



Original Article

Effectiveness of Endoscopic Sinus Surgery for Chronic Rhinosinusitis with Nasal Polyps: Follow-Up on Nasal Obstruction and Recurrence Rates

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ABSTRACT

Chronic rhinosinusitis with nasal polyps is a significant health issue linked with considerable morbidity and reduced life quality. Endoscopic Sinus Surgery (ESS) is a broadly accepted technique for nasal polyp's treatment. **Objective:** To assess and compare nasal obstruction in chronic rhinosinusitis patients with nasal polyp's pre and post-ESS and to evaluate recurrence rates at 3rd and 6th month post-surgery. **Methods:** The study was conducted as an observational study at Lahore General Hospital ENT Department from June 2019 to June 2020. A total of 88 patients underwent ESS after medical assessment. Nasal obstruction was evaluated using a visual analog scale during follow-up at 2nd week, 3rd month and 6th month. Data were analyzed using SPSS 24.0 with chi-square tests for categorical variables ($p < 0.05$). **Results:** The mean age of patients was 31.45 ± 11.343 years. At 3rd month post-operative, 59.1% had no nasal obstruction, while 34.1% had mild obstruction. At 6th month, 54.5% had no obstruction, and 37.5% had mild obstruction. Recurrence rates were 25% at 3rd month and 29.5% at 6th month. **Conclusions:** Higher nasal obstruction and recurrence rates were noted at 6th month compared to 3rd month post-ESS, highlighting the need for long-term follow-up.

INTRODUCTION

Chronic rhinosinusitis denotes persistent inflammation affecting the nasal passages and paranasal sinuses, persisting for a duration exceeding 12 weeks, affecting about 0.5–4.5% of the general population, therefore it poses a substantial economic burden on healthcare systems and significantly affects the quality of life of affected patients [1, 2]. It presents as congestion or blockage of nose, nasal discharge, hyposmia, post-nasal drip, pressure or pain in face. Additional symptoms may involve mucopurulent secretions and nasal polyps mainly in the middle meatus; CT-scan findings indicative of sinus involvement along with mucosal changes in osteomeatal

complex [3]. Chronic Rhinosinusitis (CRS) is further divided into 2 subtypes based on the findings of nasal endoscopy, CRS with nasal polyps (CRSwNP) and CRS without nasal polyps (CRSsNP) [4]. Chronic Rhinosinusitis (CRS) arises from multitude of factors, including infectious agents (viral, bacterial and fungal), cystic fibrosis, immunodeficiency, allergies, ciliary dyskinesia, asthma, reflux, mechanical obstructions (deviated septum) and adenoid hypertrophy [5]. Sinonasal Polyposis (SNP) has a prevalence rate of 4% within the general population and higher occurrence of 25–30% among individuals diagnosed with chronic rhinosinusitis [6]. SNP causes blockage of

nose, reduced sense of smell (hyposmia or anosmia) and a diminished quality of life [7]. Underscoring the medical importance of identifying, evaluating, and treating the condition [8]. The diagnosis of CRSwNP relies on medical history, clinical examination including anterior rhinoscopy, endoscopic examination, histopathology and radiological assessments [9]. CRSwNP treatment involves both medical and surgical approaches, both methods are employed to alleviate nasal obstruction, enhance sinus drainage, restore olfactory function and address any other indications of rhinitis [10]. Medical treatment involves corticosteroids, antimicrobials, antihistamines, decongestants, anti-leukotrienes, mast cell stabilizers, immunotherapy and environmental factors reduction. Corticosteroids, whether systemic or topical, are the only proven medical intervention for CRSwNP [9]. Presently, the Endoscopic Sinus Surgery (ESS) is widely acknowledged as an efficient treatment for Nasal Polyps (NP) [11, 12]. Hence, endoscopic sinus surgery focuses on the osteomeatal complex, addressing affected air cells, mucosal contact areas, and stenotic clefts. It also restores drainage and ventilation of frontal and maxillary sinuses through natural pathways. Systemic or topical steroids are generally effective for mild to moderate cases of nasal polyps. In cases where patients do not respond to medical therapy, surgery is often necessary, followed by post-operative topical nasal steroids to reduce recurrence [13]. ESS has significantly positive outcomes for CRSwNP [14]. In the diagnostic phase, nasal obstruction is the most predominant complaint in CRSwNP by the patients approximately 96.5% [15]. However, there is significant improvement in this symptom following surgery [16]. The study seeks to determine the effectiveness of endoscopic sinus surgery in CRSwNP, specifically examining changes in nasal obstruction and recurrence of polyps over the 3rd month and 6th month follow-up intervals. By following up these patients will guide us about future strategy (for how long and how frequent we have to follow up) to reduce the recurrence rate.

The study aimed to evaluate the effectiveness of ESS in CRSwNP, specifically examining changes in nasal obstruction and recurrence rates over the 3rd month and 6th month follow-up intervals. This will guide future strategies to reduce recurrence rates.

METHODS

This observational study was conducted in the department of ENT at Lahore General Hospital, Lahore / Postgraduate Medical Institute, Lahore, over a period of 12 months from June 2019 to June 2020. The study population comprised patients visiting Lahore General Hospital Lahore. A total of 88 patients with chronic rhinosinusitis with nasal polyps (CRSwNP) were selected for the study. The sample size was

calculated by the following formula keeping the margin of error equal to 10% and level of significance equal to 5%.

$$n = \frac{Z_{1-\frac{\alpha}{2}}^2 \cdot \alpha P(1-P)}{d^2}$$

P: Expected recurrence of nasal polyposis 6 th month after ESS	= 35% [17]
d²: Margin of error	= 10%
Z_{1-α/2}: Desired level of significance	= 95%
N: Calculated sample size	= 88 [18]

Non-probability purposive sampling was employed. Inclusion criteria encompassed clinically examined patients with nasal polyps of both genders, aged 15 to 70 years. Exclusion criteria included patients with intracranial extension confirmed by CT scan, patients with antrochoanal polyps confirmed by clinical assessment, patients with bleeding diathesis, patients with other comorbidities (hypertension, diabetes, ischemic heart disease), patients unwilling to participate, and those not fit for surgery. A proforma was prepared and finalized. After obtaining complete history, general physical examination, ENT examination, nasal endoscopy and CT scan of the nose and paranasal sinuses were advised to assess the anatomy and extent of the disease. Informed consent was obtained, and participants were admitted to the ENT ward for surgery. Nasal obstruction was evaluated using a Visual Analog Scale (VAS), where patients rated their nasal patency on a scale from 0 to 10, with 0 indicating no obstruction and 10 indicating complete obstruction. This assessment was done prior to surgery and then during follow-ups at the 2nd week, 3rd month and 6th month post-surgery. Endoscopic sinus surgery was performed under general anesthesia using a standard anterior to posterior approach. Surgical steps were tailored based on the extent of the disease in each case. BIPP paste-soaked gauze was used as post-operative nasal packs, which were removed on the first post-operative day. All patients were prescribed post-operative antibiotics, intra-nasal and oral steroids, along with careful nasal debridement/toilet. Augmentin (co-amoxiclav) was administered at 50 mg/kg Three Times Daily (TDS), along with prednisolone at 1 mg/kg per 24 hours, for 5 days. Topical nasal steroids were advised twice daily for one month. Post-operative follow-up was conducted at the 2nd week, 3rd month and 6th month. At each follow-up, nasal obstruction was recorded using the VAS, where patients rated their nasal patency on a scale from 0 to 10. Nasal endoscopy was also performed at the 3rd and 6th month follow-up to assess the state of the mucous membrane of the nasal cavity and recurrence of the disease. Recurrence of nasal polyposis was considered when a nasal polyp reappeared in the nasal cavity within 3 months of follow-up. Data were entered and statistically analyzed using SPSS version 24.0. Quantitative data, such as age, were analyzed by calculating the mean and standard deviation, while qualitative data, including nasal

obstruction and recurrence, were assessed by computing percentages. The chi-square test was utilized to evaluate associations and identify significant differences among categorical variables, with statistical significance defined as a p-value ≤ 0.05 . The study was approved by the Institutional Review Board of Lahore General Hospital, Lahore (AMC/PGMI/LGH/Synopsis No/00104-19/Date/26-06-2019). Written consent was obtained from all participants and strict measures were taken to uphold privacy and confidentiality in accordance with the ethical guidelines set forth in the Helsinki Declaration of Bioethics.

RESULTS

The study encompassed of 88 patients diagnosed with chronic rhinosinusitis with nasal polyps. The patients were aged 15-70 years, with an average age of 31.45 ± 11.343 years, the gender distribution was notable, with 35 were males and 53 (60.2%) females. Pre-operatively, 9 (10.2%) patients had mild nasal obstruction, 28 (31.8%) had moderate obstruction and 51 (58.6%) had severe nasal obstruction. At 2nd week post-operatively, 10 (11.3%) patients had no obstruction, with 19 (21.6%) experiencing mild obstruction, 35 (39.8%) moderate obstruction, and 24 (27.3%) severe nasal obstruction. By the 3rd month follow-up, the proportion of patients with no obstruction increased to 52 (59.1%), while 30 (34.1%) had mild obstruction, 4 (4.5%) had moderate obstruction and 2 (2.3%) had severe obstruction. At 6th month post-operatively, 48 (54.5%) patients were free of obstruction, 33 (37.5%) had mild obstruction, 5 (5.7%) had moderate obstruction and 2 (2.3%) had severe obstruction as shown in table 1.

Table 1: Endoscopic Sinus Surgery Outcomes in Patients with CRSwNP Regarding Nasal Obstruction at 3rd and 6th Months Follow Up

Nasal Obstructions	Pre-Operative Follow-Up N (%)	Post-Operative Follow-Up N (%)		
		2 nd Week	3 rd Month	6 th Month
No Obstruction	0%	10 (11.3%)	52 (59.1%)	48 (54.5%)
Mild	9 (10.2%)	19 (21.6%)	30 (34.1%)	33 (37.5%)
Moderate	28 (31.8%)	35 (39.8%)	4 (4.5%)	5 (5.7%)
Severe	51 (58.6%)	24 (27.3%)	2 (2.3%)	2 (2.3%)
Total	100%	100%	100%	100%

Similarly, among 88 patients, 22 (25.0%) had recurrence at 3rd month follow-up while majority 66 (75.0%) had no recurrence. Likewise among 88 patients, 26 (29.5%) had recurrence at 6th month follow-up while majority 62 (70.5%) had no recurrence as in shown in table 2.

Table 2: Endoscopic Sinus Surgery Outcomes in Patients with CRSwNP Regarding Recurrence at 3rd and 6th Months follow up

Recurrence	Follow-Up N (%)	
	3 rd Month	6 th Month
Yes	22 (25%)	26 (29.5%)
No	66 (75%)	62 (70.5%)
Total	100%	100%

Among, 22 patients who had recurrence at 3rd month follow-up, 19 (21.6%) had recurrence and 3 (3.4%) had no recurrence at 6th month follow-up. Among 66 patients who had no recurrence at 3rd month follow-up, 7 (7.9%) had recurrence and 59 (67.1%) had no recurrence at 6th month follow-up as shown in table 3.

Table 3: Association Between Recurrence at 3rd Month and 6th Month Follow-Up

Recurrence at 6 th Month Follow-Up N (%)	Recurrence at 3 rd Month Follow-Up N (%)		Total N (%)	p-Value
	Yes	No		
Yes	19 (21.6%)	7 (7.9%)	26 (29.5%)	0.000
No	3 (3.4%)	59 (67.1%)	62 (70.5%)	
Total	22 (25.0%)	66 (75.0%)	88 (100.0%)	

DISCUSSION

Chronic sinus issues pose significant challenges for individuals, often leading them to seek frequent medical care from doctors and Ear, Nose and Throat (ENT) specialists due to profound impact in quality of life. Endoscopic sinus surgery is widely acknowledged as an effective treatment for chronic sinus issues along with nasal polyps. During this study nasal obstruction was evaluated pre and post-operatively. At the 3rd month follow-up, 59.1% of patients experienced relief from nasal obstruction, however this improvement slightly declined to 54.5% at 6th month post-surgical follow-up. Bosteels C and Dejonckheere S observed significant improvement in CRSwNP patients' obstruction of nose after surgery [19]. Similarly, Aslam S et al., and Nair S et al., showed higher improvements of 96% and 93% respectively in alleviating nasal obstruction after sixth month follow-up, further supporting the efficacy of endoscopic sinus surgery in treating CRSwNP [13, 6]. Recurrence remained the significant concern in our study following endoscopic sinus surgery, with rates ranging from 25.0% to 29.5% at three and six months follow-up respectively. However, Aslam S et al., found lower recurrence rates of 6.0% at 3rd month and 6th month follow-up [13]. Similarly, Farrukh MS and Rafique M had 33% of the patients with recurrent disease [11]. A local study by Akhtar S et al., had 19% recurrence rate at 14 months follow-up and Javaid W et al., had 20% recurrence rate at 3rd week follow-up [20, 21]. DeConde AS et al., work had slightly higher rates of recurrence about 40% following surgical intervention which contrasted significantly with Bosteels C and Dejonckheere S higher recurrence levels about 78.9% patients after surgery [17, 19]. Similarly, Calus L et al., have found that 78.9% had recurrence after ESS and 36.8% had to undergo revision surgery [22]. Rest of the patients were managed with postoperative medications especially topical corticosteroids. Additionally, recent advancements in biologics show promise in preventing recurrence, suggesting potential improvements in future treatment protocols [23, 24]. These findings underscore the variability in recurrence rates post-ESS, highlighting

the necessity for personalized treatment plans and the potential for integrating biologics to enhance long-term outcomes. Although, these studies highlight the recurrence of disease and nasal obstruction in postoperative ESS patients but only few emphases on both and with 6th month of follow-up period. Also there is limited local data available on it, which is covered by our study. This study provides insight about the effectiveness of ESS for treating CRSwNP, but it has limitations as small sample size, no control group and relatively short follow-up period. Future studies with larger samples and longer follow-up period is recommended.

CONCLUSIONS

Endoscopic Sinus Surgery (ESS) demonstrated significant improvement in nasal obstruction among postoperative patients. However, during follow-up recurrence of disease and nasal obstruction were more pronounced at 6th month compared to 3rd month postoperatively. These findings highlight the effectiveness of ESS as a management option for chronic rhinosinusitis with nasal polyps, underscoring the critical importance of long-term follow-up.

Authors Contribution

Conceptualization: AA

Methodology: MM, MSQ, BA

Formal analysis: UA, GDK, BA

Writing, review and editing: AA, UA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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