Original Research

CLINICOPATHOLOGICAL ANALYSIS OF SINONASAL POLYPOSIS WITH SPECIAL REFERENCE TO SURGICAL MANAGEMENT - A TERTIARY CARE HOSPITAL BASED STUDY

Dr. Mirza Mahidul Islam[1], Dr. Siyum Ganguly[2], Dr. Mohammad Nizamuddin Khan[3*]
[1]ENT Specialist, Barpeta Civil Hospital, Barpeta, Assam, India.
[2]Assistant Professor, Department of Pathology, Nagaon Medical College Hospital, Nagaon, Assam, India.
[3*]Assistant Professor, Department of ENT, Nagaon Medical College Hospital, Nagaon, Assam, India.
Corresponding Author: Dr. Mohammad Nizamuddin Khan
Assistant Professor, Department of ENT, Nagaon Medical College Hospital, Nagaon, Assam, India.

ABSTRACT

Background: Sinonasal polyposis is a very common presentation among patients attending the Otorhinolaryngology outpatient clinics. Though the overall incidence of patients presenting with clinical symptomatology may not be high, however the chronicity of symptoms causes considerable morbidity to those affected. This in turn warrants either conservative medical treatment or as in most cases, surgical approach for resolution of the symptoms. The current study is aimed at studying the various clinical presentations of patients with sinonasal polyposis, the response following conservative medical treatment, the outcome of the different surgical approaches and the histopathological spectrum of the various sinonasal polyps.

Methods: This was a hospital based clinical observational study including a total of 30 patients presenting with sinonasal polyposis over a period of one year.

Results: Around 70% of patients had history of allergy and infection as etiological risk factors. Most of the patients presented with nasal obstruction followed by other complaints like discharge, headache, epistaxis and smell disturbance for duration around 3-6months. Initially all patients were treated with conservative medical management. Those patients who did not show symptomatic improvement were taken up for surgery. Any of the three surgical approaches that included FESS (Functional Endoscopic Sinus Surgery), Caldwell Luc or Intranasal Polypectomy were undertaken in 27 patients based on indications. Out of the 27 patients who underwent surgery, 16 patients underwent FESS, of whom 75% improved symptomatically at 2 weeks and 88% improved at 6 weeks of duration. Out of 4 patients who underwent Caldwell Luc surgery, 50% improved at 2 weeks and 75% cases improved at 6 weeks of post-operative period. Out of 7 cases who underwent Intranasal Polypectomy, 43% improved in 2 weeks and 57% improved in 6 weeks post-surgery. On comparison of VAS, maximum improvement was seen in FESS and least improvement in intranasal polypectomy. On histopathological study, maximum patients (55.56 %) had eosinophilic sinonasal polyps followed by inflammatory sinonasal polyps.

Conclusion: Surgical management continues to remain as the mainstay of treatment for a case of sinonasal polyposis. Out of all three surgical approaches, best outcome was shown by FESS followed by Caldwell Luc than Intranasal Polypectomy. Least complications were seen in FESS.

Keywords: Sinonasal Polyposis, FESS, Caldwell Luc, Intranasal Polypectomy.

INTRODUCTION

Sinonasal polyposis is a chronic inflammatory condition that affects the mucosa of the nasal cavity and paranasal sinuses. The annual incidence of chronic rhinosinusitis with nasal polyposis ranges approximately 1–20 cases per 1000 population.

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The prevalence is about 1–4% in adults and 0.1% in children. The disease is uncommon in children under 10 years of age. Certain systemic conditions, such as asthma, show a higher association, with nasal polyps present in about 7% of asthmatic patients.[1,2]

The exact etiology of sinonasal polyposis is not known. However, several factors including allergy, asthma, bacterial infections, genetic predisposition etc. have been associated with sinonasal polyposis. Patients present with varied symptoms ranging from nasal obstruction, anosmia or hyposmia, to severe complications like proptosis, diplopia, ear discharge, or hearing loss may occur.[3,4]

The primary goal of treatment is to reduce mucosal inflammation, control infection, and restore

mucociliary clearance.[5] Treatment includes environmental control, medical management and surgical treatment. Surgical treatment is indicated when patients either fail to respond to medical therapy for at least one month or when large polyps cause significant obstruction. The surgical approaches include intranasal polypectomy, Caldwell–Luc sinus surgery, and Functional Endoscopic Sinus Surgery (FESS). Amongst these, FESS is widely preferred due to its better visualization, precise removal of diseased tissue, improved sinus ventilation and drainage, and lower complication and recurrence rates.

Histopathological examination of nasal polyps may show oedematous or eosinophilic polyps, fibro-inflammatory changes, or hyperplasia of seromucous glands, which may influence clinical outcomes. Recurrence of sinonasal polyposis depends on factors such as underlying etiology, type of surgery, and postoperative management.[6]

Aims and Objectives

1. To study the various clinical presentations of patients attending the Outpatient Department of Otorhinolaryngology diagnosed as a case of sinonasal polyposis.
2. To study the outcome of different types of surgical interventions for sinonasal polyposis.
3. To study the histopathological spectrum of different sinonasal polyposis of patients included in the study group.

MATERIALS AND METHODS

This was one year prospective study conducted in the Department of ENT in tertiary care centre in Assam for a period of one year over 30 patients and diagnosed as sinonasal polyposis. Complete evaluation of the patients with history, clinical examination, laboratory test and radiological examination was done and data was collected according to a predesigned proforma. In case of children, history was taken from the mother and guardian. A complete general physical examination, systemic examination and ENT examination of the patients was undertaken. The symptoms were then scored using the VAS scale. All patients were duly informed about the study and proper consent was taken before performing any procedure. The patients were then subjected to conservative treatment minimum for 1 month with treatment given based on indications. Those patients who were not relieved with conservative treatment were then counselled for operative treatment and underwent surgery. Patients underwent either FESS (Functional Endoscopic Sinus Surgery), Caldwell Luc or Intranasal Polypectomy based on indications. IBM SPSS Statistics 21.0 was used to perform the statistical analysis.

Inclusion Criteria

All patients of age group between 5-65 years and of both gender with all or any of these criteria were included:

1. Patients presenting with symptoms of sinonasal polyposis and diagnosed clinically.
2. Sinonasal polyposis diagnosed endoscopically and radiologically.
3. All patients of sinonasal polyposis treated surgically following failed medical management.

Exclusion Criteria

1. Patients of age < 5 years and > 65years.
2. Patients with any systemic diseases leading to surgical contraindication.
3. Malignant and non-polypoidal nasal mass.
4. Intracranial or intraorbital complication of sinonasal polyposis patients.

RESULTS AND OBSERVATIONS

The present study included 30 patients diagnosed with sinonasal polyposis. As per inclusion and exclusion criteria, surgical management was performed in 27 cases. Three modalities of surgical procedure were performed which included the Functional Endoscopic Sinus Surgery (FESS), Intranasal Polypectomy (INP) and Caldwell Luc (CWL). A comparison of outcomes was drawn between the three procedures with regard to relief of symptoms and complications. Histological study of each sinonasal polypoidal mass was done.

Out of 30 sinonasal polyposis cases, maximum number of patients were seen in the age group of 25-30 years (16.67%) followed by the age group of 20-25 years (13.33%). 20 patients (67%) were males and 10 patients (33%) were females in this study with Male and Female ratio of 2:1.

In our study, most common etiological risk factor was Infection (40%) followed by Allergy (33.34%). No systemic and genetical risk factors for sinonasal polyposis found in our study.

Risk Factors	No of Cases	Percentage
Allergy	10	33.34
Infection	12	40
Asthma	3	10
Aspirin sensitivity	1	3.33
Environmental	4	13.33
Systemic disease	0	0
Genetic	0	0

Table 1: Risk Factors for Sinonasal Polyposis

Nasal obstruction (83.33 %) was the common presenting symptom followed by nasal discharge (76.67 %). Smell disturbance, Mouth breathing, sneezing, headache and bleeding from nose were other symptoms with which patients presented. A patient may have multiple presenting symptoms.

Sl. No.	Symptoms	No. of Cases	Percentage
1	Nasal obstruction	25	83.33
2	Nasal discharge	23	76.67
3	Smell disturbance	7	23.33
4	Sneezing	7	23.33
5	Headache	6	20
6	External deformity	0	0
7	Mouth breathing	8	26.67
8	Bleeding from nose	7	23.33
9	Ear discharge	0	0
10	Deafness	0	0
11	Facial pain or pressure	0	0
12	Proptosis/ Diplopia	0	0

Table 2: Presenting Symptoms

Maximum numbers of patients presented with symptoms lasting for the duration of 3-6months in both Antro-choanal and Ethmoidal polyps.

Ethmoidal Polyps were more common (53%) than Antro-choanal Polyp (47%). Considering the age at presentation, Ethmoidal Polyps most commonly presented in the age group of 35-45 years. Antro-choanal Polyps on the other hand were more common in younger age group with maximum presentation in the age groups of 5-15 years and 15-15 years.

Both Ethmoidal (68.75%) and Antro-choanal polyps (57.14%) were seen more commonly in males than females.

All cases were initially treated with conservative medical treatment. Amongst these only 2 cases (6.9%) improved symptomatically after 1 month of conservative treatment. 1 case did not come for follow up. Follow up was done in the rest of 29 cases. Among 27 cases, 59% cases underwent FESS, 26% intranasal Polypectomy and 15% cases underwent Caldwell Luc Surgeries.

Surgery	Types of Disease	No. of Cases	Total	Percentage
Intra Nasal Polypectomy	Antrochoanal Polyp	3	7	25.92
	Ethmoidal Polyp	4		
Caldwell Luc	Antrochoanal Polyp	4	4	14.81
	Ethmoidal Polyp	0		
FESS	Antrochoanal Polyp	5	16	59.25
	Ethmoidal Polyp	11		

Table 3: Distribution of Cases According to Types of Surgery Under Taken

VAS score comparison of outcome was done at different periods of treatment. On Friedman test, there was significant difference between all the groups with $p< 0.05$. On Post-Hoc analysis, using Wilcoxon Signed rank test, there was significant difference between pre-surgery and post-surgery after 2 weeks ($p= 0.0001$) & 6 weeks ($p=0.0001$) respectively after using Bonferroni correction. However, there was no significant difference before & after conservative treatment ($p=0.428$).

	At Presentation	After Conservative Treatment	After 2 Weeks of Surgery	After 6 Weeks of Surgery	P-Value
VAS Score {Median (IQR)}	19 (12-26)	21(17-24)	6(5-16)	5(4-10)	0.0001

Table 4: VAS Score Comparison of Outcome at Different Periods of Treatment

Out of all 3 surgeries, bleeding most commonly occurred in intranasal polypectomy (28.57%). Facial pain, facial swelling and ecchymosis of eye lids most commonly occurred in Caldwell Luc surgery. All complications were least in FESS.

Complications	FESS		Intranasal Polypectomy		Caldwell Luc	
	No	Percentage	No	Percentage	No	Percentage
Bleeding	3	18.75	2	28.57	1	25
Facial Pain	2	12.5	2	28.57	2	50
Facial swelling	2	12.5	1	14.28	2	50
Ecchymosis	2	12.5	2	28.57	2	50

Table 5: Immediate Complications (within 48 Hours) 0f Surgery

Improvement was considered for patients, whose total VAS score decreased by 10 at different points of time post-operatively. The following tables summarises the improvement of outcomes of the various surgeries at various points of time.

Types of Surgery	Total Cases	No. of Cases Improved	Percentage of Improved
FESS	16	12	75
Caldwell Luc	4	2	50
Intranasal polypectomy	7	3	43
	27	17	63

Table 6: Improvement at 2 Weeks of Surgery

At two weeks post operation, maximum (75%) of cases improved by FESS then Caldwell Luc (50%) followed by Intranasal Polypectomy (43%).

Types of Surgery	Total Cases	No. of Cases Improved	Percentage of Improved
FESS	16	14	88
Caldwell Luc	4	3	75
Intranasal polypectomy	7	4	57
	27	21	78

Table 7: Improvement at 6 Weeks of Surgery

At 6 weeks post-operative, maximum percentage of improvement was seen from FESS (88%) followed by Caldwell Luc (75%) and Intranasal Polypectomy (57%) respectively.

After Kruskal Wallis test, between different surgical procedure, it was found that there was statistical significant difference between VAS score with $p<0.05$ at both 2 weeks & 6 weeks after the surgery. On post-hoc analysis, using Bonferroni correction, FESS had better VAS score difference compared to INP & CWL at 6 weeks with p= 0.008 & 0.016 respectively, which was statistically significant. Also at 2 weeks this was significant (FESS vs INP; p=0.022 & FESS vs CWL; p=0.027). There was no statistically significant difference between INP & CWL at both 2 weeks & 6 weeks respectively (p=0.412).

Surgery	FESS	Intranasal Polypectomy	Caldwell LUC	p-value
2 weeks Median (IQR)	5.50(4.25-10.00)	15 (6-16)	14.50(10-22)	0.015*
6 weeks Median (IQR)	4(3.25-5.00)	6 (5-14)	9.00(7.25-16.75)	0.006*

Table 8: Comparison of Post-Operative VAS Score of Different Surgeries

In histopathological examination of 27 cases who underwent surgery, Eosinophilic sinonasal polyposis was more common (56%) than Inflammatory sinonasal polyposis (44%).

Histopathology Type	Numbers of Cases	Percentage
Eosinophilic Sinonasal polyp	15	55.56
Inflammatory Sinonasal polyp	12	44.44
	27	100

Table 9: Histopathological Findings of Sinonasal Polyposis

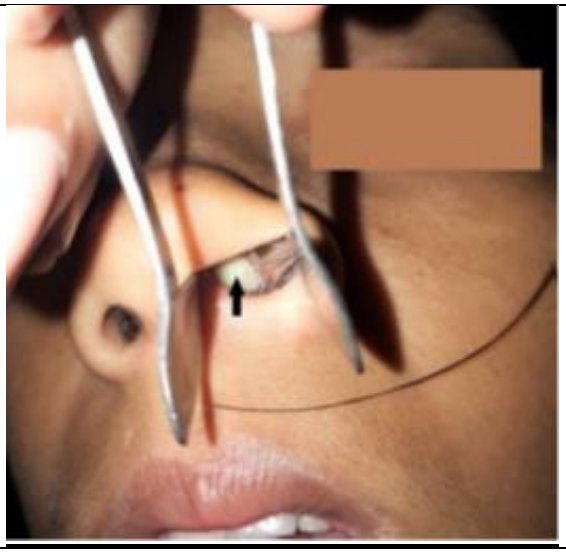

Image 1: Anterior Rhinoscopy Showing Polypoidal Mass at Left Nostril

Image 2: Polypoidal Mass Hanging at Oropharynx

Image 3: NCCT Axial View Showing Polypoidal Mass at Both Maxillary Sinus and Nasal Cavit

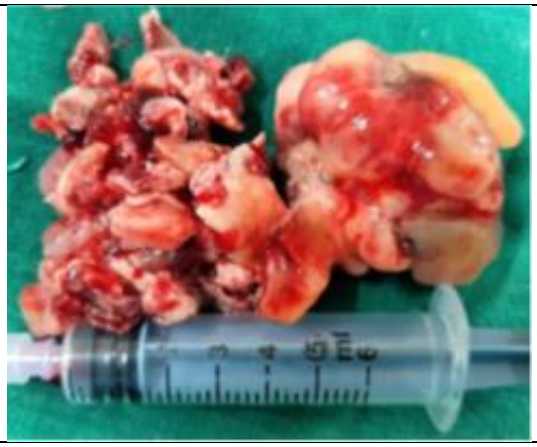

Image 4: Polypoidal Specimen Removed after Surgery

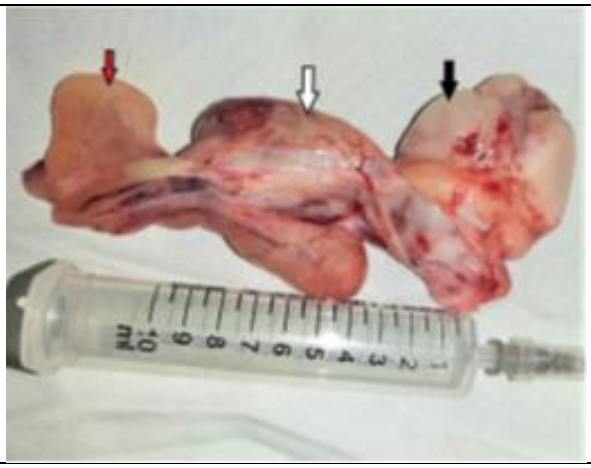

Image 5: Antrochoanal Poly Specimen, Red Arrow Showing Antral Part of Polyp, White Arrow Showing Nasal Part of Polyp, Black Arrow Showing Choanal Part of Polyp

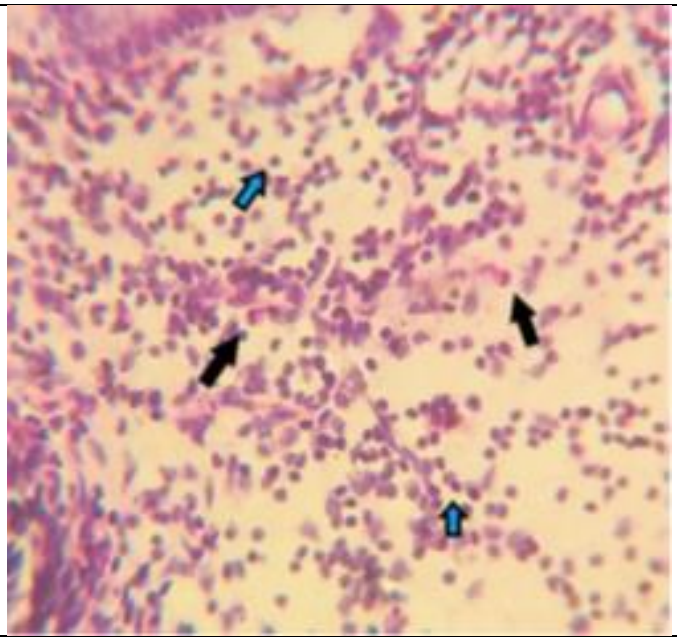

Image 6: Histopathological Image of Eosinophilic Sinonasal Polyp. Black Arrow Showing Eosinophils

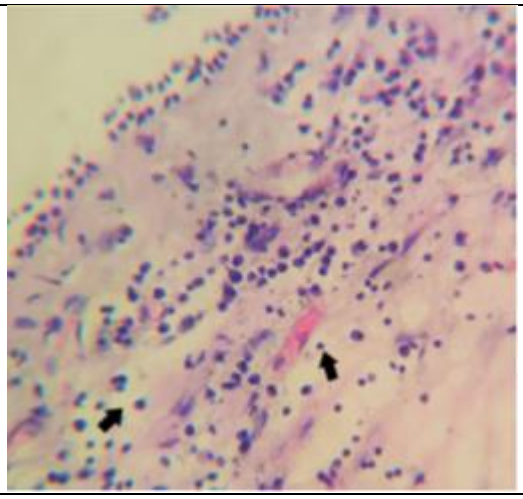

Image 7: Histopathological Image of Infective Sinonasal Polyp. Black Arrow Showing Lymphocytes

DISCUSSION

Sinonasal polyposis is a chronic inflammatory condition of the nasal and paranasal mucosa, often presenting with nasal obstruction, discharge and smell disturbances. The present study analysed 30 cases diagnosed as sinonasal polyposis. Patients ranged from 5 to 65 years, with a mean age of 31.5 years.

In terms of age distribution, the present study found that sinonasal polyposis predominantly affects adults, consistent with Jonathan Ray et al.[3] who reported that the condition commonly occurs in patients older than 20 years and is rare in children under 10 years. Similarly, Ahmed Meymane Jahromi et al.[7] reported a mean age of presentation of 39.5 years, and Shruthi Patil et al.[8] observed a mean age of 29.5 years. The peak presentation in the present study aligned with the 31–40 years range described by A B Chukuezi et al.[9]

Regarding gender distribution, the present study demonstrated a male predominance (66.67% males, M:F ratio 2:1). This finding is in agreement with other studies, such as Jonathan Ray et al.[3] who reported a male-to-female ratio of 2:1, Ahmed Meymane Jahromi et al.[7] who found males more commonly affected (60.3%), and Shruthi Patil et al.[8] who observed a male prevalence of 63.4%.

Etiological factors in the present study mirrored those reported in the literature. Allergy was present in 33.34% of cases, infection in 40%, asthma in 10%, aspirin sensitivity in 3.33%, and environmental risk factors in 13.33%. These results are comparable to Wytske Fokkens et al.[10] who described multifactorial causes including allergy, asthma, aspirin sensitivity, genetic predisposition, and environmental factors.

Clinical presentation in this study primarily involved nasal obstruction (83.33%), nasal discharge (76.67%), sneezing, epistaxis, and smell disturbances (23.33% each), with mouth breathing (26.67%) and headache (20%). These results are consistent with previous studies; Sushna Maharjan et al.[11] and Ahmed Meymane Jahromi et al.[7] reported nasal obstruction as the most frequent symptom, followed by rhinorrhea, snoring, headache, and facial pain. Similarly, Juliano Irita Haro et al.[12] documented 100% nasal obstruction and variable prevalence of sneezing, rhinorrhea, and smell disturbances.

Regarding types of polyps, ethmoidal polyps were most common in adults (53.33%), whereas antrochoanal polyps predominated in younger patients (46.67%). This pattern aligns with Shruthi Patil et al., who reported 63.4% ethmoidal and 33.4% antrochoanal polyps, and Subrahmanyam et al., who found 60.71% ethmoidal and 39.28% antrochoanal polyps. Gender-wise, both polyp types were more common in males, consistent with previous findings. The duration of symptoms before presentation was mostly 3–6 months for both ethmoidal and antrochoanal polyps, similar to the findings of Shruthi Patil et al.[8]

Treatment outcomes highlighted the limited effectiveness of conservative therapy, with only 6.9% of patients improving symptomatically, echoing the findings of M. Gelardi et al.[13] Surgical intervention yielded superior results. Functional Endoscopic Sinus Surgery (FESS) demonstrated the highest symptomatic improvement, with 75% of cases improved at 2 weeks and 88% at 6 weeks, significantly better than intranasal polypectomy and Caldwell-Luc procedures. These results support previous studies by M P Humayun et al.[14] and Soler ZM et al.[15] which reported higher success rates and sustained improvement with FESS compared to conventional surgery. Immediate postoperative complications were lowest with FESS and highest with Caldwell-Luc, consistent with literature.

Histopathological analysis in the present study revealed that eosinophilic polyps were predominant (55.56%), with the remainder being inflammatory polyps (44.44%). This aligns with prior studies by Bayan Sultan Al Jobran et al.[16] Juliano Irita Haro et al.[12] Mysorekar VV[17] and Anjali Dasgupta et al.[18]

which described allergic polyps as eosinophilic and non-allergic polyps as predominantly lymphocytic and neutrophilic.

CONCLUSION

In conclusion, the present study's findings closely mirror those reported in existing literature, confirming that sinonasal polyposis predominantly affects adult males, presents most commonly with nasal obstruction, and is most effectively treated surgically with FESS. The study reinforces the multifactorial etiology of the condition, highlights the limitations of conservative management, and provides detailed histopathological correlation, supporting the broader understanding of sinonasal polyposis in clinical practice.

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