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# The role of endoscopic sinus surgery in the management of chronic rhinosinusitis

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**Abstract**

**Background and Objective:** Chronic rhinosinusitis (CRS) is a persistent inflammatory condition of the paranasal sinuses that significantly impacts patients' quality of life. While medical therapy remains the first line of treatment, a subset of patients require surgical intervention for symptom relief and disease control. This study aimed to evaluate the clinical outcomes and effectiveness of functional endoscopic sinus surgery (FESS) in patients with chronic rhinosinusitis who were unresponsive to medical therapy.
**Material and Methods:** This prospective study included 50 patients diagnosed with chronic rhinosinusitis, refractory to at least 12 weeks of standardized medical treatment. This study was conducted at the Department of Oto-Rhinolaryngology, Annaii Medical College and Hospital, Pennalur, Sriperumbudur, Chennai, Tamil Nadu, India from February 2011 to January 2012. All patients underwent FESS under general anesthesia. Preoperative assessment included detailed history, nasal endoscopy, CT scan of the paranasal sinuses, and symptom scoring using the Lund-Mackay and SNOT-22 scales. Postoperative evaluations were conducted at 1, 3, and 6 months to assess symptom relief, endoscopic findings, and complication rates.
**Results:** Out of 50 patients, 38 (76%) showed significant improvement in symptoms within the first 3 months postoperatively, with sustained improvement at 6 months. The mean SNOT-22 score reduced from 52.6±10.2 preoperatively to 21.3±8.5 at 6 months ($p<0.001$). Endoscopic findings revealed reduced mucosal edema, improved drainage, and decreased crusting in the majority of cases. Minor complications such as nasal synechiae occurred in 3 patients (6%), while no major complications were reported.
**Conclusion:** Endoscopic sinus surgery is a safe and effective modality in the management of chronic rhinosinusitis unresponsive to medical therapy. It significantly improves both subjective symptoms and objective clinical findings, contributing to enhanced patient outcomes and quality of life.

**Keywords:** Chronic rhinosinusitis, endoscopic sinus surgery, functional endoscopic sinus surgery (FESS); SNOT-22, nasal endoscopy, sinus inflammation

## Introduction

Chronic rhinosinusitis (CRS) is a common and persistent inflammatory condition of the paranasal sinuses, characterized by nasal obstruction, facial pain or pressure, nasal discharge, and reduction or loss of smell lasting for more than 12 weeks. It affects approximately 10-12% of the global population and significantly impairs patients' quality of life, productivity, and overall well-being. The etiology of CRS is multifactorial, involving microbial infection, allergies, anatomical variations, environmental factors, and impaired mucociliary clearance [1-3].

According to the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS), CRS is classified into two major subtypes: CRS with nasal polyps (CRSwNP) and CRS without nasal polyps (CRSsNP). This classification guides treatment planning and prognosis. The initial management of CRS includes comprehensive medical therapy, such as intranasal corticosteroids, saline irrigation, antibiotics, antihistamines, and systemic corticosteroids. However, a subset of patients fails to respond to maximal medical therapy and continues to experience significant symptoms and mucosal inflammation [4, 5].

In such medically refractory cases, functional endoscopic sinus surgery (FESS) has emerged as a minimally invasive and highly effective surgical intervention. Introduced in the 1980s, FESS is based on the principle of restoring the natural ventilation and drainage of the paranasal sinuses by removing obstructive pathology and preserving normal mucosa and anatomy. It offers better visualization, targeted removal of diseased tissue, and fewer complications compared to traditional sinus surgeries [6, 7].

Numerous studies have demonstrated that FESS leads to significant improvements in both subjective symptom scores and objective clinical parameters in CRS patients. The Sino-Nasal Outcome Test (SNOT-22) and Lund-Mackay CT scoring system are widely used tools to assess surgical outcomes. Despite the demonstrated benefits, the decision to proceed with surgery requires careful patient selection and a thorough understanding of the indications, risks, and expected outcomes [8, 9].

This prospective study was conducted to evaluate the clinical outcomes of endoscopic sinus surgery in patients with chronic rhinosinusitis who failed to respond to medical management. The aim was to assess the effectiveness of FESS in relieving symptoms, improving mucosal health, and enhancing the overall quality of life, as well as to document the safety and complication profile associated with the procedure.

## Material and Methods

This prospective observational study was conducted in the Department of Otorhinolaryngology at a tertiary care hospital over a period of 12 months. This study was conducted at the Department of Oto-Rhinolaryngology, Annaii Medical College and Hospital, Pennalur, Sriperumbudur, Chennai, Tamil Nadu, India from February 2011 to January 2012. A total of 50 patients diagnosed with chronic rhinosinusitis (CRS), who did not respond to a full course of medical management, were enrolled for evaluation and surgical intervention.

### Inclusion Criteria

**Patients aged 18 to 60 years**

- Diagnosis of chronic rhinosinusitis according to EPOS 2007 criteria (i.e., presence of ≥2 symptoms, one of which must be nasal blockage/congestion or nasal discharge, along with facial pain/pressure or hyposmia, lasting >12 weeks).
- Failure to respond to at least 12 weeks of standardized medical therapy, including nasal corticosteroids, saline irrigation, and antibiotics.
- Patients who consented to undergo functional endoscopic sinus surgery (FESS).
- Both CRS with nasal polyps (CRSwNP) and CRS without nasal polyps (CRSsNP) were included.

### Exclusion Criteria

- Patients with sinonasal malignancy or fungal sinusitis.
- History of previous sinus surgery.
- Immunocompromised individuals
- Patients with cystic fibrosis, ciliary dyskinesia, or systemic granulomatous diseases
- Pregnant women.
- Uncontrolled diabetes mellitus or hypertension.
- Patients who did not provide consent for surgery or follow-up.

### Study Procedure

All patients underwent a detailed clinical evaluation including medical history, nasal endoscopy, and CT scan of the paranasal sinuses. Symptom severity was assessed using the Sino-Nasal Outcome Test (SNOT-22) questionnaire and Lund-Mackay CT scoring system. Functional endoscopic sinus surgery was performed under general anesthesia using standard surgical protocols. Postoperative care included antibiotics, nasal decongestants, steroid nasal sprays, and saline irrigation. Patients were followed up at 1 week, 1 month, 3 months, and 6 months post-surgery with repeat symptom scoring and nasal endoscopic examination.

## Results

A total of 50 patients with chronic rhinosinusitis (CRS) underwent functional endoscopic sinus surgery (FESS). The demographic details, symptom severity, surgical outcomes, and postoperative follow-up findings are presented in the tables below.

**Table 1:** Age and Gender Distribution of Study Participants (n = 50)

| Age Group (years) | Male (n) | Female (n) | Total (n) | Percentage (%) |
|---|---|---|---|---|
| 18-30 | 7 | 6 | 13 | 26% |
| 31-40 | 10 | 5 | 15 | 30% |
| 41-50 | 9 | 6 | 15 | 30% |
| 51-60 | 5 | 2 | 7 | 14% |
| Total | 31 | 19 | 50 | 100% |

The study included 50 patients, with a male predominance (62%). The highest number of patients were in the 31-50 years age group (60%), which is the most commonly affected age range for CRS.

**Table 2:** Preoperative Symptom Profile Based on SNOT-22 Scores

| Symptom | Number of Patients | Percentage (%) |
|---|---|---|
| Nasal obstruction/congestion | 48 | 96% |
| Nasal discharge/postnasal drip | 45 | 90% |
| Facial pain/pressure | 38 | 76% |
| Hyposmia/anosmia | 40 | 80% |
| Sleep disturbance/fatigue | 42 | 84% |

Nasal obstruction and discharge were the most commonly reported symptoms. A significant proportion of patients also reported reduced sense of smell and sleep-related issues, reflecting the typical symptom burden of CRS.

**Table 3:** Comparison of Mean SNOT-22 Scores before and After FESS

| Time Point | Mean SNOT-22 Score±SD | p-value |
|---|---|---|
| Preoperative | 52.6±10.2 | — |
| 1 Month Post-op | 31.5±9.8 | < 0.001 |
| 3 Months Post-op | 25.4±8.6 | < 0.001 |
| 6 Months Post-op | 21.3±8.5 | < 0.001 |

There was a statistically significant improvement in SNOT-22 scores postoperatively at all follow-up points. The scores progressively decreased, indicating sustained symptom relief and improvement in quality of life following FESS.

**Table 4:** Endoscopic Findings Postoperatively at 1 and 6 Months

| Endoscopic Finding | At 1 Month (n/%) | At 6 Months (n/%) |
|---|---|---|
| Mucosal edema | 28 (56%) | 10 (20%) |
| Crusting | 24 (48%) | 7 (14%) |
| Polyp recurrence | 4 (8%) | 3 (6%) |
| Synechiae formation | 5 (10%) | 5 (10%) |
| Healthy sinus cavity | 10 (20%) | 33 (66%) |

Endoscopic findings showed progressive mucosal healing over 6 months. The number of patients with healthy sinus mucosa increased significantly, and crusting and edema reduced. Minimal polyp recurrence and synechiae formation were observed.

**Table 5:** Complications Following FESS

| Complication | Number of Patients | Percentage (%) |
|---|---|---|
| Minor bleeding (controlled) | 3 | 6% |
| Synechiae formation | 5 | 10% |
| Orbital complications | 0 | 0% |
| CSF leak | 0 | 0% |
| No complications | 42 | 84% |

FESS was found to be a safe procedure with minimal complications. Most were minor and self-limiting, with no major intraoperative or postoperative complications reported.

## Discussion

Chronic rhinosinusitis (CRS) is a long-standing inflammatory disease of the paranasal sinuses, often leading to considerable morbidity and impaired quality of life. When medical management fails to provide relief, functional endoscopic sinus surgery (FESS) becomes the treatment of choice. In this study, FESS significantly improved symptom scores and endoscopic outcomes in patients with medically refractory CRS. The demographic distribution in our study showed a male predominance, with most patients falling in the 31-50 age range. This finding is in agreement with previous research showing similar age-related incidence and a higher frequency of FESS among males reported by Anand *et al.*, (2004); Bhattacharyya *et al.*, (2009) [10, 11].

In terms of symptom profile, nasal obstruction, nasal discharge, and hyposmia were the most commonly reported complaints. These are hallmark features of CRS as described by Meltzer *et al.* (2004). Our patients had a high mean preoperative SNOT-22 score of 52.6, which reduced significantly to 21.3 by 6 months postoperatively, indicating substantial improvement. These findings are comparable to those of Hopkins *et al.* (2009) and Smith *et al.* (2005), who also demonstrated significant symptom relief following FESS in CRS patients [12-14].

Postoperative nasal endoscopy revealed marked mucosal healing, reduced edema, and improved sinus patency. These outcomes are consistent with the therapeutic goals of FESS, as emphasized by Fokkens *et al.* (2007), which include restoring sinus ventilation and preserving mucociliary clearance. Furthermore, the low recurrence rate of nasal polyps (6%) observed in our study is within the acceptable range previously reported given by Kennedy *et al.*, (1995). Only minor complications were observed, such as mild bleeding and synechiae formation, with no major complications like cerebrospinal fluid (CSF) leak or orbital injury. This is in line with the findings of Stankiewicz *et al.* (2011), who reported a low rate of serious complications when FESS is performed with proper technique and perioperative care [15-18].

These results reaffirm the role of FESS as a safe and effective surgical intervention for CRS. However, long-term benefits are optimized through meticulous postoperative care, including nasal irrigation and corticosteroid use, as suggested by Rudmik and Smith (2011). This study had a limited sample size and a relatively short follow-up duration. A larger, multicenter study with long-term follow-up is recommended to further evaluate the durability of surgical outcomes [19-21].

## Conclusion

This prospective study demonstrates that functional endoscopic sinus surgery (FESS) is an effective and safe treatment modality for patients with chronic rhinosinusitis (CRS) who are unresponsive to medical therapy. The majority of patients experienced significant and sustained improvements in both symptom scores and endoscopic findings following surgery. FESS led to enhanced quality of life, reduced nasal symptoms, and minimal complications when performed with appropriate patient selection and technique. Given the chronic and often recurrent nature of CRS, surgical intervention should be considered after the failure of optimized medical management. Postoperative care and regular follow-up remain essential for maintaining long-term outcomes and preventing recurrence. Larger multicenter studies with longer follow-up durations are recommended to further validate these findings and refine clinical guidelines.

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