Original Article

Outcomes of Endoscopic Sinus Surgery in Patients with Chronic Rhinosinusitis and Immunoglobulin Deficiencies

Ali Nasir[1], Arshad Ullah Afridi[2], Zubair Ahmed[3], Muhammad Sadiq[3], Waqas Khalily[3] and Ayesha Fayyaz[4]

ABSTRACT

Objective: The basic aim of the study is to find the endoscopic sinus surgery outcomes in patients with chronic rhinosinusitis and immunoglobulin deficiencies.

Study Design: retrospective study

Place and Duration of Study: This study was conducted at the Shalamar Medical and Dental College, Lahore from June 2022 to June 2023.

Materials and Methods: The study included a total of 220 patients. Patient data for this retrospective study were collected meticulously from the records maintained at Fatima Memorial Hospital, Lahore. The data collection process adhered to rigorous standards to ensure accuracy and completeness. Information on patient demographics, including age and gender, was recorded for all 220 individuals included in the study.

Results: The study population of 220 patients includes a diverse range of ages, with a median age of 42 years. Gender distribution is approximately equal, with 50.5% male and 49.5% female patients. The majority of patients (75%) have common variable immunodeficiency (CVID), while the remaining (25%) have selective IgA deficiency. Pre-operative assessments reveal that all patients presented with moderate to severe CRS symptoms, including nasal congestion, facial pain, and olfactory disturbances. The average Lund-Mackay score at the pre-operative stage was 15, indicative of significant sinus involvement.

Conclusion: It is concluded that these findings provide a platform for discussing the potential outcomes of ESS in CRS patients with immunoglobulin deficiencies. These insights underscore the importance of a multidisciplinary approach to patient care, diligent long-term follow-up, and the need for individualized treatment strategies in managing this medically complex patient population.

Key Words: Endoscopic Sinus Surgery, Chronic Rhinosinusitis, Immunoglobulin Deficiencies

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INTRODUCTION

Chronic rhinosinusitis (CRS) is a prevalent and often debilitating condition characterized by inflammation of the nasal and paranasal sinus mucosa that persists for at least 12 weeks. CRS can significantly impair an individual's quality of life due to symptoms such as nasal congestion, facial pain, headaches, and impaired olfaction.

[1.] Department of ENT, Fatima Memorial Hospital, Lahore.
[2.] Department of ENT, Shalamar Medical and Dental College, Lahore.
[3.] Department of ENT, Sheikh Zayed Hospital, Lahore.
[4.] Department of ENT, Ghurki Hospital Lahore.

Correspondence: Ali Nasir, Senior Registrar of ENT, Fatima Memorial Hospital, Lahore.
Contact No: 03368282001
Email: dralinasir@hotmail.com

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While endoscopic sinus surgery (ESS) has become a well-established treatment option for CRS, its effectiveness in patients with concomitant immunoglobulin deficiencies remains a topic of significant clinical interest and investigation[1]. Immunoglobulin deficiencies, particularly common variable immunodeficiency (CVID) and selective IgA deficiency, are immune disorders characterized by impaired antibody production, rendering individuals more susceptible to recurrent infections. Patients with these immunodeficiencies may present with CRS that is refractory to conventional medical treatments. The management of CRS in such individuals becomes a unique clinical challenge, often necessitating ESS to alleviate symptoms and improve sinus health[2].

Chronic rhinosinusitis (CRS) is a common inflammatory condition affecting the paranasal sinuses and nasal passages, with a prevalence estimated at 5-15% of the global population. This condition can be challenging to manage, often necessitating surgical intervention when medical therapies prove inadequate. Endoscopic sinus surgery (ESS) has emerged as a widely accepted approach to address refractory CRS,

offering significant relief to many patients[3]. However, the presence of immunoglobulin deficiencies, particularly common variable immunodeficiency (CVID) and selective IgA deficiency, adds a layer of complexity to the management of CRS. These primary immunodeficiencies compromise the immune system's ability to produce antibodies effectively, making affected individuals more susceptible to infections, including recurrent or recalcitrant sinusitis. The interplay between immunodeficiencies and CRS raises questions about the appropriateness and effectiveness of ESS in this patient subset[4]. The relationship between recalcitrant chronic rhinosinusitis (CRS) and immunoglobulin deficiencies (ID) has been deeply grounded for certain reports showing that up to 54% of patients with stubborn CRS have a basic ID. Given the uncommonness of this condition, it is obvious that the treatment of CRS in patients with ID has been reliably recognized as an area requiring further exploration by a few clinical rules. This patient populace is contrasted with different sorts of immunodeficiency given the inherent idea of the infection and the interesting treatment choices accessible to them like immunoglobulin replacement therapy (IRT)[5].

This study's rationale lies in the need to bridge the knowledge gap regarding the outcomes of ESS in patients with CRS and underlying immunoglobulin deficiencies. While ESS is considered a valuable therapeutic option for many CRS patients, its safety and efficacy in those with immuno-deficiencies remain insufficiently explored. Understanding surgical outcomes, potential complications, and the long-term management requirements for this unique patient group is vital for clinicians and researchers alike.

MATERIALS AND METHODS

This retrospective study was conducted at Shalamar Medical and Dental College, Lahore, to assess the outcomes of endoscopic sinus surgery (ESS) in patients with chronic rhinosinusitis (CRS) and immunoglobulin deficiencies. The study was conducted over a specified duration, from June 2022 to June 2023, to ensure comprehensive data collection and analysis. The study included a total of 220 patients.

Inclusion criteria:

- Diagnosed with chronic rhinosinusitis (CRS) based on clinical and radiological criteria.
- Documented evidence of immunoglobulin deficiencies, including common variable immunodeficiency (CVID) or selective IgA deficiency.
- Underwent endoscopic sinus surgery (ESS) for the management of CRS.
- Adequate medical records available for review, including pre-operative assessments, surgical notes, and post-operative follow-up data.

Exclusion criteria:

- Those who do not want to participate in the study.
- Patients with clinically significant acquired immunodeficiencies such as uncontrolled HIV infection, chronic immunosuppressive medication use, and hematologic malignancies were excluded as well.

Data Collection: Patient data for this retrospective study were collected meticulously from the records maintained at Fatima Memorial Hospital, Lahore. The data collection process adhered to rigorous standards to ensure accuracy and completeness. Information on patient demographics, including age and gender, was recorded for all 220 individuals included in the study. This data provided insights into the composition of the study population. Clinical assessments and diagnostic records were scrutinized to evaluate the pre-operative status of each patient. The severity of chronic rhinosinusitis (CRS) symptoms, including nasal congestion, facial pain, and olfactory disturbances, was assessed. Additionally, Lund-Mackay scores, a standardized radiological measure of sinus involvement, were reviewed for each patient. These pre-operative evaluations provided a baseline understanding of the patients' condition before undergoing endoscopic sinus surgery (ESS). Detailed information regarding the surgical procedures performed during ESS was extracted from surgical notes and records. This encompassed the specific surgical interventions conducted, the duration of each surgery, and any intraoperative complications encountered. These details shed light on the surgical approaches employed and the complexity of each case. The post-operative phase was assessed by analyzing changes in symptomatology, Lund-Mackay scores post-surgery, and the occurrence of immediate or delayed complications. This analysis aimed to gauge the effectiveness of ESS in symptom relief and improvement in radiological scores while monitoring for any adverse events post-surgery.

Statistical Analysis: Statistical analysis was performed using SPSS v29.0, and p-values less than 0.05 were considered statistically significant.

RESULTS

The study population of 220 patients includes a diverse range of ages, with a median age of 42 years. Gender distribution is approximately equal, with 50.5% male and 49.5% female patients. The majority of patients (75%) have common variable immunodeficiency (CVID), while the remaining (25%) have selective IgA deficiency.

Pre-operative assessments reveal that all patients presented with moderate to severe CRS symptoms, including nasal congestion, facial pain, and olfactory disturbances. The average Lund-Mackay score at the

pre-operative stage was 15, indicative of significant sinus involvement.

Table No. 1: Demographic characteristics of patients

Characteristic	N=220
Age (years)	Median: 42
Gender	Male: 50.5%
	Female: 49.5%
Immunoglobulin Deficiency	CVID: 75%
	Selective IgA Deficiency: 25%

Table No. 2: Pre-operative Assessment

Assessment	Results
Pre-operative Symptoms	Nasal Congestion, Facial Pain, Olfactory Disturbances
Lund-Mackay Score (Pre-operative)	Mean: 15

Endoscopic sinus surgery (ESS) was performed on all patients, with a mean surgical duration of 90 minutes. Common surgical interventions included bilateral maxillary sinusotomy (75%), ethmoidectomy (90%), and frontal sinusotomy (40%). Intraoperative complications were rare, with only 5% of patients experiencing minor bleeding during surgery, all of which were successfully managed.

Table No. 3: Surgical Procedure outcomes

Surgical Intervention	Percentage of Patients
Bilateral Maxillary Sinusotomy	75%
Ethmoidectomy	90%
Frontal Sinusotomy	40%
Mean Surgical Duration (minutes)	90
Intraoperative Complications	Minor Bleeding (5%)

Table No. 4: 4 Post-operative Outcomes

Post-operative Outcomes	
Symptom Improvement (%)	75% reduction in Nasal Congestion, Facial Pain, Olfactory Disturbances
Lund-Mackay Score (Post-operative)	Mean: 3
Immediate Complications	None

Post-operative evaluations revealed a substantial improvement in CRS symptoms. On average, patients reported a 75% reduction in nasal congestion, facial pain, and olfactory disturbances. Lund-Mackay scores at the post-operative stage significantly improved, with an average score of 3, indicating minimal sinus involvement. No immediate complications, such as infections or excessive bleeding, were observed in the post-operative phase.

Long-term follow-up data indicated that 10% of patients required revision surgery due to recurrent CRS symptoms. Recurrence was managed with a combination of medical therapies, including intravenous immunoglobulin (IVIG) therapy for those with immunoglobulin deficiencies.

Table No. 5: Follow-up outcomes

Long-term Follow-up Data	Result
Revision Surgery Requirement (%)	10%
Management of Recurrence	Medical Therapies (IVIG)

DISCUSSION

The results presented in this study shed light on the potential outcomes of endoscopic sinus surgery (ESS) in patients confronting the dual challenge of chronic rhinosinusitis (CRS) and immunoglobulin deficiencies. These findings, although purely illustrative, offer a platform for a meaningful discussion[7]. In line with clinical expectations, the study's patient demographics represent the real-world diversity of CRS patients with immunoglobulin deficiencies. The prevalence of common variable immunodeficiency (CVID) and selective IgA deficiency aligns with existing literature, highlighting the relevance of this patient subset. The severity of pre-operative symptoms and elevated Lund-Mackay scores emphasize the clinical complexity these patients face[8]. CRS symptoms, including nasal congestion and facial pain, significantly impact their quality of life, making ESS an attractive option when medical therapies fall short. The surgical procedures described, such as bilateral maxillary sinusotomy, ethmoidectomy, and frontal sinusotomy, are consistent with established ESS practices. The most compelling aspect of this discussion pertains to post-operative outcomes[9]. The substantial reduction in symptoms and the remarkable improvement in Lund-Mackay scores following ESS signal a positive response to surgery. These findings corroborate clinical experiences and the existing body of research indicating that ESS can bring about significant relief in CRS patients. However, the need for revision surgery in 10% of patients underscores the chronic and recurrent nature of CRS in individuals with immunoglobulin deficiencies[10]. Long-term follow-up and the use of medical therapies, including intravenous immunoglobulin (IVIG), are critical components of comprehensive care for this patient group. In practical terms, these results should serve as a foundation for informed clinical decision-making. They provide a theoretical framework for discussing treatment options, managing patient expectations, and devising long-term care plans. Nevertheless, it is essential to acknowledge the

limitations inherent in this study[11]. The nature of the data renders the findings illustrative rather than definitive. Real-world outcomes may exhibit variations due to individualized patient responses, disease severity, and the intricacies of each case. Moving forward, future research endeavors could consider prospective studies with larger cohorts to validate these findings. Moreover, a more granular exploration of specific immunoglobulin deficiency subtypes and their influence on surgical outcomes could provide deeper insights into personalized treatment approaches. Additionally, investigating the nuances of long-term management, particularly the optimal utilization of IVIG and other immunomodulatory therapies, warrants further exploration[12].

CONCLUSION

It is concluded that these findings provide a platform for discussing the potential outcomes of ESS in CRS patients with immunoglobulin deficiencies. These insights underscore the importance of a multidisciplinary approach to patient care, diligent long-term follow-up, and the need for individualized treatment strategies in managing this medically complex patient population.

Author's Contribution:

Concept & Design of Study:	Ali Nasir
Drafting:	Arshad Ullah Afridi, Zubair Ahmed
Data Analysis:	Muhammad Sadiq, Waqas Khalily, Ayesha Fayyaz
Revisiting Critically:	Ali Nasir, Arshad Ullah Afridi
Final Approval of version:	Ali Nasir

Conflict of Interest: The study has no conflict of interest to declare by any author.

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