Original Article

Assessing the Effectiveness of Oral Steroid Treatment in Patients of Nasal Polyposis, Scheduled for Surgery: A Prospective Single-Arm Interventional Study

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Abstract

Background: Nasal polyposis is a chronic inflammatory condition of the nasal mucosa characterized by benign polyps. Corticosteroids are the mainstay of treatment due to their anti-inflammatory effects, especially in patients awaiting surgery.

Objective: The objective of this study was to study the effectiveness of oral steroids by comparing the pre-medication and post-medication symptoms in patients of nasal polyposis scheduled for surgery.

Methodology: A prospective study was conducted in the ENT outpatient department of a tertiary care hospital after approval by the Institutional review board and included 196 patients diagnosed with nasal polyposis awaiting surgery. Participants received oral prednisolone at a dose of 1 mg/kg for 7-10 days with gradual tapering. Symptom severity and quality of life were assessed before and after the treatment using the Sino-Nasal Outcome Test-22 (SNOT-22). Statistical analysis was performed by SPSS version 26 to compare pre and post-medication scores.

Results: Significant improvement was observed after treatment in nasal symptoms including congestion, sneezing, rhinorrhea, and postnasal discharge, as well as systemic and sleep related complaints. The proportion of the patients reporting moderate to severe nasal obstruction decreased markedly after treatment. The mean SNOT-22 score reduced from 63.71 ± 15.87 before treatment to 40.72 ± 9.20 after the therapy, demonstrating a statistically significant improvement ($p\text{-value} < 0.001$)

Conclusion: Short term oral steroid therapy effectively reduced symptoms severity and improved quality of life in patients with nasal polyposis prior to surgery, supporting its use as an important preoperative management strategy.

Key words: Nasal polyps, Rhinosinusitis, SNOT 22, Prednisolone

Introduction

Nasal polyposis is a chronic inflammatory condition characterized by growth of polyps (benign non-neoplastic pedunculated outgrowths) in nasal cavity and sinuses. It significantly impacts quality of life and is associated with persistent nasal obstruction and anosmia. Recent studies confirm the central role of type 2 inflammation in its pathophysiology.[1,2] Despite its prevalence, the underlying pathophysiology remains incompletely understood and effective long-term management strategies are limited. Steroid therapy has been a mainstay in the treatment of nasal polyposis due to its potent anti-inflammatory properties. Corticosteroids, whether admi-

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nistered topically or systemically, are considered the mainstay of medical management for nasal polyps.[3] They have been shown to have a therapeutic effect on the symptoms of nasal polyposis and can help reduce the underlying inflammation that contributes to the polyps formation.[4] Additionally, oral steroid therapy, either alone or in combination with intranasal steroids, can lead to improvements in symptoms such as hyposmia, polyp size, and nasal airflow in patients with nasal polyposis.[5] Furthermore, studies have shown that the use of nasal steroids in combination with other agents like oxymetazoline can be more effective in improving symptoms such as blocked nose, hyposmia, and polyp size compared to nasal steroids alone.[6]

In 2023, a double-blind randomized control trial study enrolled 139 patients with Chronic Rhinosinusitis with Nasal Polyps (CRSwNP) and concluded that short-term oral steroids were effective for rapid symptoms and polyp reduction in chronic rhinosinusitis with nasal polyposis, suitable as initial or pre-surgical therapy.[7] Existing literature indicates that short-term oral steroid therapy in patients with nasal polyposis results in early improvement in hyposmia, a symptom that significantly affects quality of life.[8] Similarly, another study has recommended a short course of oral steroids as initial therapy in patients with chronic rhinosinusitis with nasal polyps.[9] In summary, the previous literature strongly supports the use of systemic steroid as a fundamental component in the management of nasal polyposis. However, although oral steroids are commonly given before surgery in patients with CRSwNP, patients do not respond the same way, and there is limited local data about how much real improvement they get and how it helps in planning surgery. The primary aim of this research was to study the effectiveness of oral steroids by comparing the pre-medication and post-medication symptoms in patients of nasal polyposis scheduled for surgery, while also contributing to the growing body of evidence on steroid therapy in this population. Understanding the effect of steroid treatment on nasal polyposis is essential for optimizing patient care and developing therapeutic approaches.

Methodology

The study was conducted in the ENT outpatient department of Ghurki Trust Teaching Hospital (GTTH), Lahore over a period of one year. Non-probability sampling technique was used. The sample size was calculated using the WHO formula for estimating a proportion in a large population ($n = Z^2p(1-p)/d^2$) with a 95% confidence level (Z=1.96), expected prevalence of chronic rhinosinusitis of 12%[10] and 5% margin of error, of 5%, yielding a minimum required sample size of 162 participants. To account for potential dropouts and incomplete responses, the sample size was inflated by approximately 20%; therefore, all 196 eligible patients presenting to the OPD during the study period were included in the final analysis.

Ethical Consideration: Institutional review board (IRB) approval was obtained prior to the initiation of the study (Letter No; LMDC / L-ORIC-27-2025, Dated: 28 January 2025). Participants were assured of confidentiality, and data were collected after obtaining informed consent from all eligible patients.

Inclusion criteria: All the patients of nasal polyposis presenting to ENT outpatient department of GTTH who are scheduled for surgery were included in the study. Nasal polyps are benign, pedunculated mucosal growths originating within the nasal cavity or paranasal sinuses.

Exclusion Criteria: Patients of nasal polyposis who were not scheduled for surgery or patients having infections were excluded. A complete baseline investigation was done to rule out ongoing infections.

A pre-medication SNOT 22 form was filled by patients before starting the oral steroid treatment with prednisolone 1mg/Kg adjusted based upon the patient's age, weight and comorbidities for 7-10 days. The medication was tapered off gradually. Following the medication, a complete post-medication assessment was done. Post-medication SNOT 22 form was also filled by the patient. Sino Nasal Outcome Test 22 is a universally used patient reported questionnaire that measures the quality of life and severity of symptoms of chronic rhino sinusitis with nasal polyposis and demonstrates high internal consistency, with Cronbach's alpha reported as >0.80 across all domains.[11,12] The possible range of total SNOT 22 form score is between 0 to 110. Patients were categorized into mild (0-20), moderate(>20-50), and severe (>50) disease groups based on their SNOT-22 scores, in accordance with previously published criteria. This categorization was adapted from the scoring and assessment approach described by previous studies, where SNOT-22 was utilized as a validated tool for assessing symptom severity and clinical outcomes in chronic rhinosinusitis.[13,14]

Statistical Analysis: All data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 26. Normality of the data was tested using Shapiro Wilk test. Mean and Standard deviation were

calculated for quantitative variables while frequencies and percentages were constructed for qualitative variables. Paired t test was used to compare pre- and post-medication SNOT 22 form scores.

Results

In our study, a total of 196 patients were included. Among these majority, 100(56.1%) were males, while 96(43.9%) were females. Pre- and post-medication frequency and percentage of patients with different symptoms is provided in Table I and II respectively. Overall, a significant reduction in symptom severity was observed following treatment, with fewer patients reporting to severe symptoms across all domains. Nasal blockage/congestion, one of the most severe baseline symptoms (74.4%), showed marked improvement, decreasing to 45.4% post-treatment. Similarly, the need to blow the nose decreased from 58.7% to 16.4%. Other nasal symptoms, including sneezing, rhinorrhea, and postnasal discharge, also improved substantially.

Systemic symptoms such as dizziness and fatigue demonstrated significant improvement, with moderate to severe dizziness declining from 41.4% to 1.5%. Sleep-related and psychological symptoms also showed notable improvement, with reductions observed in sleep disturbances, fatigue, and emotional distress. Overall, post-treatment assessments indicated a consistent and clinically meaningful improvement in symptom burden. The mean post-medication SNOT 22 score showed a significant reduction (p-value < 0.001) as shown in Table III.

Figure I demonstrates the distribution of SNOT-22 severity categories before treatment, while Figure II shows post-treatment mean scores for snoring. Prior to medication, most patients were in the moderate to severe categories, whereas after treatment, a majority shifted to the mild category and no patients remained in the severe group, indicating significant improvement in symptom burden.

Table I: *Pre-medication Frequency and percentage of patients with different symptoms*

Pre-Medication	No problem n (%)	Very mild problem n (%)	Mild or slight problem n (%)	Moderate problem n (%)	Severe problem n (%)	Problem as bad as it can be n (%)
Need to Blow Nose	28 (14.3%)	21 (10.7%)	32 (16.3%)	47 (24.0%)	43 (21.9%)	25 (12.8%)
Sneezing	24 (12.2%)	31 (15.8%)	39 (19.9%)	48 (24.5%)	36 (18.4%)	18 (9.2%)
Runny Nose	28 (14.3%)	24 (12.2%)	43 (21.9%)	46 (23.5%)	39 (19.9%)	16 (8.2%)
Cough	94 (48.0%)	24 (12.2%)	30 (15.3%)	26 (13.3%)	18 (9.2%)	4 (2.0%)
Postnasal Discharge	11 (5.6%)	10 (5.1%)	32 (16.3%)	62 (31.6%)	51 (26.0%)	30 (15.3%)
Thick Nasal Discharge	12 (6.1%)	16 (8.2%)	34 (17.3%)	58 (29.6%)	46 (23.5%)	30 (15.3%)
Ear Fullness	45 (23.0%)	25 (12.8%)	51 (26.0%)	42 (21.4%)	20 (10.2%)	13 (6.6%)
Dizziness	77 (39.3%)	30 (15.3%)	50 (25.5%)	27 (13.8%)	8 (4.1%)	4 (2.0%)
Ear Pain/Pressure	71 (36.2%)	30 (15.3%)	48 (24.5%)	32 (16.3%)	11 (5.6%)	4 (2.0%)
Facial Pain/Pressure	67 (34.2%)	18 (9.2%)	47 (24.0%)	41 (20.9%)	13 (6.6%)	10 (5.1%)
Difficulty Falling Asleep	60 (30.6%)	41 (20.9%)	37 (18.9%)	33 (16.8%)	16 (8.2%)	9 (4.6%)
Waking Up at Night	60 (30.6%)	34 (17.3%)	42 (21.4%)	26 (13.3%)	24(12.2%)	10 (5.1%)
Lack of a Good Night's Sleep	63 (32.1%)	39 (19.9%)	39 (19.9%)	24 (12.2%)	23 (11.7%)	8 (4.1%)
Waking Up Tired	56 (28.6%)	40 (20.4%)	42 (21.4%)	36 (18.4%)	17 (8.7%)	5 (2.6%)
Fatigue During the Day	54 (27.6%)	34 (17.3%)	49 (25.0%)	39 (19.9%)	15 (7.7%)	5 (2.6%)
Reduced Productivity	51(26.0)	34(17.3)	60 (30.6)	43 (21.9)	6 (3.1)	2 (1.0)
Reduced Concentration	52 (26.5%)	34 (17.3%)	64 (32.7%)	31 (15.8%)	12 (6.1%)	3 (1.5%)
Frustrated/Restless/Irritable	32 (16.3%)	38 (19.4%)	64 (32.7%)	34 (17.3%)	19 (9.7%)	9 (4.6%)
Sad	50 (25.5%)	36 (18.4%)	59 (30.1%)	37 (18.9%)	8 (4.1%)	6 (3.1%)
Embarrassed	50 (25.5%)	29 (14.8%)	44 (22.4%)	51 (26.0%)	14 (7.1%)	8 (4.1%)
Sense of Taste/Smell	26 (13.3%)	18 (9.2%)	36 (18.4%)	51 (26.0%)	40 (20.4%)	25 (12.8%)
Blockage/Congestion of Nose	5 (2.6%)	1 (0.5%)	14 (7.1%)	30 (15.3%)	83 (42.3%)	63 (32.1%)

n: number of participants

Table II: *Post-medication Frequency and percentage of patients with different symptoms*

Post-Medication	No problem n (%)	Very mild problem n (%)	Mild or slight problem n (%)	Moderate problem n (%)	Severe problem n (%)	Problem as bad as it can be n (%)
Need to Blow Nose	56 (28.6)	43 (21.9)	64 (32.7)	26 (13.3)	6 (3.1)	1 (0.5)
Sneezing	74 (37.8)	48 (24.5)	56 (28.6)	17 (8.7)	1 (0.5)	-
Runny Nose	69 (35.2)	60 (30.6)	54 (27.6)	10 (5.1)	1(0.5)	2 (1.9)
Cough	124 (63.3)	40 (20.4)	26 (13.3)	6 (3.1)	-	-
Post Nasal Discharge	26 (13.3)	58 (29.6)	66 (33.7)	41 (20.9)	5 (2.6)	-
Thick Nasal Discharge	32 (16.3)	55 (28.1)	71 (36.2)	29 (14.8)	8 (4.1)	1 (0.5)
Ear Fullness	91 (46.4)	61 (31.1)	29 (14.8)	13 (6.6)	2 (1.0)	-
Dizziness	115 (58.7)	54 (32.7)	14 (7.1)	3 (1.5)	-	-
Ear Pain/Pressure	112 (57.1)	55 (28.1)	27 (13.8)	2 (1.0)	-	-
Facial Pain/Pressure	100 (51.0)	51 (26.0)	41 (20.9)	4 (2.0)	-	-
Difficulty Falling Asleep	112 (57.1)	45 (23.0)	29 (14.8)	9 (4.6)	1 (0.5)	
Waking Up at Night	110 (56.1)	58 (29.6)	22 (11.2)	4 (2.0)	2 (1.0)	-
Lack of a Good Night's Sleep	116 (59.2)	43 (21.9)	30 (15.3)	5 (2.6)	2 (1.0)	-
Waking Up Tired	106 (54.1)	60 (30.6)	26 (13.3)	4 (2.0)	-	-
Fatigue During the Day	103 (52.6)	63 (32.1)	23 (11.7)	7 (3.6)	-	-
Reduced Productivity	99 (50.5)	72 (36.7)	18 (9.2)	5 (2.6)	1 (0.5)	1 (0.5)
Reduced Concentration	104 (53.1)	62 (31.6)	22 (11.2)	7 (3.6)	1 (0.5)	
Frustrated/Restless/Irritable	82 (41.8)	70 (35.7)	28 (14.3)	12 (6.1)	4 (2.0)	
Sad	88 (44.9)	71 (36.2)	28 (14.3)	9 (4.6)	-	-
Embarrassed	98 (50.0)	46 (23.5)	37 (18.9)	12 (6.1)	2 (1.0)	1 (0.5)
Sense of Taste/Smell	51 (26.0)	37 (18.9)	69 (35.2)	29 (14.8)	7 (3.6)	3 (1.5)
Blockage/Congestion of Nose	18(9.2)	32(16.3)	57(29.1)	68(34.7)	18(9.2)	3(1.5)

n: number of participants

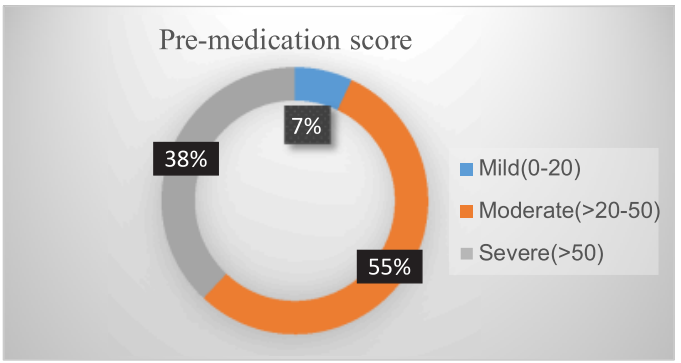

Figure I: *Distribution of patients in mild, moderate severe categories before medication*

Table III: *Comparison of pre-& post-medication SNOT 22 score*

Medication	Mean ± SD	p-value	95% CI
Pre-medication score	63.71± 15.87	<0.001	20.77–25.21
Post-medication score	40.72 ± 9.20		

Mean SD: Mean standard deviation, p-value calculated by paired t test, p-value < 0.05 considered significant, 95% CI: 95% Confidence Interval

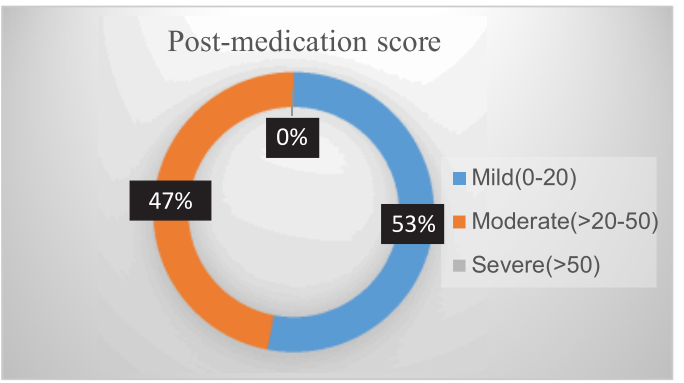

Figure II: *Distribution of patients in mild, moderate severe categories after medication*

Discussion:

The present study demonstrated a significant improvement in symptom burden following short-term oral corticosteroid therapy, as reflected by a marked reduction in total SNOT-22 scores. Improvements were observed across nasal, systemic, sleep-related, and psychological domains, indicating a broad impact on patient

quality of life. Our results align with existing evidence demonstrating that short-term oral corticosteroid therapy significantly improves sinonasal symptoms in patients with chronic rhinosinusitis with nasal polyps, supporting its role in medical management.[15] In 2021 a study was conducted which showed decrease in the number of eosinophils and decreased fibrosis in the nasal polyp's tissue in CRSwNP patients who were given short course of systemic prednisolone.[16] Another observational study concluded that combined therapy with oral prednisolone and fluticasone propionate nasal spray for 3 weeks is very effective in reducing the symptoms of chronic rhinosinusitis along with decrease in nasal secretions, edema and polyp size. Similarly, use of oral corticosteroids has been recommended for the management of chronic rhinosinusitis with nasal polyps, particularly in the perioperative period, which is consistent with the present study in which oral steroids were used in pre-surgical patients.[17,18] This practice is supported in the literature, with other studies showing that short-course adjunct oral corticosteroid therapy improves symptom severity, reduces polyp size, and enhances CT sinus findings in patients with chronic rhinosinusitis with nasal polyps.[19] Although these studies together attest to the therapeutic value of oral steroids, our study specifically focuses on patients under waiting for surgery, providing a focused view on symptom relief within this subgroup. In the current study, the number of patients classified as mild, moderate, and severe according to SNOT 22 scores decreased substantially after oral steroid treatment, reflecting a marked improvement in symptom severity across all categories. These findings are consistent with a previous research that reported significant reductions in SNOT 22 scores in chronic rhinosinusitis patients treated with systemic steroids, demonstrating that oral corticosteroids alone can effectively improve patient-reported symptom burden.[20] Together, these results reinforce the efficacy of steroid therapy in alleviating disease severity and highlight the value of SNOT 22 as a reliable tool for monitoring treatment response.

Conclusion:

In summary, this trial reaffirms the use of oral steroids as a potent short-term treatment for symptom burden reduction in patients with nasal polyposis undergoing surgery, supported by meaningful SNOT-22 score reductions, but also highlights the necessity for further studies. Larger controlled trials need to be carried out to validate these results, assess long-term effectiveness, and establish the intervention's influence on surgical outcomes.

Limitations and Recommendations

The main limitations of the study include the use of convenience sampling, its cross-sectional observational design, and the short-term duration of treatment assessment. Future studies with a longer follow-up period and inclusion of a control group to better evaluate the sustained effects of oral steroid therapy on nasal polyposis. Lastly, although symptom relief is encouraging, the study does not investigate the effect on surgical outcomes e.g., ease of operation, complication rate, or post-operative recovery thus leaving a knowledge gap regarding the complete pre-surgical benefit of this intervention.

Conflict of Interest: None

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Authors Contribution

All authors have approved the final version of the manuscript and are responsible for its integrity.

AAU & SZ: Concept, design, data interpretation and revision of the manuscript

AS & HY: write manuscript, data collection, analysis and interpretation of results and revisions

TS: Literature review, data collection, writeup and revision of the manuscript