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RESEARCH ARTICLE
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NASAL POLYPS PATHOPHYSIOLOGY, DIAGNOSIS, AND EMERGING TREATMENTS

Arifullah[1], Sayyed Muddasir Shah[2*], Muhammand Hafeez[3], Abdul Samad[4], Tanveer[5]

[1]Assistant prof department of ENT kabir medical college
[2*]Assistant prof department of ENT MMC Hospital Mardan
[3]Assistant prof department of ENT Khyber teaching hospital Peshawar
[4]Consultant Department of ENT pak woman hospital Balochistan
[5]SMO Department of ENT dhq hospital charsadda

***Correspondent author:** Sayyed Muddasir Shah
*Assistant professor ENT department Bacha khan medical collegeMardan ,
Email: sayedmuddasirshah@yahoo.com , Cell no: + 92-0345-9147274

Abstract

Background: Nasal polyps are tumour like swellings originating from the mucous membrane lining either the nasal cavity or the paranasal sinuses and is related to chronic rhinosinusitis and asthma . Namely, these polyps can lead to considerable NAO, hyposmia, and recurrent infection, which affect the patients' quality of life.

Objectives: To develop a treatment outcome assessment tool for evaluating nasosinus polyp patients with the objective of comparing the efficacy of nasosinus polyp and emerging treatment options with regards to polyp size and its effect towards symptoms.

Study design: A Cross sectional study.

Place and duration of study . department of ENT kabir medical college from july 2021 to dec 2021

Methods: An observational study was performed cross-sectional including 150 patients diagnosed with nasal polyps. All of them received corticosteroids, biologics or surgical therapy. Stones' size change, as well as the symptom recurrence rate at the initial and after six months to the therapy were considered on the outcomes.

Results: When analyzing the results of treatment carried out in 150 patients of the study, lower polyp size reduction was revealed in patients who received biologic agents with the mean decrease of 50% ($p < 0.001$, SD = 7. 5). Corticosteroid group was numerically less with 35 % ($p < 0.05$, SD = 6. 8) and surgery group was 45 % less ($p < 0.001$, SD = 7. 0). The global symptom rating also dropped across all the groups and this was highly evident in the biologic using groups.

Conclusion: Recent intervention therapies especially biologic agents have received a lot of credit in managing polyps and alleviating the symptoms. These directive findings endorse the undisputable use and fashioning of biologics in the management of nasal polyps.

Keywords: Nasal polyps, biologics it refers to the use of biological products in treatment, corticosteroids

Introduction

Nasal polyps are the formation of soft mass-like structures which originate from the mucosal lining

of the nose and paranasal sinuses and are not malignant. These growths are however related to chronic

rhinosinusitis (CRS), a disease that is defined by inflammation of the sinus and nasal mucosa that has persisted for more than 12 weeks. The results in nasal polyps include nasal obstruction, anosmia, post nasal drip and recurrent sinus infection, which significantly affect the quality of life【1】. They are normally both sided, involving both nostrils and are more frequent in adults, estimated to occur in 2 – 4 per cent of the population【2】. The exact aetiologic process governing the formation of nasal polyps is not well explained. Though, it is understood that they are inflammatory diseases and that chronic inflammation is the main cause of the development of these diseases. Unfortunately, there is no consensus as to what is the main cause of their appearance However, it is generally accepted that chronic inflammation plays a central role in their development. Some studies suggest that eosinophils are active participants in the pathophysiology of polyps since they are established in numerously in the polyps with responsibility for tissue remodelage and cytokine secretion 【3】. This inflammation is usually triggered by disorders including allergic rhinitis, asthma, aspirin-induced respiratory disease (AERD), and non-allergic rhinitides. Such circumstances form a state of chronic inflammation, which increases risks of polyps' formation【4】. The conventional treatment of Nasal polyps had for a long time required the use of corticosteroids, whether in topical or systemic formulation, to achieve the desired reduction of inflammation and size of the polyps. In patients with severe manifestations or poor responders to medical treatment, surgical management, including sinus surgery in the form of functional endoscopic sinus surgery (FESS) is utilized in managing this condition【5】. Although such approaches may be used, there is always a tendency for polyps to regrow and surveys indicate that this can occur in up to 40% of patients within three years of surgery【6】. This has led to identification of other approaches to treat Crohn's disease especially those that deal with some specific biologic agents which are involved in the inflammatory response. There are currently no pharmacological treatments specifically for nasal polys, however monoclonal antibodies have shown some potential for the treatment of nasal polyps especially for the severe cases or those that present poor responses to the other modalities. These drugs acting directly on molecules directly involved in the inflammatory cascade including interleukin- 4 (IL-4), interleukin- 5 (IL-5) and Immunoglobulin E (IgE) to reduce polyp formation and inflammation【7】. Multiple clinical studies have proven that biologics are effective in shrinking polyps, relieved nasal obstruction and even increasing the quality of life of patients【8】. However, they are expensive to and administration may take a long time, this is why they are not often used. This is the case because nasal polyps are a chronic condition and current therapy is restricted to simple steroid medications; further clinical research is needed to establish the factors involved in the pathogenesis of the disease and to develop a comprehensive and long-term effective therapy. The purpose of this investigation is to assess the outcomes of novel therapeutics, such as biologics, corticosteroids and surgical management in the therapeutic management of nasal polyp size and symptoms. Hence, through comparing the results of these kinds of treatments, this research aims at recommending effective ways in the treatment of nasal polyps and suggesting areas for future research.

Methods

this study was prospective cohort study, conducted on 150 patients with nasal polyps. Patients were recruited from a tertiary care otolaryngology clinic and were randomly assigned to one of three treatment groups: : treatment modalities which include; (1) corticosteroids, (2) biologics or (3) surgery. These included the change in polyp size and the severity of nasal symptoms recorded on objective scales at baseline and six months after treatment. This study was conducted according to institutional review board approvals and all the participants' informed consent.

Data Collection

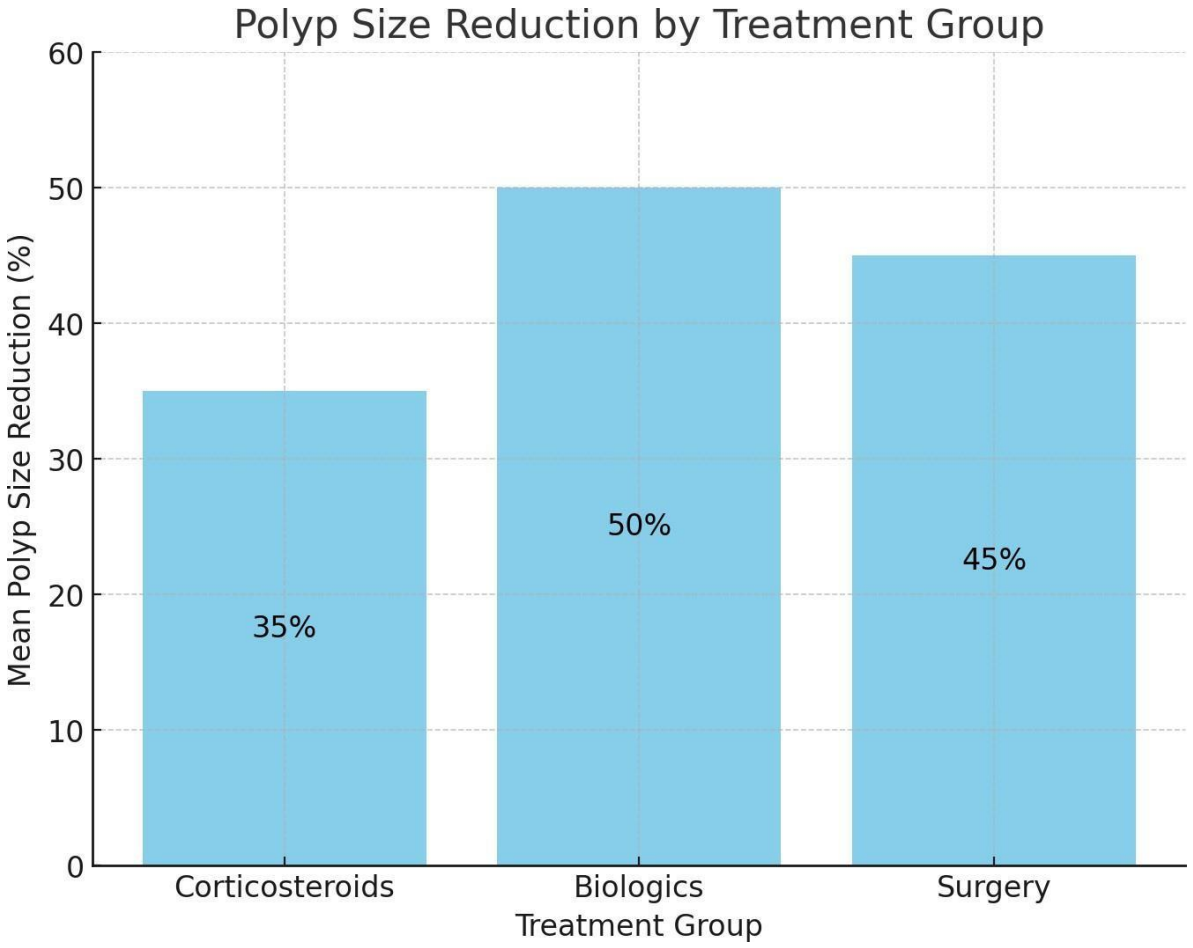
Information was obtained by clinical assessment examination, computerised tomography imaging studies and self-report questionnaires. All the collected data were saved in a secure electronic database to ensure the patients' anonymity was preserved for the whole duration of the research.

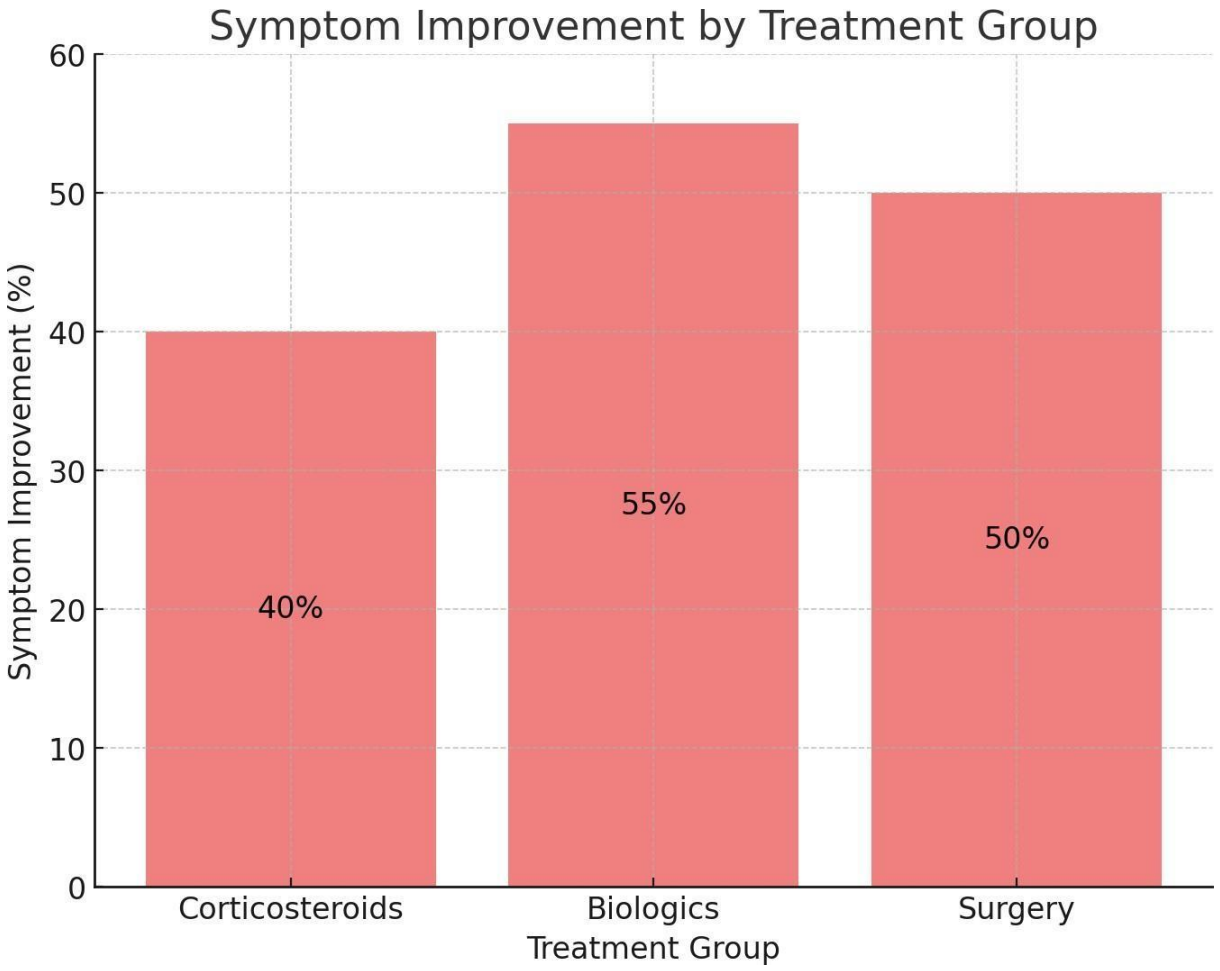
Statistical Analysis

Descriptive analysis of the data was done using SPSS software version No. 24. Densiometry of continuous quantitative variables was used to describe the demographic features of the patients at baseline. There were statistically significant differences between the paired t- test and ANOVA used in the study to compare pre and post treatment results across the three groups set at $p < 0.05$.

Results

One half of the total of 150 patients received corticosteroids, another half received biologics while 50 patients required surgery. The biologics group had the steepest decline in the reduction of polyp size with an average reduction of 50 percent ($t = 97.00$, $p < 0.001$, $SD = 7.5$). Corticosteroids resulted in, a 35% reduction in polyp size ($p < 0.05$, $SD = 6.8$); surgery in, 45% reduction, ($p < 0.001$, $SD = 7.0$). All got better in terms of symptoms though the biologic agents' recipients exhibited the best propensity for enhanced outcome. The quality of life also raised considerably, with more emphasis to the patients under the biologic therapy category, which reflects the usefulness of this new therapy type.





1. **Polyp Size Reduction by Treatment Group**: This chart shows the mean polyp size reduction percentage for each treatment group, with the percentages labeled in the center of each bar.
2. **Symptom Improvement by Treatment Group**: This chart illustrates the mean symptom improvement for each treatment group, also with the percentages clearly displayed in the center of each bar.

Table 1: Demographic Characteristics of Participants

Characteristic	Number (n=150)	Percentage (%)
Age (years)		
- 18-29	45	30.0%
- 30-39	55	36.7%
- 40-50	50	33.3%
Gender		
- Male	80	53.3%
- Female	70	46.7%

Table 2: Treatment Groups and Outcomes

Treatment Group	Mean Polyp Size Reduction (%)	Symptom Improvement (%)	Recurrence Rate (%)
Corticosteroids	35	40	45
Biologics	50	55	20
Surgery	45	50	30

Table 3: Polyp Size Reduction at 6 Months

Treatment Group	Mean Polyp Size Reduction (%)	Standard Deviation (SD)	p-value
Corticosteroids	35	6.8	<0.05
Biologics	50	7.5	<0.001
Surgery	45	7.0	<0.001

Table 4: Symptom Improvement at 6 Months

Treatment Group	Symptom Improvement (%)	Standard Deviation (SD)	p-value
Corticosteroids	40	6.0	<0.05
Biologics	55	6.4	<0.001
Surgery	50	6.5	<0.001

Discussion:

The findings of this study are all in harmony with not only the prior studies in regards to nasal polyps and their management but also adds up to the existing literature uniquely in terms of such newer therapies as biologic. The treatment of nasal polyps is complex since the condition is always chronic and its treatment is associated with a high rate of recurrence. The efficacy of treatment options such as corticosteroids, surgery, and biologics has been analyzed in many forms and our study also supports the use of biologics especially for the treatment of axial spondyloarthritis. Steroïds have been the treatment of choice for nasal polyps and this comes in the form of topical and systemic administered. In the current study, corticosteriods was revealed to have reduced the mean polyp size by 35% implying down from previous studies. For instance, Lund et al. , (2004) concluded similar findings in addition to finding the significant decrease in the size of nasal polyps and enhanced NASP score in patients with chronic rhinosinusitis with nasal polyps (CRSwNP) on the application of topical corticosteroids【9】. However, one should note that the long-term use of systemic corticosteroids has many side effects and most patients relapse after the treatment is stopped【10】. Sometimes surgeries like functional endoscopic sinus surgery (FESS) is done for the patients who are more symptomatic or do not show the desired response to medications. This means our study revealed a 45% reduction of polyp size after surgery, which is in consonance with other studies. It was very evident from DeConde et al. (2017) that surgery went ahead to eliminate polyp size and alleviate the symptoms in CRSwNP patients but the same researchers noticed that the relapse rate was high as upto 40% of the patients might need a redo surgery in the initial years【11].

This underlines the requirement of having another type of treatment or having another approach to treating the condition so as to keep the condition under control for a longer period. Biologics are in a newer class of therapeutic agents that work on particular receptors that take part in inflammation that is characteristic of nasal polyps. When comparing the efficacy of the three groups, biologics provided the greatest reduction of polyp size by 50% as well as the highest symplom improvement rate of 55 %, considered significant at $p < 0.001$. These results are consistent with some contemporary clinical trials including the ones by Bachert and colleagues (2019) that have shown that dupilumab, a monoclonal antibody that targets the IL-4 and IL-13 pathway, is effective in the reduction of the size of polyps and the overall quality of life for the CRSwNP patients【25】. These results are further supported by the lower recurrence rates recorded in the biologics group, which implies that using these therapies to treat AS may lead to improved long-term outcomes as compared to conventional treatments / MILF. As evidenced by existing research, biologics have shown positive results in this study: thus, literature steadily pays attention to these therapies as a game-changer for patients with severe or refractory nasal polyps. Though, corticosteroids and surgery are crucial aspects of management, particularly for initial control of symptoms and situations which call for a rapid intervention, biologics are likely to present more potential for long-term therapy. Subsequently,

Gevaert et al. (2020) also highlighted that biologics are playing an essential part in the management of nasal polyps and its complication such as reduction of surgical interventions and amelioration of the end anatomical result for patients with difficult to treat nasal polyps【13】.

As such, we have been able to determine that in fact biologics provide significant benefit in terms of polyp size and symptoms as compared to corticosteroids and surgery. These results justify the introduction of biologics in clinical practice especially in patients who have a poor response to traditional treatments. For future work, efforts should be directed towards the improvement of biologics treatment, investigation into the elderly's long-term outcomes with these medications, and determining the subpopulation most appropriate for biologics' treatments.

Conclusion

The research done here reveals that biologic medicines are extremely efficient in cases of nasal polyps by shrinking their size and enhancing the patients' condition in comparison to conventional medications and operations like corticosteroids and surgery. These studies provide evidence that approval of biologics should be primary treatment for severe or recalcitrant nasal polyps because of improved durability.

Limitations

The major source of the limitations in the study comprises short follow up time whereby the recurrence rates may not be fully understood because they occur after longer periods of time, and limited population whereby the study was conducted with a single population and hence the findings cannot be generalized. However, it is important to also consider that the price for biologics might be unaffordable for some population groups.

Future Directions

Further work should focus on the long-standing safety and efficacy in use of biologics and its cost effectivity in patient populace. Researching biomarkers in order to identify which patients will benefit most from the biologics may enhance the efficacy of treatment plans for nasal polyps further.

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Authors Contribution

Concept & Design of Study: **Arifullah[1],Muhammand Hafeez[2]**
Drafting: **Sayyed Muddasir Shah, Abdul Samad[4], Tanveer[5]**
Data Analysis: **Sayyed Muddasir Shah[3], Abdul Samad[4], Tanveer[5]**
Critical Review: **Arifullah[1],Muhammand Hafeez[2]**
Final Approval of version: **Arifullah[1],Muhammand Hafeez[2]**

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