A DESCRIPTIVE STUDY OF DIAGNOSTIC AND MANAGEMENT PROTOCOLS IN CHRONIC RHINOSINUSITIS

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ABSTRACT

BACKGROUND

Rhinosinusitis is an inflammatory process involving the mucous membrane of the nose and one or more sinuses. The last decade has seen the development of a number of guidelines as well as publications on the epidemiology, diagnosis and treatment of rhinosinusitis and nasal polyposis in U.S.A. and Europe. In our country, proper population surveys are required to know the exact prevalence of chronic rhinosinusitis. However, even from the limited data available, it is very apparent that chronic rhinosinusitis is a significant health problem resulting in considerable medical costs and severe impact on the health related quality of life.

This descriptive study was conducted to- 1. To study the efficacy of clinical examination, diagnostic nasal endoscopy and CT scan in diagnosing chronic rhinosinusitis with and without polyps; 2. To study the surgical techniques and surgical findings of all the patients of chronic rhinosinusitis undergoing endoscopic sinus surgery; 3. Patient's satisfaction will be assessed by comparing preoperative and post-operative Rhinosinusitis Disability Index.

MATERIALS AND METHODS

Our study was a descriptive study conducted at our hospital for a time period of 1 year. The study consisted of 52 cases having clinically diagnosed as chronic rhinosinusitis according to symptoms defined by rhinosinusitis task force.

RESULTS

There is a definitive male preponderance in our study with most of the patients coming from age groups between 20 - 60 years. This is comparable to most of the studies. Chronic rhinosinusitis with polyps (42.4%), chronic rhinosinusitis without polyps (57.6%), ENT examination could identify 34.6% of patients with polyps, which includes three categories. Sinonasal polyposis (27.7%), Antrochoanal polyps (55.5%), Allergic fungal polyposis (15.6%). Postoperatively, patient's satisfaction is better in chronic rhinosinusitis without polyps.

CONCLUSION

Patient's satisfaction was assessed by comparing pre- and post-operative Rhinosinusitis Disability Index. Highly significant difference was noted when pre- and post-operative Rhinosinusitis Disability Index ($p=0.003$) were compared. For patients with polyps, P value= 0.00 and patients without polyps, P value= 0.00.

KEYWORDS

Chronic Rhinosinusitis, Endoscopic Sinus Surgery, FESS, Allergic Rhinosinusitis.

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BACKGROUND

Chronic rhinosinusitis is quite a common disease of the nose and sinuses seen globally and in India. The incidence of rhinosinusitis is increasing in our country due to increasing air pollution, industrial fumes and allergic factors especially in the urban areas. In the rural areas also, rhinosinusitis is quite prevalent due to lack of proper hygiene and malnutrition resulting in low immunity.

The last decade has seen the development of a number of guidelines, consensus documents as well as publications on the epidemiology, diagnosis and treatment of rhinosinusitis and nasal polyposis in U.S.A. and Europe.

In our country, proper population surveys are required to know the exact prevalence of chronic rhinosinusitis. However, even from the limited data available it is very apparent that chronic rhinosinusitis is a significant health problem resulting in considerable medical costs and severe impact on the health-related quality of life.

Rhinosinusitis is an inflammatory process involving the mucous membrane of the nose and one or more sinuses. The mucous membrane of the nose and sinuses is continuous and bears the brunt of any offending causative factor, especially bacterial infection. Chronic rhinosinusitis generally develops as a complication of viral or allergic inflammation of the upper respiratory tract.¹ Although bacteria can be found in the sinuses of most patients who have CRS, the exact aetiology of the inflammation associated with this condition is uncertain.^{2,3} Chronic rhinosinusitis is a multifactorial disease. Factors contributing to rhinosinusitis can be mucociliary impairment, bacterial infection, allergy, swelling of the mucosa due to any reason and physical obstructions caused by anatomical variations in the nasal cavity or paranasal sinuses. Bachert and Colleagues⁴ suggested that bacterial superantigens may have a possible role in the pathophysiology of nasal polyposis.⁴ Most of the cases show

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presence of eosinophilic infiltration only.⁵ The origin of pathology in osteomeatal complex also plays a significant role in the pathogenesis of rhinosinusitis.

Nasal polyps and chronic rhinosinusitis are often considered as one disease entity, because it seems difficult to clearly differentiate between the two. Nasal polyposis is the ultimate manifestation of chronic inflammation.⁶

The lamina propria of the polyps is abundant with eosinophils and lymphocytes. Through the inflammation within these tissues is mediated by a number of cells namely fibroblasts, epithelial cells and endothelial cells.⁷ The causal relationship of allergic rhinitis to rhinosinusitis is conflicting. There is no question that there is a definite association of allergic rhinitis and CRS.^{8,9} Suzuki et al¹⁰ also showed an increase in activated eosinophils and neutrophils as well as Interleukin (IL)-5 in sinus effusions of allergic patients compared with non-allergic patients.

It is not confirmed whether the inflammation is infectious. It should be possible to diagnose a case of rhinosinusitis on the basis of detailed history and significant signs found during ENT examination. The analysis of signs and symptoms such as purulent discharge, nasal congestion, cough and any impairment of sense of smell together with the variation of intensity is important in diagnosing disease and monitoring treatment. However, in chronic cases with long-standing symptoms and no obvious signs, investigations in addition to a general ENT examination are necessary.

CT scan is invaluable for evaluation of the sinus disease, for assessment and road map during surgery. CT scan of PNS in coronal and axial views reveal mucosal changes deeper in osteomeatal complex and helps to correlate anatomical and pathological information. It also gives maximum information about the extent of disease assessing the contents in the sinus cavity and soft tissue lesions.

Routine ENT examination also includes endoscopic inspection of the nose. With Nasal Endoscopy, purulent secretions coming from sinus ostia, surgically treated sinus cavities and small polyps can be diagnosed at an early stage. Nasal Endoscopy combined with CT scan helps to locate the site and delineate the extent of nasal and sinus diseases. With the introduction of improved computer software, the imaging techniques have become both fascinating and rewarding.

Patients who are allergic must be carefully evaluated, as even minor allergies may cause enough of an exacerbation of chronic rhinosinusitis to cause dramatic worsening of symptoms. In addition to environmental controls, the anti-allergic therapy is also used to manage these patients. Any patient with chronic rhinosinusitis poorly responsive to medical treatment should have an extensive immunological evaluation including immunoglobulin levels. Children should be evaluated for cystic fibrosis.

In the past chronic sinusitis cases used to be dealt by repeated antral punctures and washes resulting in transitory improvement of symptoms. During that time, the concept or myth of the patients suffering from chronic rhinosinusitis used to be that sinusitis is a life-long untreatable disease. This view is now fast changing with the replacement of conventional external surgical techniques like Lynch Howarth and Caldwell Luc operations by less invasive and more effective techniques such as Endoscopic sinus surgery.

From the management point of view, patients with chronic rhinosinusitis in their early stages should first be

treated with antibiotics and anti-allergic drugs. In case the chronic rhinosinusitis is associated with nasal polyps, an appropriate course of oral steroids in tapering doses may help the patients. In case signs and symptoms persist or recur after medical treatment endoscopic sinus surgery should be considered, which has been found quite effective for the treatment of chronic rhinosinusitis.

Various new techniques of endoscopic sinus surgery have emerged including lasers to provide optimal results. Septum correction and endoscopic turbinate reduction along with endoscopic sinus surgery are advocated whenever necessary. Patient who has recurrent disease must be evaluated for allergic fungal and invasive fungal disease.

Some patients who do not respond to surgery may need selective antibiotics and anti-allergic therapy for 6 - 8 weeks to clear up infection and to control allergic symptoms. The role of supportive measures like nasal irrigation or spray with saline solution is also equally important keeping the chronicity of the disease in view. Treatment strategy for each patient must therefore be carefully planned.

Aims and Objectives

1. To study the efficacy of clinical examination, diagnostic nasal endoscopy and CT scan in diagnosing chronic rhinosinusitis with and without polyps.
2. To study the surgical techniques and surgical findings of all the patients of chronic rhinosinusitis undergoing endoscopic sinus surgery.
3. Patient satisfaction will be assessed by comparing preoperative and post-operative Rhinosinusitis Disability Index.

MATERIALS AND METHODS

Our study was a descriptive study conducted at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Gannavaram, Krishna District for a time period of 1 year. The study consisted of 52 cases having clinically diagnosed as chronic rhinosinusitis according to symptoms defined by Rhinosinusitis task force.

RESULTS

The study includes 52 patients having clinically diagnosed as chronic rhinosinusitis according to definition proposed by International task force on rhinosinusitis.¹¹

Rhinosinusitis Symptoms/Signs (Requires Two Major or One Major and Two Minor Factors)

	Major Factors		Minor Symptoms
1.	Facial pain/ Pressure	1.	Headache
2.	Facial congestion/ Fullness	2.	Fever (Non-Active)
3.	Nasal obstruction/ Blockage	3.	Halitosis
4.	Nasal discharge/ Purulent/ Discoloured posterior drainage	4.	Fatigue
5.	Hyposmia/ Anosmia		
6.	Purulence on nasal examination		
7.	Fever (Acute RS only)		

Table 1. Criteria for Diagnosing Chronic Rhinosinusitis

Geographical Distribution

In our study, patients mainly came from Krishna (76.9%) and West Godavari (19.2%) districts of Andhra Pradesh and few were from other places.

Age Distribution

Patients mainly presented in the age groups between 21 - 40 years (61.5%) and 41 - 60 years (25.1%). However, there are 5 patients below the age of 20 (9.6%).

Age	Numbers	CRS without Polyps		CRS with Polyps	
		No.	%	No.	%
0-20	5	2	40%	3	60%
21-40	32	22	68.7%	10	31.2%
41-60	13	6	46.1%	7	53.8%
61-80	2	0	0%	2	100%

Table 2. Age Distribution in Relation to Presence or Absence of Polyps

Gender Distribution

Out of 52 patients suffering from chronic rhinosinusitis, 61.5% were males and 38.5% were females showing male preponderance.

Sex Distribution in Relation to Presence or Absence of Polyps

Out of 32 male patients 43.7% has polyps and 56.3% has no polyps and out of 20 female patients 60% has no polyps and 40% have polyps.

Socio-Economic Status

Socio-economic status is poor in 53.8% of patients and middle class in 46.2% of patients. No patients from upper socio-economic class.

Distribution Based on Symptoms

All the 52 patients were evaluated for following symptoms. Nasal obstruction is the most common symptom seen in 96.1% patients, swelling of cheek is present in one case in which chronic rhinosinusitis is associated with osteomyelitis of left maxilla.

Symptoms	Number	%
Nasal obstruction	50	96.1%
Nasal discharge	37	71.1%
Postnasal drip	20	38.4%
Sneezing	13	25%
Headache and Facial pain	35	67.3%
Epistaxis	3	5.7%
Disturbance of smell	17	32.6%
Swelling or deformity	1	1.9%
Snoring	8	15.3%
Change in speech	8	15.3%

Table 3. Distribution based on Symptoms

Clinical Examination

Clinical examination was done by anterior rhinoscopy and Diagnostic Nasal Endoscopy in all patients.

ENT Examination

Septal deviation is the most common sign present in 67.3% of patients. Polyposis which includes sinonasal polyposis, antrochoanal polyps and polyps with fungal aetiology is present in 34.6% of cases.

Sign		Number	%
Septal deviation		35	67.3%
Pale mucosa		11	21.1%
Turbinate	Inferior	18	34.6%
Hypertrophy	Middle	14	26.9%
Discharge		21	40.3%
Polyp		18	34.6%
1. Sinonasal polyposis		5	27.7%
2. Antrochoanal polyp		10	55.5%
3. Allergic fungal polyposis		3	16.6%

Table 4. Distribution of Clinical Examination Findings

Diagnostic Nasal Endoscopy

Diagnostic Nasal Endoscopy was done in all 52 patients. Septal deviation is the most common sign present in 71.1% of cases and purulent nasal discharge is second most common sign present in 40.3% of cases. Nasal polyposis which includes Sinonasal polyposis (23.8%), Antrochoanal polyps (47.6%) and Allergic fungal sinusitis (28.5%) is present. Polyps are better identified in Diagnostic Nasal Endoscopy (21) than in anterior rhinoscopy (18).

Sign		Number	%
Septal deviation		37	71%
Pale mucosa		11	21.1%
Turbinate	Inferior	18	34.6%
Hypertrophy	Middle	14	26.9%
Discharge (Purulent)		21	40.3%
Polyps		21	40.3%
1. Sinonasal polyposis		5	23.8%
2. Antrochoanal polyp		10	47.6%
3. Allergic fungal polyposis		6	28.5%

Table 5. Distribution of Diagnostic Nasal Endoscopy Findings

Radiological Examination

Both anatomical variations and pathological findings were studied in CT scan coronal cuts.

Anatomical Variations

Pneumatized middle turbinate is the most common variation detected in 34.6% cases. Agger nasi is the second most common anatomical variant.

Anatomical Variations	No. of Cases	%
Agger nasi	9	17.3%
Pneumatisation of MT	18	34.6%
Enlarged ethmoidal bulla	7	13.4%
Paradoxical MT	6	11.5%
Everted uncinata	1	1.9%
Haller cell	4	7.6%
Onodi cell	6	11.5%
Frontal sinus cells	6	11.5%

Table 6. Distribution of Anatomical Variations in CT Scan

Figure 1. Anatomical Variations in CT-PNS

Pathological Findings

OMC block with maxillary sinusitis is present in 96.1% of cases. Total number of polyposis identified in CT scan are 22 cases which includes 45.4% of antrochoanal polyp, 31.8% of allergic fungal polyposis, 22.7% of Sinonasal polyposis. CT scan is a better diagnostic tool to identify polyps (Allergic fungal sinusitis) than Anterior rhinoscopy and Diagnostic Nasal Endoscopy.

Pathological Variations	No. of Cases	%
Septal deviation	35	67.3%
Osteomeatal complex block	50	96.1%
Maxillary sinusitis	50	96.1%
Anterior ethmoidal sinusitis	45	86.5%
Posterior ethmoidal sinusitis	35	67.3%
Sphenoid sinusitis	18	34.6%
Frontal sinusitis	22	42.3%
Polyposis	22	42.3%
1. Sinonasal polyposis	5	22.7%
2. Antrochoanal polyp	10	45.4%
3. Allergic fungal	7	31.8%

Table 7. Distribution of Pathological Variations in CT Scan

Chronic Rhinosinusitis with Polyps and Chronic Rhinosinusitis without Polyps

Pathologically chronic rhinosinusitis is divided into two major groups depending upon presence or absence of polyps. In our study, there were polyps in 42.4% of cases and there were no polyps in 57.6% of cases.

Cases	Number	%
Chronic rhinosinusitis with	22	42.4%
Chronic rhinosinusitis	30	57.6%

Table 8. Distribution of Polypos in Chronic Rhinosinusitis

Haematological Investigations

Routine blood investigations were done in all the cases and absolute eosinophil count was raised in 7 (3.4%) cases, which were having history of allergy.

Surgical Management

All the 52 patients having chronic rhinosinusitis underwent functional endoscopic sinus surgery. Uncinectomy and middle meatal antrostomy was performed in all cases. Surgical findings which involve mucosal oedema (21.1%), polyps (42.3%), discharge (34.6%) and fungal debris (13.4%).

Technique	No. of Cases	%
Septoplasty	35	67.3%
Uncinectomy	52	100%
Middle meatal antrostomy	52	100%
Anterior ethmoidectomy	45	86.5%
Posterior ethmoidectomy	35	67.3%
Sphenoidotomy	18	34.6%
Frontal recess surgery	22	42.3%
Reduction of MT	18	34.6%
Partial inferior turbinectomy	14	26.9%
Polypectomy	22	42.3%

Table 9. Distribution of Techniques in Endoscopic Sinus Surgery

Surgical Findings	No. of Cases	%
Mucosal oedema	11	21.1%
Polyps	22	42.3%
Discharge	18	34.6%
Fungal debris	7	13.4%

Table 10. Distribution of Surgical Findings in Endoscopic Sinus Surgery

Post-Op Diagnostic Nasal Endoscopy

Endoscopy showed presence of synechiae in 15.3% cases, persistence of discharge in 9.6% cases.

Rhinosinusitis Disability Index

Patient's satisfaction before and after surgery were noted for patients having chronic rhinosinusitis with and without polyps separately. Postoperatively, patient's satisfaction is better in chronic rhinosinusitis without polyps.

DISCUSSION

Chronic rhinosinusitis is a common disease affecting several people all over the world. Lot of research work has gone on several aspects of chronic rhinosinusitis. As the disease affects functions of nose and paranasal sinuses as well as quality of life, a number of guidelines and consensus have been published. American Academy of Otolaryngology and Head and Neck Surgery (AAOHN)¹² has formed a task force to develop clarification and protocols for management of chronic rhinosinusitis.

Epidemiology of Chronic Rhinosinusitis

According to National Ambulatory Medical Care Survey data (NAMCS) in the USA,¹³ Rhinosinusitis is the most common

diagnosis for which an antibiotic is prescribed. Rhinosinusitis accounts for 9% and 21% of all paediatric and adult antibiotic prescriptions in 2002. High prevalence of chronic rhinosinusitis was confirmed by a survey suggesting that 16% of adult US population has chronic rhinosinusitis. A survey of 1200 households in Nottingham, UK¹⁴ revealed that 13.7% has CRS. Unfortunately, no epidemiological data could be found.

Incidence

The present study evaluated 52 patients of both the sexes who were surgically treated for chronic rhinosinusitis in Dr. PSIMS for a time period of one year. The study consisted of patients who attended both general outpatient clinic and also 'Aarogyasri' outpatient clinic. As endoscopic sinus surgery is included in 'Aarogyasri' (A social welfare program initiated by Government of Andhra Pradesh for the population below the poverty line), hence this does not include true incidence of chronic rhinosinusitis in general population.

Diagnostic Criteria

The patients were selected based on the symptoms defined by task force on rhinosinusitis.

Rhinosinusitis symptoms and signs (requires two major or one major and two minor factors).

Geographical Distribution

In our study, patients mainly came from Krishna (76.9%) and West Godavari (19.2%) districts of Andhra Pradesh, two cases were from other places. Geographically, our hospital lies between Krishna and West Godavari districts, so 96% of cases came from these districts. Rest of the two cases was referred from other places.

Age Distribution

Patients mainly presented in the age groups between 21 - 40 years (61.5%) and 41 - 60 years (25.1%). However, there were 5 patients below the age of 20 years (9.6%); 86.7% of cases were in the age group between (21 - 60).

Sex Distribution

Out of 52 patients suffering from chronic rhinosinusitis 61.5% were males and 38.5% were females, showing male preponderance. In a Canadian study,¹⁵ prevalence of chronic rhinosinusitis was high in females than in male subjects. In our study, the prevalence was high in males than in females.

Socioeconomic Status

All the patients belonged to middle and low socioeconomic classes. As the hospital is affiliated to a medical college, there were no patients from the upper socioeconomic class.

Distribution Based on Symptoms

All the 52 patients were evaluated for the following symptoms- Nasal obstruction (96.1%), Nasal discharge (71.1%), Postnasal drip (38.4%), Sneezing (25%), Headache and Facial pain (67.3%), Epistaxis (5.7%), Disturbance of smell (32.6%), Swelling or deformity (1.9%), snoring (15.3%) and Change in speech (15.3%).

Clinical Examination

All the 52 patients in the study were evaluated by detailed ENT examination, Diagnostic Nasal Endoscopy and

Radiological evaluation. We have found two major groups of Chronic rhinosinusitis.

1. CRS with polyps (42.4%).
2. CRS without polyps (57.6%).

ENT Examination

Detailed ENT examination was done for all the patients and following signs were noted- Septal deviation (67.3%), Pale mucosa (21.1%), Inferior turbinate hypertrophy (34.6%), Middle turbinate hypertrophy (26.9%), Discharge (40.3%), Polyps (34.6%). Chronic rhinosinusitis without polyposis accounted for 65.4% of patients and with Polyposis which include Sinonasal polyposis (27.7%), Antrochoanal polyps (55.5%) and Allergic fungal polyposis (16.6%) accounts for 34.6% of cases.

Diagnostic Nasal Endoscopy

Diagnostic Nasal Endoscopy was done for all the 52 patients. The signs noted are septal deviation (71.1%), pale mucosa (21.1%), Inferior Turbinate Hypertrophy (34.6%), Middle Turbinate Hypertrophy (26.9%) and Purulent discharge (40.3%). Polyposis which include sinonasal polyposis (23.8%), Antrochoanal polyps (47.6%) and Allergic fungal polyposis (28.5%) was present in 40.3% of patients.

Three patients having polyps were identified by Diagnostic Nasal Endoscopy that was not seen by ENT examination. This is because the polyps were small and confined to middle meatus. Hence, Diagnostic Nasal Endoscopy can pick up small polyps that were not identified by ENT examination, increasing the sensitivity of the investigation on Diagnostic Nasal Endoscopy (34.6% - 40.3%).

CT Scan

Both anatomical variations and pathological findings were studied in CT coronal cuts in all the 52 patients.

Anatomical Variations

The Anatomical variations identified in CT are Agger nasi (17.3%), Pneumatisation of MT (34.6), Enlarged ethmoid bulla (13.4%), Paradoxical MT (11.5%), Everted Uncinate (1.9%), Haller cell (7.6%), Onodi cell (11.5%) and Frontal sinus cells (11.5%).

Pathological Findings

Pathological findings noted were Septal deviation (67.3%), Osteomeatal complex block (96.1%), Maxillary sinusitis (96.1%), Anterior ethmoidal sinusitis (86.5%), Posterior ethmoidal sinusitis (67.3%), Sphenoid sinusitis (34.6%), Frontal sinusitis (42.3%), Polyps which included sinonasal polyposis (22.7%), Antrochoanal polyps (45.4%) and Allergic Fungal Polyposis (31.8%) are present in 42.3% of patients. The CT scan identified one more patient having nasal polyposis that was not identified by Diagnostic Nasal Endoscopy and ENT examination (from 34.6% which was identified on ENT examination, 40.3% in Diagnostic Nasal Endoscopy to 42.4% that was diagnosed on CT scan). It proves to state that CT scan, Diagnostic Nasal Endoscopy and ENT examination were complimentary to each other for diagnosing nasal polyposis. CT scan has also been used for

staging of the disease by the Lund-Mackay system proposed by the task force on rhinosinusitis of the AAO-HNS.¹¹

In a study conducted by Dua and Chopra¹⁶ regarding CT scan paranasal sinuses findings in CRS, they found that in majority of patients osteomeatal complex and anterior ethmoids were involved in 88% patients, agger nasi cells in 40%, concha bullosa and Haller cells in 16% of patients. Apart from these, deviated nasal septum was found in 40% of the patients. In our study, the most common anatomical variant was Pneumatisation of middle turbinate (34.6%), Agger nasi (17.3%), Paradoxical middle turbinate (11.5%), the most common pathological findings were Osteomeatal complex block (96.1%) and anterior ethmoidal sinusitis (86.5%).

Haematological Examination

Haematological examination was done in all 52 patients. Absolute eosinophil count was increased in 3.4% of all cases having history of allergy.

Surgical Management

All the 52 patients having chronic rhinosinusitis underwent functional endoscopic sinus surgery, out of which four of the patients were for revision surgery. Surgery was planned after appropriate medical treatment. Surgery was done by the following techniques: Uncinectomy (100%), Middle meatal antrostomy (100%), Anterior ethmoidectomy (86.5%), Posterior ethmoidectomy (67.3%), Sphenoidotomy (34.6%) Frontal recess surgery (42.3%) and Reduction of middle turbinate (34.6%). Auxiliary surgeries such as septoplasty and partial inferior turbinectomy (26.9%) were done to gain access to middle meatus and for relieving nasal obstruction.

1. Uncinectomy and middle meatal antrostomy was done in all 52 patients (100%).
2. Uncinectomy and middle meatal antrostomy alone was done in 7 cases (13.4%).
3. Uncinectomy and middle meatal antrostomy and anterior ethmoidectomy was done in 45 (86.5%) patients.
4. Uncinectomy and middle meatal antrostomy, anterior and posterior ethmoidectomy was done in 35 (67.3%) patients.
5. Uncinectomy and middle meatal antrostomy, ethmoidectomy and frontal recess surgery was done in 22 (42.3%) patients.
6. Uncinectomy and middle meatal antrostomy ethmoidectomy, frontal recess surgery and sphenoidotomy were done in 18 (34.6%) patients.

Uncinectomy and middle meatal antrostomy was done for antrochoanal polyps and isolated maxillary sinusitis. We have not found isolated frontal and sphenoid sinusitis. For all the patients having sinonasal polyposis and allergic fungal sinusitis, endoscopic polypectomy was done which was followed by appropriate ethmoidectomy. In case of antrochoanal polyps, polypectomy was followed by partial ethmoidectomy.

Endoscopic sinus surgery was done to remove the pathology from osteomeatal complex area to facilitate ventilation of sinuses thereby decreasing nasal secretions, reduction of diseased sinus mucosa by removal of polypoid tissue, improving olfaction and providing relief from nasal

obstruction. Keeping the objectives of endoscopic sinus surgery, all 52 patients underwent appropriate exenteration of ethmoid cells and thereby obtaining wider access to major sinuses.

In a study conducted by Deal and Kauntakis,¹⁷ regarding significance of nasal polyps in chronic rhinosinusitis symptoms and surgical outcome in 201 patients having chronic rhinosinusitis with and without polyps they found that symptoms score was high in patients with polyps and surgical outcome was equally good when compared to patients suffering from chronic rhinosinusitis without polyps. In our study, symptoms score was high in patients having polyps and surgical outcome was equally good in patients with and without polyps. No intraoperative or preoperative complications were encountered in any of the patients in our study, though minor and major complications have been described in literature.¹⁸

Post-Operative Management

Nasal pack was removed on second postoperative day. Patients were given medical treatment in the form of antibiotics, decongestants, analgesics and anti-histamines for two weeks. Decongestant and saline nasal drops were given in immediate post-operative period.

Surgical Outcome

1. Surgical outcome was assessed by postoperative Diagnostic Nasal Endoscopy.
2. Patient's satisfaction was measured by comparing preoperative and postoperative Rhinosinusitis Disability Index form.

Post-Operative Diagnostic Nasal Endoscopy

Diagnostic Nasal Endoscopy showed the presence of synechia in 8 patients and presence of discharge in 5 patients, rest of the patients were free of any pathological findings post-operatively. All 100% had well-healed ethmoid cavities.

Rhinosinusitis Disability Index

The patients were given Rhinosinusitis Disability Index form which contains questions regarding physical, functional and emotional factors which was filled during preoperative and postoperative periods.

Rhinosinusitis Disability Index is a recently designed validated measure that has not been used much in clinical studies. In a study conducted by Birch and Saleh in 53 patients with chronic rhinosinusitis, they found that P value= 0.02 when preoperative and postoperative RSDI scores were compared. In our study, we divided patients with chronic rhinosinusitis into patients with and without polyps. Patients with chronic rhinosinusitis with polyps had significant difference in outcome when compared to preoperative and postoperative RSDI scores (P= 0.00). In patients with chronic rhinosinusitis without polyps, the RSDI index for preoperative and postoperative periods also showed significant difference (p value= 0.00).

CONCLUSION

The present study includes 52 patients having chronic rhinosinusitis as defined by chronic rhinosinusitis task force. All the patients underwent endoscopic sinus surgery in an

institute in a time period of 1 year with a mean follow-up period of three months.

All the 52 patients were evaluated by detailed ENT examination, Diagnostic Nasal Endoscopy and CT scan. MRI (PNS) scan was not done in any patient in the series, because there is no periorbital and intracranial extension.

96.2% of patients belonged to Krishna and West Godavari Districts of Andhra Pradesh as the hospital catered to the people of the two districts. True incidence of chronic rhinosinusitis could not be evaluated in this study because the patients belonged to two categories- one category of patients who were attending outpatient clinic and another category included patients who were advised surgery under Aarogyasri scheme.

There is a definitive male preponderance in our study with most of the patients coming from age groups between 20 - 60 years. This is comparable to most of the studies.

1. Clinico-pathologically, patients were divided into two major groups.
2. Chronic rhinosinusitis with polyps (42.4%).
3. Chronic rhinosinusitis without polyps (57.6%).
4. ENT examination could identify 34.6% of patients with polyps, which includes three categories.
5. Sinonasal polyposis (27.7%).
6. Antrochoanal polyps (55.5%).
7. Allergic fungal polyposis (15.6%).

Diagnostic Nasal Endoscopy confirmed these findings and also could diagnose early polyposis in three more patients that was not identified by ENT examination. CT scan confirmed the presence of polyps and could identify one more case of polyposis, making the percentage of patients of chronic rhinosinusitis with polyposis 42.3%. Hence, all three are complimentary to each other in diagnosing nasal polyposis.

All 52 patients underwent endoscopic sinus surgery, uncinectomy and middle meatal antrostomy were done in all the cases. Polypectomy was done in 42.3% of cases; anterior and posterior ethmoidectomy was done in 67.3% patients; ethmoidectomy and frontal recess surgery were done in 42.3% patients; ethmoidectomy, frontal recess surgery and sphenoidotomy was done in 34.6% patients. There were no preoperative and postoperative complications in any of the patients.

Surgical outcome was assessed by postoperative Diagnostic Nasal Endoscopy, which showed synechiae and presence of persistent discharge in a few cases. Patient's satisfaction was assessed by comparing pre- and post-operative Rhinosinusitis Disability Index. Highly significant difference was noted when pre- and post-operative Rhinosinusitis Disability Index ($p=0.003$) were compared. For patients with polyps, P value= 0.00 and patients without polyps, P value= 0.00.

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