Original Article

Outcome of Functional Endoscopic Sinus Surgery in Patients with Chronic Rhinosinusitis — A Study in a Tertiary Care Hospital in Bangladesh

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ABSTRACT

Introduction: *Chronic rhinosinusitis (CRS) significantly impacts the quality of life for many individuals. The aim of the study was to evaluate the impact of functional endoscopic sinus surgery on patients' symptom profiles and their overall quality of life.* ***Methods & Materials:*** *This prospective cross-sectional study was conducted at the Department of Otolaryngology in Monno Medical College Hospital, Manikganj, from July 2020 to July 2023. A total of 60 patients were selected as study subjects by simple random sampling as per inclusion and exclusion criteria. All patients were instructed to complete the SNOT-22 questionnaire 48 hours before and 6 months after the surgery. The gathered data were analyzed using various statistical techniques. Data analysis was performed with the Statistical Package for the Social Sciences (SPSS) version 22.0 for Windows.* ***Results:*** *It was observed that most of the patients (31,51.6%) had pre-existing asthma, followed by allergic rhinitis (23,38.3%), sleep apnea (17,28.3%), migraines (13,21.6%), chronic pulmonary disease (11,18.3%), and obesity (10,16.6%). In this series, a statistically significant improvement was observed between the scores of pre and postoperative SNOT-22 in the unilateral chronic rhinosinusitis group (34.55 ± 10.81 vs 12.26 ± 9.23) and also in the bilateral chronic*

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rhinosinusitis group (34.0 ± 7.61 vs 14.57 ± 7.88) by Wilcoxon signed-rank test. Furthermore, there was a notable decrease observed in the scores of the four distinct domains of SNOT-22 between the preoperative and postoperative periods. ***Conclusion:*** *Patients with chronic rhinosinusitis experience a notable enhancement in their disease-specific quality of life following functional endoscopic sinus surgery. In addition, a significant reduction is seen in the scores of the four different domains of SNOT-22 between the preoperative and postoperative evaluation.*

Keywords: *Functional endoscopic sinus surgery, Chronic rhinosinusitis, Quality of life, Nasal obstruction*

INTRODUCTION

CRS stands out as the most prevalent otolaryngologic ailment globally, significantly affecting the quality of life (QOL) of those it afflicts. Within the United States, it impacts 14–16% of the populace, generating an annual cost estimated at USD 4.3 billion[1,2]. Functional endoscopic sinus surgery (FESS) emerges as the preferred option for treating CRS resistant to medical interventions. This approach facilitates the restoration of ventilation and mucociliary clearance. Various advanced tools, including the latest Sino Nasal Outcome Test (SNOT-22) questionnaire, have been employed to measure symptom alterations and forecast the degree of improvement following surgery[3-5]. Kennedy is credited with coining the term Functional Endoscopic Sinus Surgery in 1985. Subsequently, Kennedy, Stammberger, and Zinreich played pivotal roles in rapidly disseminating the diagnosis and surgical treatment of endoscopic sinus disease in sinonasal conditions in 1996. Hilding and later Messerklinger demonstrated the organized propulsion of the mucous blanket covering the epithelium from the sinuses through natural ostia into the nose and nasopharynx. Additionally, a study conducted by *Bassiouny et al.* highlighted that the maxillary sinus mucosa in chronic sinusitis can return to normal with improved ventilation and drainage following FESS[6-8]. Functional endoscopic sinus surgery (FESS) has solidified its position as a widely accepted approach for managing chronic rhinosinusitis unresponsive to conventional medical therapies. Comprising a variety of techniques, FESS offers a minimally invasive surgical option enabling direct visualization and access to the sinuses. The diagnosis of chronic rhinosinusitis typically involves the identification of two or more major factors, which may include facial congestion/fullness, nasal obstruction, purulent nasal discharge or discolored postnasal drainage, and hyposmia/anosmia (loss of smell). Alternatively, one major factor along with two or more minor factors such as headache, halitosis, fatigue, dental pain, cough, or ear pressure/fullness can also contribute to the diagnosis. Numerous systemic factors can play a role in the development of chronic rhinosinusitis, encompassing conditions such as allergy, cystic fibrosis, primary ciliary dyskinesia, and immune deficiency[9]. While the availability of effective medical therapies has altered the landscape of treatment for chronic rhinosinusitis, the indications for surgery have also evolved. Despite these advancements, there still exists a subset of patients for whom surgery remains neces-

sary. This cohort may have unique circumstances or disease characteristics that warrant surgical intervention to achieve optimal outcomes. Treating chronic and recurrent acute sinusitis often involves adopting a functional approach, aiming to address underlying pathophysiological processes through conservative surgery in specific affected areas. Functional endoscopic sinus surgery (FESS) serves as the cornerstone of surgical intervention for such patients and has been shown to enhance their quality of life (QOL). Evaluating QOL is typically done subjectively and can be quantified using disease-specific questionnaires[10]. The current study aimed to evaluate the results of functional endoscopic sinus surgery for chronic rhinosinusitis patients at a tertiary care hospital in Bangladesh.

OBJECTIVE

General Objective

- To evaluate the results of functional endoscopic sinus surgery for chronic rhinosinusitis patients at a tertiary care facility in Bangladesh.

Specific Objectives

- To determine the distribution of age and gender among the respondents.
- To observe the presenting symptoms of the participants.
- To evaluate the pre-existing comorbidities of the study subjects.

METHODS & MATERIALS

This cross-sectional study was conducted at the Department of Otolaryngology in Monno Medical College Hospital, Manikganj, from July 2020 to July 2023. Patients diagnosed with rhinosinusitis were considered as the study population. A total of 60 patients were selected as study subjects by simple random sampling as per inclusion and exclusion criteria.

Inclusion Criteria:

- Patients aged 18 years or more.
- Patients who had chronic rhinosinusitis (CRS) refractory to medical therapy with preoperative CT scan of the paranasal sinuses and then underwent FESS.
- Patients who were willing to give consent.

Exclusion Criteria:

- Patients with nasal polyposis.
- Patients with benign/malignant tumors.
- Patients with fungal sinusitis.
- Patients with mucocele, antrochoanal polyp, and chronic diseases (diabetes, tuberculosis, HIV/SIDA) or without preoperative CT scans were suspended.
- Patients who did not give consent to participate in the study.

General health and disease-specific outcome questionnaires were completed both before and after the surgery. Prior to enrollment, all participants had failed medical management, which included at least a 3-week course of broad-spectrum antibiotics, a 3-week trial of topical nasal corticosteroid sprays, and a 30-day course of systemic steroids. The type of endoscopic surgery was determined based on the affected sinuses as assessed by a preoperative computed tomography (CT) scan. Surgical procedures included maxillary

antrostomy, anterior ethmoidectomy, posterior ethmoidectomy, sphenoidotomy, frontal sinus surgeries, with or without septoplasty, and inferior turbinate reduction. Patients were instructed to fill out the SNOT-22 questionnaire 48 hours before and 6 months after the surgery. This questionnaire is commonly used in clinical settings and is validated as the most suitable scoring system for sinonasal outcomes. The collected data were analyzed using various statistical methods with the Statistical Package for the Social Sciences (SPSS) version 22.0 for Windows. The results were then presented in tables and charts. Ethical approval was obtained from the ethics committee of Monnu Medical College Hospital, and informed written consent was secured from all participants.

RESULTS

Table I: Age distribution of the respondents (*n*=60)

Age (years)	*n*	%
18-28	17	28.3
29-38	24	40.0
39-48	11	18.3
49-58	5	8.3
>58	3	5.0

It was observed that the majority of the patients (24,40.0%) belonged to the 29-38 years age group, followed by the 18-28 years age group (17,28.3%). [**Table I**]

Table II: Gender distribution among the participants (*n*=60)

Gender	*n*	%
Female	38	63.3
Male	22	36.6

Female preponderance (38,63.3%) was observed in this study. [**Table II**]

Table III: Distribution of patients according to symptoms (*n*=60)

Symptoms	*n*	%
Nasal obstruction	54	90.0
Postnasal drip	53	88.3
Dry upper respiratory tract syndrome	39	65.0
Hyposmia	40	66.6
Headache	38	63.3
Asthmatic complaints	21	35.0

In this study, the majority of the patients presented with nasal obstruction (54,90.0%), followed by, post nasal drip (53,88.3%), hyposmia (40,66.6%), dry upper respiratory tract syndrome (39,65.0%), headache (38,63.3%), and asthmatic complications (21,35.0%). [**Table III**]

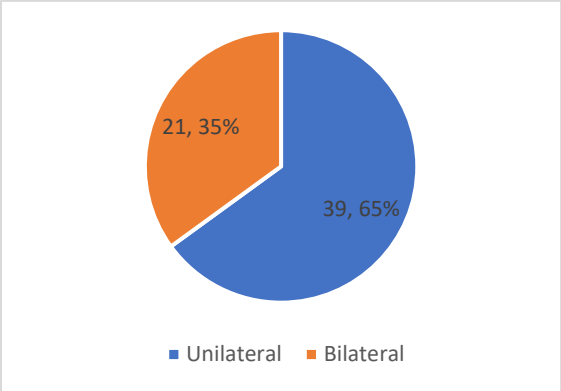

Figure 1: Distribution of patients according to laterality of rhinosinusitis (*n*=60)

In this study majority of the patients were experiencing unilateral rhinosinusitis (39,65.0%). [**Figure 1**]

Table IV: Distribution of patients according to pre-existing co-morbidities (*n*=60)

Co-morbidities	*n*	%	*p*-value
Asthma	31	51.6	<0.05
Allergic rhinitis	23	38.3	
Chronic pulmonary disease	11	18.3	
Sleep apnea	17	28.3	
Obesity	10	16.6	
Migraines	13	21.6	

It was observed that most of the patients (31,51.6%) had pre-existing asthma, followed by allergic rhinitis (23,38.3%), sleep apnea (17,28.3%), migraines (13,21.6%), chronic pulmonary disease (11,18.3%), and obesity (10,16.6%). [**Table IV**]

Table V: Outcome of functional endoscopic sinus surgery (*n*=60)

Group	Disease-specific QOL	SNOT-22 (Mean±SD)		*p*-value
		Preoperative	Postoperative	
Unilateral chronic rhinosinusitis	Rhinologic symptoms	12.50 ± 3.40	3.66 ± 3.12	<0.05
	Extranasal rhinology symptoms	6.74 ± 2.22	1.87 ± 1.70	
	Ear/facial symptoms	6.21± 2.30	2.23 ± 1.90	
	Sleep dysfunction	9.10 ± 2.89	4.50 ± 2.51	
Total SNOT-22		34.55 ± 10.81	12.26 ± 9.23	
Bilateral chronic rhinosinusitis	Rhinologic symptoms	10.19 ± 2.80	4.28 ± 2.18	<0.05
	Extranasal rhinology symptoms	4.33 ± 0.96	1.86 ± 1.01	
	Ear/facial symptoms	7.81 ± 1.20	3.43 ± 1.90	
	Sleep dysfunction	11.67 ± 2.65	5.0 ± 2.79	
Total SNOT-22		34.0 ± 7.61	14.57 ± 7.88	

SNOT-22: 22-item Sino-Nasal Outcome; QOL: Quality of life

In this series, a statistically significant improvement was observed between the scores of pre and postoperative SNOT-22 in the unilateral chronic rhinosinusitis group (34.55 ± 10.81 vs 12.26 ± 9.23) and also in the bilateral chronic rhinosinusitis group (34.0 ± 7.61 vs 14.57 ± 7.88) by Wilcoxon signed-rank test. In addition, a significant reduction was seen in the scores of the four different domains of SNOT-22 between the preoperative and postoperative times. [**Table V**]

DISCUSSION

It was observed that the majority of the patients (24,40.0%) belonged to the 29-38 years age group, followed by the 18-28 years age group (17,28.3%). Additionally, female preponderance (38,63.3%) was observed in this study. As individuals grow older, the likelihood of experiencing

chronic rhinosinusitis (CRS) and asthma tends to rise, particularly after the age of 40. Elderly individuals are notably more affected by CRS compared to younger ones, with the prevalence being approximately four times higher in this demographic[12]. *Madani SA et al.* conducted a study involving 60 patients, consisting of 41 males (68.3%) and 19 females (31.7%), with an average age of 29.13±15.21 years. Among the participants, 13 (21.6%) were in the 15-20 years age bracket, followed by 8 (13.3%) each in the 25-30 and 30-35 years age groups[13]. In this study, the majority of patients presented with nasal obstruction (54, 90.0%), followed by postnasal drip (53, 88.3%), hyposmia (40, 66.6%), dry upper respiratory tract syndrome (39, 65.0%), headache (38, 63.3%), and asthmatic complications (21, 35.0%). Additionally, most patients (31, 51.6%) had a history of asthma, followed by allergic rhinitis (23, 38.3%), sleep apnea (17, 28.3%), migraines (13, 21.6%), chronic pulmonary disease (11, 18.3%), and obesity (10, 16.6%). According to Tan BK et al., individuals with chronic rhinosinusitis (CRS) often exhibited a higher prevalence of several conditions before diagnosis, including acute rhinosinusitis, allergic rhinitis, chronic rhinitis, asthma, gastroesophageal reflux disease, adenotonsillitis, sleep apnea, anxiety, and headaches (all *p*-value <.001)[14]. Allergic rhinitis is characterized by bouts of sneezing, runny nose, nasal congestion, and itching. Additional frequent symptoms include postnasal drip, cough, irritability, and tiredness[15]. Asthma, chronic pulmonary disease, weight loss, obesity, and migraines were found to exist in the study subjects of *Chung SD et al.*[16]. In this series, a statistically significant improvement was observed between the scores of pre and postoperative SNOT-22 in unilateral chronic rhinosinitis group (34.55 ± 10.81 vs 12.26 ± 9.23) and also in bilateral chronic rhiosinitis group (34.0 ± 7.61 vs 14.57 ± 7.88) by Wilcoxon signed-rank test. Additionally, there was a notable decrease in the scores across all four domains of the SNOT-22 between preoperative and postoperative assessments. *Laababsi R et al.* similarly reported a highly significant improvement in SNOT-22 scores, with the unilateral group showing scores of [37.13 ± 9.307 (IQR = 14) versus 14.11 ± 8.531 (IQR = 7)] and the bilateral group showing [41.76 ± 6.949 (IQR = 10) versus 18.57 ± 8.495 (IQR = 16)][17]. *Al Badaai Y et al.* found that patients with chronic rhinosinusitis experienced significant enhancements in disease-specific quality of life following functional endoscopic sinus surgery, aligning with the findings of this study. *Damm M et al.* also noted that the main issues for patients with chronic rhinosinusitis are airway obstruction and postnasal drip, which severely affect quality of life. Their research indicates that functional endoscopic sinus surgery can substantially relieve these symptoms in most patients, leading to lasting improvements in quality of life[18].

Limitations of The Study:

The research was conducted at a single hospital with a small sample size, which may not represent the larger population. Furthermore, patients were observed for only 6 months.

Conclusion:

Patients with chronic rhinosinusitis experience a notable enhancement in their disease-specific quality of life following functional endoscopic sinus surgery. Furthermore, there was a notable decrease ob-

served in the scores of the four distinct domains of SNOT-22 between the pre-operative and postoperative periods.

Recommendation:

Chronic rhinosinusitis, while not a life-threatening condition, can significantly affect patients' lives. Functional endoscopic sinus surgery (FESS) proves to be a dependable and efficient approach for enhancing patients' quality of life and alleviating symptoms after 6 months post-surgery. Additionally, further research with larger sample sizes and multiple centers is recommended to obtain more comprehensive data.

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