

Clinico-Epidemiological Profile and Perioperative Outcomes Including Complications of Functional Endoscopic Sinus Surgery (FESS): A Cross-Sectional Study

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ABSTRACT:

Introduction: Functional Endoscopic Sinus Surgery (FESS) is commonly used to treat chronic rhinosinusitis and other sinus disorders. However, limited data exist on patient characteristics and surgical outcomes in Nepal. This study aimed to evaluate the patient profile and early postoperative outcomes of FESS at Birat Medical College Teaching Hospital. **Methods:** A hospital-based cross-sectional study was conducted at Birat Medical College Teaching Hospital, Nepal, from July 2025 to March 2026. Adult patients undergoing elective FESS for chronic rhinosinusitis and related conditions were enrolled using consecutive sampling. Data were collected using a structured proforma and analyzed descriptively using PSPP software. Ethical approval was obtained (IRC-37-2081/82). **Results:** Among 60 patients, mean age was 37.8 ± 5.9 years, with male predominance. Chronic rhinosinusitis (38.33%), CRS with nasal polyposis (35%), and allergic fungal sinusitis (26.7%) were the commonest diagnoses. Allergies (68.3%) and deviated nasal septum (51.7%) were the most frequent comorbidity and anatomical variation, respectively. CRS refractory to medical therapy was the leading surgical indication (53.3%). Unilateral surgery was performed in 66.67%, with mean operative duration of 150.1 ± 31.6 minutes. All patients experienced mild-to-moderate postoperative pain, but all demonstrated early symptomatic improvement at one to four weeks follow-up. No major intraoperative or immediate postoperative complications were recorded. **Conclusions:** FESS was predominantly performed for chronic rhinosinusitis and nasal polyposis with favorable short-term outcomes. Although minor pain was universal, all patients showed early improvement, and no major complications occurred, supporting FESS as a safe and effective surgical option.

Keywords: Chronic rhinosinusitis; Complications; Functional endoscopic sinus surgery; Nasal polyposis.

INTRODUCTION

Chronic rhinosinusitis (CRS) is a common inflammatory condition of the nose and sinuses. It is defined by persistent symptoms lasting at least 12

weeks, along with signs of mucosal inflammation seen on nasal endoscopy or CT scan.¹ According to the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS 2020), diagnosis requires at least two symptoms, including either nasal blockage or nasal discharge, with or without facial pain or loss of smell.² CRS affects more than 10% of adults worldwide and significantly reduces quality of life, lowers work productivity, and increases healthcare costs.³

Treatment of CRS includes saline rinses, nasal corticosteroids, antibiotics when needed, and short courses of oral steroids for some patients.² Those who continue to have symptoms despite proper medical treatment are candidates for functional endoscopic sinus surgery (FESS). This surgery aims to restore sinus drainage, preserve normal mucosal function, and improve delivery of topical medications.²

FESS has become the gold-standard

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surgical treatment for CRS that does not respond to medication, CRS with nasal polyps, and selected cases of allergic fungal sinusitis.⁴ Advances in endoscopic tools and imaging have improved surgical accuracy, leading to better symptom control, improved quality of life, and fewer complications when performed by experienced surgeons.^{2,3} Recent evidence supports a more personalized approach to CRS management based on disease type and inflammatory patterns, highlighting the need to tailor surgical and postoperative care.⁵

Although FESS is now performed routinely worldwide, patient characteristics, reasons for surgery, anatomical variations, surgical findings, and outcomes vary across different populations and healthcare settings. Studies from Nepal have shown good results after FESS but are limited, mainly focusing on surgical outcomes rather than comprehensive patient profiles.⁶

Understanding the demographic pattern, clinical features, surgical details, and early outcomes of FESS patients is important for evaluating current practice and generating local evidence. Such information can help improve patient selection, guide preoperative counseling, and enhance surgical planning in resource-limited settings. Therefore, this study aimed to assess the patient profile, surgical characteristics, surgical findings, and perioperative outcomes of FESS at Birat Medical College Teaching Hospital, Morang, Nepal.

METHODS

We conducted a hospital-based cross-sectional study in the Department of Otorhinolaryngology at Birat Medical College Teaching Hospital, Morang, Nepal, over nine months from July 2025 to March 2026. The study included adult patients aged 18 years and above who underwent elective FESS for chronic rhinosinusitis and related sinus diseases during the study period.

We enrolled all eligible patients using total enumeration sampling with consecutive sampling until the study period ended. The sample included all patients meeting the inclusion criteria during the study duration. Patients who gave written informed consent were included. We excluded those with weakened immune systems, known sinus cancer, previous sinus surgery, or those who refused consent. No eligible patients were excluded during the study period.

Data were collected using a structured form developed after reviewing relevant literature and

validated by ENT specialists for content relevance and clarity. The form included socio-demographic information, clinical diagnosis, symptom duration, other medical conditions, anatomical variations, reasons for surgery, surgical findings, and postoperative outcomes including immediate complications and short-term recovery.

Data were obtained from preoperative clinical records, radiology reports, operation notes, and postoperative follow-up records. Postoperative outcomes were assessed during routine follow-up visits within 1-4 weeks after surgery as part of standard care. Postoperative pain was measured using a standard verbal rating scale during the immediate postoperative period and at follow-up visits. No additional procedures beyond routine care were performed for research purposes.

Data were entered into Microsoft Excel and analyzed using PSPP 2.1.1 statistical software. Continuous variables were shown as mean \pm standard deviation (SD), while categorical variables were presented as frequencies and percentages. Descriptive statistics were used for data presentation. Given the descriptive nature of the study, no sample size calculation was done beforehand, and inferential statistical analyses were not performed.

Ethical approval was obtained from the Institutional Review Committee (IRC) of Birat Medical College Teaching Hospital (Reference No: IRC-37-2081/82). Written informed consent was obtained from all participants before enrollment, and confidentiality of participant information was strictly maintained throughout the study.

RESULTS

A total of 60 patients who underwent FESS were included in the study. The average age of the participants was 37.8 ± 5.9 years, with most participants aged ≤ 40 years. Table 1 shows other socio-demographic characteristics. There was a slight male predominance. More than half of the participants lived in Sunsari district. Most had a bachelor's level education, and teaching was the most common occupation.

Table 2 shows the clinical presentation and baseline characteristics. The most common diagnosis was chronic rhinosinusitis, followed by chronic rhinosinusitis with nasal polyposis and allergic fungal sinusitis. The average symptom duration was 24.3 ± 9.8 months, with 73.3% of patients reporting symptoms for more than 12 months. Most patients had a history of allergies. Deviated nasal septum

Table 1. Socio-demographic Characteristics of Study Participants (N = 60)

Characteristics	Variables	n (%)
Age (years)	≤40	37 (61.6)
	≥41	23 (38.3)
Sex	Male	33 (55)
	Female	27 (45)
Place of Residence	Sunsari	32 (53.3)
	Morang	18 (30)
	Jhapa	10 (16.6)
Educational Status	Master	9 (15)
	Bachelor	37 (61.6)
	School level	9 (15)
	Illiterate	5 (8.3)
Occupation	Teacher	30 (50)
	Homemaker	13 (21.6)
	Traffic Police	12 (20)
	Electrician	5 (8.3)

Table 2. Clinical Presentation and Baseline Characteristics (N=60)

Characteristics	Variables	n (%)
Primary Diagnosis	Chronic Rhinosinusitis (CRS)	23 (38.3)
	CRS with Nasal Polyposis	21 (35)
	Allergic Fungal Sinusitis	16 (26.6)
Duration of Symptoms (months)	≤12 months	16 (26.6)
	>12 months	44 (73.3)
Previous Medical History	Allergies	41 (68.3)
	Asthma	6 (10)
	None	13 (21.6)
Anatomical Variants (multiple response)	Deviated Nasal Septum (DNS)	31 (51.6)
	Onodi Cells	12 (20)
	Haller Cells	9 (15)
	Concha Bullosa	8 (13.3)

Note: Multiple responses possible; percentages do not sum to 100%.

(DNS) was the most frequently seen anatomical variation.

Table 3 presents the surgical indications and intraoperative findings. The most common reason for FESS was chronic rhinosinusitis not responding to medical treatment. Unilateral surgery was performed in 66.7% of cases, and all procedures were done under general anesthesia. The average surgery time was 150.1±31.6 minutes, with 66.7% of procedures lasting more than 120 minutes. During surgery, polyps involving all sinuses were the most common finding. The average estimated blood loss

Table 3. Surgical Indications and Intraoperative Findings (N=60)

Characteristics	Variables	n (%)
Indication for FESS	CRS refractory to medical therapy	32 (53.3)
	Recurrent nasal polyposis	28 (46.6)
Type of Surgery	Unilateral	40 (66.6)
	Bilateral	20 (33.3)
Duration of Surgery (minutes)	≤120 minutes	20 (33.3)
	>120 minutes	40 (66.7)
Intraoperative Findings	Polyps in all PNS	40 (66.7)
	Maxillary & ethmoid sinus	9 (15)
	Maxillary sinus only	11 (18.3)
Estimated Blood Loss	≤100 mL	57 (95)
	>100 mL	3 (5)

was 95.8±41.3 mL, with most patients having blood loss of 100 mL or less.

All patients experienced mild-to-moderate pain immediately after surgery, which was managed with routine painkillers. No major complications (such as cerebrospinal fluid leak, eye injury, or severe bleeding) occurred during or right after surgery. All patients showed early symptom improvement during follow-up at 1-4 weeks after surgery.

DISCUSSION

This study evaluated the patient characteristics, surgical details, surgical findings, and early outcomes of FESS at a tertiary care teaching hospital in eastern Nepal. The results showed that most patients were young adults with chronic rhinosinusitis not responding to medical therapy. There was a high rate of allergies and anatomical variations, especially deviated nasal septum. FESS led to good early outcomes, with all patients reporting symptom improvement during follow-up. No major complications occurred. These findings match current international guidelines supporting FESS as an effective treatment for properly selected patients with CRS not responding to medication.^{2,3}

The average age was 37.8±5.9 years, with about two-thirds of patients aged 40 years or younger. Similar age patterns have been reported in both Nepalese and international studies, showing that CRS requiring surgery mainly affects people during their working years.^{3,6,7} This has important public health implications because CRS is linked to reduced work productivity, lower quality of life, sleep problems, and high healthcare costs.³ Early detection and timely referral of symptomatic patients

may therefore reduce disease burden and improve outcomes.

We found a slight male predominance, consistent with previous Nepalese reports.^{6,8} Although epidemiological studies suggest that CRS affects both sexes equally, surgical groups often have more male patients.³ This difference may be due to occupational exposure to dust, smoke, and pollutants, as well as differences in healthcare-seeking behavior, referral practices, and access to ENT services.

Chronic rhinosinusitis without nasal polyps was the most common diagnosis, followed by CRS with nasal polyposis and allergic fungal sinusitis. This pattern matches the classification system proposed by EPOS 2020, which separates CRS with and without nasal polyps as distinct conditions requiring different management approaches.² The relatively high number of nasal polyposis cases reflects advanced disease in patients coming for surgery. Recent advances in understanding inflammatory types emphasize that disease behavior and treatment response are influenced by underlying immune mechanisms rather than just appearance.⁵ Therefore, thorough preoperative assessment, including evaluation of allergy status and inflammatory features, may help personalize treatment and improve long-term results.

The average symptom duration was over two years, with nearly three-quarters of patients having symptoms for more than 12 months before surgery. This suggests delayed presentation and prolonged medical treatment before surgical referral. In resource-limited settings like Nepal, delayed referral may result from limited access to specialists, financial constraints, geographic barriers, and attempts at prolonged conservative treatment before surgical consultation. Long-standing sinus inflammation may lead to progressive tissue changes, poor mucus clearance, and reduced quality of life, making surgery more complex.^{2,3} Earlier identification of patients who do not respond to optimal medical therapy may therefore improve outcomes while reducing the long-term socioeconomic burden of CRS.

Allergies were found in more than two-thirds of patients, highlighting their important role in CRS development. Allergic inflammation causes persistent tissue swelling, blockage of sinus openings, poor drainage, and chronic changes that predispose patients to recurrent disease.^{3,5} The high allergy rate in this study emphasizes the need for comprehensive perioperative care, including

allergy evaluation, patient education, environmental control, and continued postoperative medical therapy. Such multidisciplinary management may reduce symptom recurrence and improve long-term surgical outcomes.

Among anatomical variations, deviated nasal septum was the most common finding, followed by Onodi cells, Haller cells, and concha bullosa. Similar findings have been reported in Nepalese studies of FESS patients.^{6,7} Anatomical variations themselves may not directly cause CRS, but they can impair sinus ventilation, block drainage pathways, and increase surgical difficulty. Identifying these variations on preoperative CT scans is essential for surgical planning, reducing the risk of eye or skull-base injury, and achieving complete disease clearance.²

Surgical Indications and Intraoperative Findings

The most common reason for surgery was CRS not responding to medical therapy, followed by recurrent nasal polyposis, consistent with EPOS 2020 recommendations for surgery after failed medical treatment.² Restoring normal sinus drainage, preserving mucosal function, and improving postoperative topical therapy remain the main goals of FESS. The predominance of unilateral procedures in this study likely reflects differences in disease distribution rather than variations in surgical practice.

The average operation time was 150.1±31.6 minutes, with 66.7% of procedures exceeding 120 minutes. This longer duration may be due to extensive polyposis and complex sinus disease requiring careful dissection. Extensive disease generally requires meticulous dissection and complete removal of obstructive tissue while preserving normal mucosa. During surgery, polyps involving all sinuses were the most common finding, indicating advanced disease at presentation.

Despite the complexity of these procedures, blood loss remained modest, with an average of 95.8±41.3 mL and most patients having blood loss of 100 mL or less. This finding supports previous evidence that FESS is a safe procedure with acceptable surgical risks when performed by experienced surgeons using modern techniques.^{9,10} The absence of major complications in this group further matches published reviews showing that FESS has a low complication rate when done by experienced surgeons.^{9,10}

More importantly, all patients reported early

symptom improvement during follow-up between one and four weeks after surgery. These findings are consistent with previous Nepalese studies showing significant improvement in quality-of-life measures after FESS.^{7,9} A study from eastern Nepal also reported significant improvement in SNOT-22 scores after FESS, confirming its effectiveness in improving patient-reported outcomes.⁷ Likewise, recent reviews and meta-analyses have consistently shown that FESS significantly improves sinus symptoms, quality of life, and functional status in patients with CRS not responding to medication, while maintaining low complication rates.^{9,10} Although this study evaluated only short-term outcomes, the universal early symptom improvement supports the effectiveness of FESS in properly selected patients managed within routine clinical practice.

This study provides valuable local evidence about the demographic characteristics, disease pattern, anatomical variations, reasons for surgery, and early outcomes of FESS patients in eastern Nepal. Such information is particularly important because published Nepalese data describing the comprehensive patient profile of FESS patients remain limited. The findings may help clinicians improve patient selection, enhance preoperative counseling, anticipate anatomical challenges during surgery, and plan postoperative follow-up in similar resource-limited settings.

Strengths and Limitations

The strengths of this study include the comprehensive evaluation of socio-demographic, clinical, radiological, surgical, and postoperative characteristics using total enumeration sampling, which reduces selection bias within the study period. However, several limitations should be noted. The study was conducted at a single tertiary care center with a relatively small sample size, which may limit the generalizability of the findings. The short follow-up period prevented assessment of long-term symptom control, recurrence, revision surgery, and sustained quality-of-life improvement.¹¹ Additionally, postoperative outcomes were evaluated

clinically rather than using validated patient-reported outcome measures such as the Sinonasal Outcome Test-22 (SNOT-22).¹² The absence of a control group prevents direct comparison with medical therapy or other surgical approaches. Furthermore, the lack of objective endoscopic or radiological assessment during follow-up limits the evaluation of mucosal healing and disease clearance. Future multicenter prospective studies with larger sample sizes, longer follow-up, objective endoscopic assessment, radiological evaluation, and standardized quality-of-life tools are needed to further establish predictors of successful surgical outcomes among Nepalese patients undergoing FESS.

CONCLUSIONS

Functional endoscopic sinus surgery (FESS) appears to be an effective and safe surgical option for patients with chronic rhinosinusitis that does not respond to medical treatment. In this study, most patients were young adults with long-standing disease, a high rate of allergies, and common anatomical variations such as deviated nasal septum. Chronic rhinosinusitis not responding to medical therapy was the most common reason for surgery, and polyps involving multiple sinuses were frequently seen during surgery. FESS showed good early results, with all patients reporting symptom improvement during short-term follow-up. No major complications were observed. These findings support the role of FESS in improving symptom burden and quality of life in properly selected patients in resource-limited settings. However, the short follow-up period and small sample size highlight the need for larger prospective studies with longer-term outcome assessment to confirm these findings and identify predictors of sustained improvement in the Nepalese population.

Conflict of Interest:

The authors declare that no competing interests exist

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None

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