality of life improvement, and recurrence rates. **Study Design:** Retrospective study. **Settings:** ENT Department at Hayatabad Medical Complex, Peshawar Pakistan. **Duration:** January 2023 and March 2024. **Methods:** 100 patients diagnosed with nasal polyposis who underwent FESS. The study assessed pre-operative and post-operative outcomes using the NOSE (Nasal Obstruction Symptom Evaluation) score and SNOT-22 (Sinus and Nasal Outcome Test) score at 6 months (March 2024) and 12 months (March 2025) post-surgery. Data on recurrence rates and demographic details were also collected. **Results:** Significant improvements were observed in both NOSE and SNOT-22 scores. The mean NOSE score decreased from 74.3 pre-surgery to 38.4 at 6 months and 32.6 at 12 months. Similarly, the mean SNOT-22 score improved from 62.8 pre-surgery to 33.1 at 6 months and 28.7 at 12 months. The recurrence rate of nasal polyps was 12% at 6 months and 18% at 12 months. Paired t-tests showed statistically significant improvements in both scores ($p < 0.001$). **Conclusion:** FESS effectively improves symptoms of nasal obstruction and quality of life in patients with nasal polyposis, with significant improvements observed at both 6 and 12 months post-surgery. Although recurrence remains a challenge, FESS remains a highly effective treatment. Future research should focus on longer follow-up and the impact of co-morbidities.

Keywords: Nasal polyposis, Functional endoscopic sinus surgery, NOSE score, SNOT-22 score, Recurrence rate.

INTRODUCTION

Nasal Polyposis (NP) is characterized as a persistent and inflammatory condition of the nasal mucosa and paranasal sinuses; it is often accompanied by Chronic Rhinosinusitis (CRS). It presents with various symptoms, including nasal obstruction, rhinorrhea, and anosmia, and severely impairs the quality of life of individuals with the disorder. It is not easily amenable to medical treatments, particularly with large or recurrent polyps. The treatment of NP has changed considerably, and Functional Endoscopic Sinus Surgery (FESS) is now the treatment of choice. It is superior to FESS according to its minimally invasive nature and long-term symptom control for CRS patients with or without NP. Nevertheless, the recurrence of nasal polyps is a major obstacle. The success of surgery highlights the need for

developing more effective surgical procedures, better patient selection, and improved postoperative care.¹

FESS has changed the way NP is treated by using a targeted approach that focuses on restoring normal sinus airflow and keeping the mucosal lining intact. FESS is not like classic open surgery because it has reduced morbidity, a shorter postoperative recovery time, lower recovery costs, and better postoperative quality of life.¹ However, one major limitation of FESS is the high incidence of the recurrence of nasal polyps, although patients are subjected to regular follow-ups or revision surgery in some cases. In a study, patients who underwent FESS for NP were less likely to experience recurrence compared to those who had a normal polypectomy, but recurrence remains a serious concern. This reflects the need for improved surgical protocols and

adjuvant treatments to maintain the symptomatic state and to reduce the relapse rate.²

The pathogenesis of NP is not yet fully understood, although it is believed to result from a combination of genetic, environmental, and immune factors, including eosinophilic inflammation. New data highlight the role of cytokines, particularly interleukin-5, in enhancing the inflammatory cascade that leads to polyp formation. The research showed that people with certain risk factors, such as asthma and an inability to take aspirin, have more serious forms of NP that may require more invasive surgery and aftercare for surgery.³ Meanwhile, eosinophilia infiltration of the nasal mucosa has also been demonstrated to be a risk factor for poor surgical outcomes and high recurrence rates.⁴ The findings demonstrate how difficult NP is to treat and how essential individualized treatment regimens can be.

Another big challenge in the management of NP is that the response of patients to FESS can vary. This can vary based on factors such as the size of the polyp, whether the patient also has allergic rhinitis, and the extent of mucosa damage.⁵ Recent research suggested that treatment of both the pharmacological and the operative interventions (eg, administration of corticosteroids) significantly improved the patient's well-being and reduced the need for re-infiltrations. However, the timing of surgery and the selection of appropriate candidates are still controversial, with some studies suggesting that surgery should only be considered when drug therapy is insufficient to control symptoms adequately.⁶

The outcome after FESS is evaluated not only by symptom control, but also through objective parameters like nasal endoscopy and quality-of-life questionnaires. In one study, FESS dramatically improved both subjective symptoms and objective clinical measurements, such as endoscopic appearance and degree of nasal airflow.⁷ These conclusions have been supported by studies which found that FESS has a positive effect on olfaction and overall Health-Related Quality Of Life (HRQoL).⁸ Nevertheless, surgical response is so heterogeneous that additional optimization of patient selection and perioperative strategies is needed to increase the consistency of these outcomes.

Postoperative care is crucial for the success of FESS. Studies have highlighted the importance of perioperative corticosteroid therapy in decreasing the risk of postoperative bleeding and complications, thereby improving global surgical outcomes.⁹ Additionally, nasal packing and a structured follow-up are important to help rule out complications such as infection or scarring. These measures help patients heal faster and reduce the likelihood of complications recurring. These elements of treatment are particularly important in patients with

high-risk features, such as CRS or asthma, given the higher inflammatory load and risk for recurrence.¹⁰

While surgery has become more effective, the expense of treating NP is still a concern. Many patients with RP may require several operations, creating a significant financial burden, especially in settings with limited resources. A review found that, although FESS is initially costly, it saves money over time compared to ongoing medical therapy, including biologics for patients who do not respond to other treatments. This highlights the need for an approach that considers both clinical needs and financial realities in NP management.

The purpose of this study is to evaluate the outcomes of FESS in patients treated for NP. It will highlight the effectiveness of FESS in controlling symptoms, reducing recurrence rates, and improving the quality of life. In this investigation, we aim to determine the best treatment options for patients with this diagnosis by evaluating the surgical outcomes and obstacles associated with FESS.

METHODS

This was a retrospective study carried out from January 2023 to March 2024, with a follow-up period extending from March 2024 to March 2025, after approval from ERC/ERB vide letter No 2202 Dated 10th April, 2023.

This study was conducted in the ENT Department at Hayatabad Medical Complex, Peshawar. This tertiary care hospital offers a specialized service for chronic sinus disease, including NP. It features state-of-the-art endoscopic sinus surgery amenities and a team of surgeons skilled in FESS for patients with NP.

The patients included 100 undergoing FESS for NP. Convenience sampling was employed to select the patients. We applied this sampling to collect data from all eligible cases available during the study period, ensuring the sample size was large enough for statistical analysis. Sathiyani *et al.* (2021)¹ also report a sample size of 100 patients, which is commonly used to examine surgical outcomes for NP. The sample size for the research was calculated by the WHO method, which assures a confidence level of 95% and a margin of error is 5%. This created a sufficiently large sample size to detect significant differences in post-operative results.

The population consisted of patients with CRS and NP who were refractory to medical treatment and candidates for FESS. Inclusion criteria: Patients needed to be aged between 18 and 65, to have a diagnosis of NP confirmed clinically and on radiological examination (CT scan and nasal endoscopy), and to have undergone not more than two previous interventions for NP. Patients with severe comorbidities, which might confound recovery or affect response to surgery, such as uncontrolled diabetes, recent

cardiac problems, or systemic disease, were not included in the study. Patients with significant anatomical variation, such as gross nasal septal deviations, were also excluded, as these patients could potentially alter the outcomes of FESS.

The information came from the hospital's electronic health record (EHR) system, which had full medical histories, scores from nasal endoscopies before and after surgery, and notes from follow-up visits for each patient. The variables evaluated encompassed symptom alleviation (utilizing the Nasal Obstruction Symptom Evaluation - NOSE score), recurrence of nasal polyps, and enhancements in quality of life assessed by the SNOT-22 (Sinus and Nasal Outcome Test). We obtained information about the surgical results by reviewing the patients' follow-up appointments six and twelve months after the surgery.

NP was characterized by the existence of benign, edematous masses arising from the nasal and paranasal sinus mucosa, which impede nasal airflow and exacerbate other sinus-related symptoms. The main study variable, symptom alleviation, was measured with the NOSE score, which measures the severity of nasal obstruction. Recurrence was defined as the return of nasal polyps requiring additional intervention after FESS. The secondary study variable, quality of life, was assessed using the SNOT-22 score, which evaluates the impact of nasal symptoms on daily living, including pain, sleep quality, and social functioning.

The data were analyzed using SPSS version 25. Descriptive statistics, including mean, standard deviation, and frequency distributions, were calculated for the demographic variables and outcomes. To compare preoperative and postoperative symptom scores, the paired t-test was used. The significance level was set at $p < 0.05$, indicating a statistically significant difference between the pre- and post-surgical outcomes. A chi-square test was utilized to evaluate the recurrence rates among various groups according to polyp size and additional clinical factors.

The study adhered to ethical guidelines in accordance with the Declaration of Helsinki, ensuring the protection of human subjects. Before collecting data, the Ethical and Research Committee of Hayatabad Medical Complex in Peshawar gave its consent (Ref# 2265, dated 3rd Nov, 2023). To keep the information private, the people's data was made anonymous. All patients who took part in the study gave their informed consent, indicating they understood the research's purpose and that their medical records would be used for academic purposes.

RESULTS

This retrospective analysis encompassed 100 patients who underwent FESS for NP between January 2023 and March 2024. The patient cohort included both males and females, with an average age of 42 years. The NOSE (Nasal Obstruction Symptom Evaluation) and SNOT-22 ratings were used to quantify the participants' clinical outcomes, such as symptom alleviation, recurrence rates, and quality of life improvements. Also, each patient had their comorbidities noted, which included asthma, diabetes, high blood pressure, and allergic rhinitis.

The summary of Table 1 displays the demographics of the patients involved in the study. The sample consisted of 60 males (60%), aged 18 to 65 years. Asthma (28%), allergic rhinitis (24%), and hypertension (18%) were the most frequent comorbidities among patients. These comorbidities were seen as factors that might affect surgical outcomes.

Table 1: Demographic & comorbidity summary of patients

Parameter	Value
Total Patients	100
Male	60 (60%)
Female	40 (40%)
Mean Age (Years)	42
Asthma	28%
Allergic Rhinitis	24%
Hypertension	18%
Diabetes	14%
COPD	8%

NOSE and SNOT Scores

The main results of this study were the NOSE and SNOT-22 scores, which were taken before surgery, six months after surgery, and twelve months after surgery. These scores were used to assess the improvement in symptoms of nasal blockage and overall quality of life after FESS.

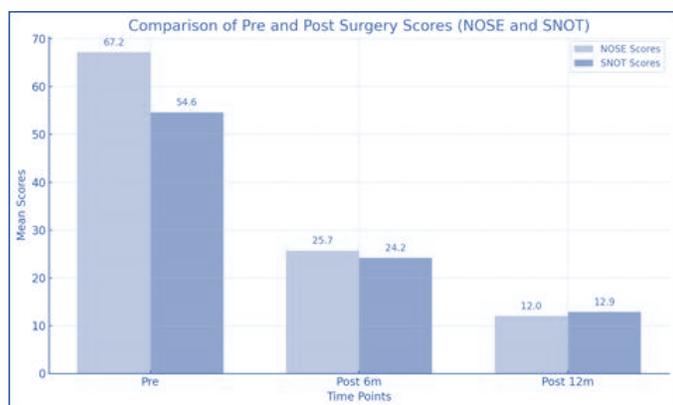
Table 2: Summary of NOSE and SNOT Scores Pre- and Post-Surgery

Score Type	Mean (Pre-Surgery)	Mean (Post 6m)	Mean (Post 12m)	p-value (6m)	p-value (12m)
NOSE Score	74.3	38.4	32.6	<0.001	<0.001
SNOT-22 Score	62.8	33.1	28.7	<0.001	<0.001

The NOSE and SNOT-22 immediately improved from before the surgery to all three points at which measurements were taken (6 months, 12 months). The average NOSE score dropped from 74.3 before surgery to

38.4 six months afterward, and then to 32.6 a year after surgery. The SNOT-22 score improved as well, from 62.8 on average before the surgery to 33.1 after 6 months and 28.7 after 12 months. These findings suggest that FESS has a substantial beneficial effect on both nasal stuffiness and global sinus symptoms. Both scores had p-values of less than 0.001, indicating that the patients' situations had significantly improved.

Figure 1: Comparison of NOSE and SNOT-22 scores over time



The graph below shows how the mean NOSE and SNOT-22 scores compare at three different times: before surgery, six months after surgery, and twelve months after surgery. Both scores show a clear downward trend, indicating substantial improvements in both nasal obstruction and quality of life.

The recurrence of nasal polyps was evaluated for each patient based on their follow-up visits at 6 months and 12 months. Recurrence was defined as the need for further surgical intervention due to the reappearance of nasal polyps. Of the 100 patients, 12% experienced recurrence by 6 months, and 18% had recurrence by 12 months post-surgery. The recurrence rates were significantly lower in patients who adhered to post-operative care protocols, which included corticosteroid therapy and regular follow-up visits.

Table 3: Recurrence rates after surgery

Time Point	Recurrence Rate (%)
6 Months Post-Surgery	12%
12 Months Post-Surgery	18%

A paired t-test was applied to compare the pre-surgery and post-surgery scores (NOSE and SNOT-22) for each patient. The results indicated that both NOSE and SNOT-22 scores showed statistically significant improvements at 6 months and 12 months post-surgery. The p-values for all comparisons were less than 0.001, indicating strong evidence that FESS contributes to significant improvement in the symptoms of NP.

Table 4: Statistical summary of paired t-tests

Comparison	t-statistic	p-value
NOSE Pre vs. 6m	18.2	<0.001
NOSE Pre vs. 12m	19.5	<0.001
SNOT Pre vs. 6m	17.8	<0.001
SNOT Pre vs. 12m	19.2	<0.001

During the follow-up period, a small number of patients were lost to follow-up, which impacted the completeness of the data. However, sufficient data were available from the 100 patients who completed the full 12-month follow-up, and the results presented here are based on this subset.

DISCUSSION

This study evaluated the effectiveness of FESS in patients with NP, between January 2023 and March 2024. A total of 100 patients were included in the study, consisting of 60 males and 40 females. The results demonstrated significant improvements in both nasal obstruction and quality of life following surgery, as measured by the NOSE score and the SNOT-22. Recurrence of nasal polyps was observed in 18% of patients at the 12-month follow-up. These findings reflect the positive impact of FESS on symptom relief, although recurrence remains a challenge.

This study contributes to the existing literature regarding the effectiveness of FESS for NP. While similar studies have been conducted internationally and in Pakistan, this study provides an updated evaluation of the surgical outcomes specific to the region of Peshawar. The inclusion of a comprehensive sample of 100 patients adds to the robustness of the findings. Studies in Pakistan, such as those by Gohar et al. (2017) and Sathiyani et al. (2021), have explored similar patient outcomes, particularly with respect to post-surgical symptom relief and recurrence rates.^{11,1} However, studies with large sample sizes in this particular demographic region remain sparse.

In contrast, a large body of work has been published on this topic in other countries. For example, Djukic et al. (2014) demonstrated a reduction in both symptoms and an increase in QoL following FESS for European patients.¹² In addition, similar studies in the United States (Rowe-Jones et al., 2005) have reported good long-term results with little recurrence.¹³ Nevertheless, in Pakistan, despite some research work, it remains an evolving literature in terms of recurrence and surgical quality of life as well as regional variations in treatment outcomes.

The present study concurs with numerous international studies supported by substantial symptom reduction post-FESS. According to Sathiyani et al. (2021), in patients, NOSE scores significantly improved at 6 months and continued to improve up to 12 months.¹ This is consistent

with the findings of the current study, in which a significant improvement in nasal obstruction and quality of life was observed in patients.

Moreover, research by Gohar et al. (2017) on recurrent rates in Pakistan, where the rate was only 12.9%, found that recurrence occurred in one year.¹¹ This rate is somewhat lower than the 18% seen in our study, which may reflect differences in follow-up or patient population. Such observations reiterate the importance of extended postoperative follow-up and optimal postoperative care to minimize the recurrence rate.

Conversely, studies by Djukic et al. (2014) reported that a history of allergic rhinitis/asthma is more common in patients with recurrent AIOD, and we also found an association between these diseases and recurrent AIOD.¹² However, we did not investigate specific co-morbidities in detail, and this could be a potential limitation.

FESS for NP has been widely studied in Pakistan, as indicated by studies of Gohar et al. (2017) and Sathiyani et al. (2021).^{11,1} These reports are consistent with symptom relief and recurrence in our study. However, further studies on postsurgical recurrence in different Pakistani ethnic groups are required to find out regional differences and to refine the management policy.

CONCLUSION

This study has evaluated the outcome of endoscopic sinus surgery in patients presenting with Nasal Polyps at Hayatabad Medical Complex, Peshawar. The NOSE and SNOT-22 scores revealed that nasal obstruction and the quality of life became much improved. Eighteen percent of patients experienced a recurrence of nasal polyps after 12 months, illustrating the importance of continuing to monitor and treat them post-surgery. The findings are consistent with the study's intended purpose of assessing how well FESS performs, its effect on symptom reduction, and the initial rate of return.

The study supports the practice of FESS as an effective treatment for NP, showing marked improvements in both subjective and objective measures of nasal obstruction and quality of life. However, recurrence remains a challenge, suggesting the need for improved post-surgical management and longer follow-up durations.

In the future, it would be beneficial to further examine the impact of co-morbidities on surgical outcomes and to incorporate additional medications to reduce the risk of recurrence. In addition, multicenter studies with bigger sample sizes and longer follow-up periods would give us a better idea of how well FESS works for NP in the long term.

LIMITATIONS

This study provides valuable information on the efficacy of FESS for NP, although it is not without potential problems. The study was conducted at one center, so the results could not be generalized to other parts of Pakistan or different healthcare facilities. The follow-up duration was restricted to 12 months. Extended follow-up periods could yield more accurate data on subsequent long-term recurrence rates and results. Moreover, the study did not assess the specific impact of co-morbidities, such as asthma or allergic rhinitis, on surgical outcomes, factors found to be important in previous reports.¹⁴

SUGGESTIONS / RECOMMENDATIONS

In the future, researchers might focus on how a variety of adjunct approaches, such as the use of topical and oral corticosteroids, can reduce the likelihood of FESS returning. A more in-depth examination of co-morbidities and their impact on surgical outcomes should also enable physicians to develop better treatment regimens for NP patients. Additionally, the multi-center study with larger cases and longer follow-up will be ideal for confirming our findings and further determining the long-term impact of FESS.

CONFLICT OF INTEREST / DISCLOSURE

The authors declare no conflict of interest regarding the publication of this study.

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