

A PROSPECTIVE STUDY OF CLINICAL PROFILE OF CHRONIC RHINOSINUSITIS IN A TERTIARY CARE CENTRE

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ABSTRACT

BACKGROUND

Chronic Rhinosinusitis (CRS) is a prevalent medical disorder encountered in Otorhinolaryngology practice that has both personal and economic impact. It leads to significant patient morbidity in terms of quality of life and decreased overall productivity. Therefore, it becomes very important to understand the clinical profile of CRS patients so that proper treatment model can be advised. In this study, attempt has been made to identify the clinical profile of patients with CRS who attended Department of Otorhinolaryngology, Medical College Hospital, Thiruvananthapuram, during a period of 1 year from April 2014 - April 2015.

The aim of this study is to study the clinical profile of patients with chronic rhinosinusitis and to study the clinical profile of patients with chronic rhinosinusitis and to decide on treatment; to find out the prevalence of fungal sinusitis among chronic rhinosinusitis in population and identify the commonest strain of fungus.

MATERIALS AND METHODS

314 patients with symptoms of Chronic Rhinosinusitis were included over a period of 1 year. Demographic data, Symptomatology and Clinical signs were recorded; 3 months treatment given and later the endoscopic features and CT scan observed. Patients with persistent disease were operated upon with FESS, operative notes recorded. Per-operative polyps, fungal, mucin were subjected to HPE and fungal culture.

RESULTS

Out of 314 patients, 164 were females (52%) and 150 were males (48%). The commonest age group was 21 - 50 years. The commonest symptoms were Nasal block 57%, Nasal discharge 58% and Facial congestion 59%; 80% of the patients needed FESS. Operative findings included 46% had oedematous mucosa, 33.4% had polyp and 1.6% patients had fungal debris alone. *Aspergillus* Sp was the commonest fungus.

CONCLUSION

The mean age of Chronic Rhinosinusitis was 40 years having equal distribution among males and females. Common presenting symptoms were headache, nasal discharge and nasal obstruction. Anatomical variations like deviated nasal septum can predispose to chronic rhinosinusitis. Surgery plays a significant role in the management of refractory cases of chronic rhinosinusitis.

KEYWORDS

Sinusitis, FESS, Fungal, Oedematous, Polyp, Mucosal Oedema.

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BACKGROUND

Definition and Classifications

The term rhinosinusitis refers to a group of disorders characterised by inflammation of mucosa of the nose and paranasal sinuses. As the nose is invariably involved with paranasal sinuses and the mucosa of nose and paranasal sinuses lays in continuity the term rhinosinusitis is a more preferred term.¹ This disease has got diverse symptomatology and has got a negative impact on quality of life. To tackle the difficult issues related to defining, staging and research of

rhinosinusitis, the American Academy of Otolaryngology - Head and Neck Surgery convened a multidisciplinary in August 1996.⁽²⁾ As a result of it the article "Adult Rhinosinusitis Defined" has emerged in 1997 and was endorsed by the American Academy of Otolaryngologic Allergy and American Rhinologic Society (AAO-HNS) and later was modified by contributions of Lanza and Kennedy.⁽³⁾ Acute rhinosinusitis is typically subdivided into Acute Bacterial Rhinosinusitis (ABRS) or Acute Viral Rhinosinusitis (AVRS).⁽⁴⁾ Acute viral rhinosinusitis is usually self-limited, whereas bacterial rhinosinusitis presents with most of the symptoms they became the point of interest.⁵ Rhinosinusitis can present in any age group without any gender predisposition. A study conducted by Wayne D Hsueh et al⁶ on identifying clinical symptoms on improving the symptomatic diagnosis of CRS showed no significant differences between CRS and non-CRS patients in terms of age, sex and race. There is lack of evidence whether the male and female patients with rhinosinusitis were different and whether they should be treated differently. So a focused research in this area is warranted.⁽⁷⁾ It affects between 5 to 15% of population according to Western literature.⁽⁸⁾

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Fungal Hypothesis⁹

The fungal hypothesis proposes that patients with CRS mount an eosinophilic response to fungi with initial evidence showing some degree of fungi and eosinophilic mucin in all patients with CRS. The intranasal fungi in a patient with CRS would probably exacerbate the disease process through protease effects on nasal epithelial cells as well as activated eosinophils and lymphocytes present in the nose.

MATERIALS AND METHODS

This is a Prospective study conducted between April 2014 and March 2015 in the ENT OPD of Government Medical College, Thiruvananthapuram; 314 patients with chronic rhinosinusitis attending the Outpatient Department of ENT, Government Medical College, Thiruvananthapuram were included. All patients attending the Outpatient Department were studied.

Inclusion Criteria

1. Chronic rhinosinusitis patients fulfilling the diagnostic criteria.
2. Patients in the age group of 18 - 70 years.
3. Both males and females.

Exclusion Criteria

1. Patients less than 18 years and more than 70 years.
2. Those not willing to participate in the study.
3. Patients who underwent previous nasal surgery.

Data Collection

Semi-structured questionnaire regarding detailed history, duration and severity of symptoms are collected from the patients who attended the Outpatient Department of Otorhinolaryngology. Patients were examined in detail which included anterior rhinoscopy and diagnostic nasal endoscopy. Patients were given medical management with antibiotics, topical steroids, decongestants and nasal douche for 3 weeks and kept under followup. Patients were continued on topical steroids for 3 months, following which patients were re-examined. Computed tomography of nose and paranasal sinuses (Axial, coronal and sagittal view) was taken for patients without symptomatic improvement. They were taken up for Functional Endoscopic Sinus Surgery. Per-operative findings were recorded. Allergic mucin noted during surgery was sent for microbiology, fungal culture and sensitivity and fungal strain identified and recorded. A semi-structured questionnaire was used to elicit demographic data, anterior rhinoscopy and diagnostic nasal endoscopy. Wherever necessary computed tomography of nose and paranasal sinuses was done. Functional Endoscopic Sinus Surgery was done in patients with correct indications. Swabs and materials from the surgical site were sent to Microbiology Department for fungal strain identification and culture.

Data Analysis

Qualitative data is expressed in percentage and proportion. Quantitative data is expressed in mean and standard deviation. Association is measured by Chi square test. Data entered in Microsoft Excel and analysed using SPSS.

OBSERVATIONS AND RESULTS

Among the total number of 314 patients' data collected 164 were females (52%) and 150 were males (48%) (Table 1).

Sex	No. of Patients	Percentage
Female	164	52%
Male	150	48%
Total	314	

Table 1. Percentage Distribution of Sample according to Sex

Among 314 patients in the study, the most common age group was 31-40 years (23%). Others were 41-50 years (22%), 21-30 years (19%), 51 - 60 years (17%), 10-20 years (11%) and 61-70 years (8%). Mean age group of sample was found to be 40 years with standard deviation of 14.2 (Table 2).

Age in Years	Male	Female	Total No. of Patients	%
10 - 20 Years	21	12	33	11%
21 - 30 Years	27	33	60	19%
31 - 40 Years	29	44	73	23%
41 - 50 years	35	35	70	22%
51 - 60 Years	24	29	53	17%
61 - 70 Years	14	11	25	8%
Mean ± SD			39.9 ± 14.2	

Table 2. Age Wise Distribution

Among the 314 patients observed, the average period for which the patients suffered from chronic rhinosinusitis was 3.7 years. Duration varied from 4 months to 40 years (Table 3).

Duration of Symptoms in Years	No. of Patients	Percentage
1 - 5 Years	249	79.3%
6 - 10 Years	49	15.6%
11 - 15 Years	8	2.5%
16 - 20 Years	5	1.6%
21 - 25 Years	0	0.0%
26 - 30 Years	1	0.3%
31 - 35 Years	0	0.0%
36 - 40 Years	2	0.6%
Total	314	

Table 3. Duration of Symptoms

Among the 314 patients, majority of patients (79%) had symptoms for 1 - 5 years. Among the 314 patients, it was found that the most common symptom was headache (84%) followed by nasal discharge (59%), nasal block (58%) and facial congestion (57%). Other results and analysis symptoms were facial pain, halitosis, anosmia/hyposmia, fatigue, fever, epistaxis, cough and dental pain (Table 4).

Presenting Symptoms	Present	Percentage (%)
Nasal Block	183	58%
Facial Pain	141	45%
Facial Congestion	179	57%
Headache	265	84%
Dental Pain	17	5%
Nasal Discharge	186	59%
Epistaxis	45	14%
Anosmia/Hyposmia	91	29%
Halitosis	133	42%
Fever	52	17%
Fatigue	66	21%
Cough	36	11%

Table 4. Presenting Symptoms

Category	No. of Patients	Percentage
No block	131	42%
Unilateral	50	16%
Bilateral	133	42%
Total	314	100%

Table 5. Nasal Block

Among 314 patients 58% had nasal block, of which 42% had bilateral nasal block and 16% had unilateral nasal block (Table 5).

Nature	No. of Patients	Percentage
No block	131	42%
Non-Progressive	29	9%
Progressive	154	49%
Total	314	

Table 6. Nasal Block Nature

Among 314 patients 42% did not have nasal block, 49% had progressive nasal block and 9% had non-progressive nasal block (Table 6).

Nature	No. of Patients	Percentage
Non-Progressive	29	16%
Progressive	154	84%
Total	183	100%

Table 7. Nasal Block Nature

Among the patients with nasal block (183 patients), 84% patients had progressive nasal block and 16% patients had non-progressive nasal block (Table 7).

Nasal Block Severity	No. of Patients	Percentage
No Nasal Block	132	42%
Mild Nasal Block	15	5%
Moderate Nasal Block	128	41%
Severe Nasal Block	39	12%
Total	314	100%

Table 8. Nasal Block Severity

Among 314 patients in the study 42% patients did not have nasal block, 5% had mild nasal block, 41% had moderate nasal block and 12% had severe nasal block (Table 8).

Facial Pain	No. of Patients	Percentage
No Facial Pain	173	55%
Facial Pain	141	45%
Total	314	100%

Table 9. Facial Pain

Among 314 patients, 45% patients had facial pain and 55% did not have facial pain (Table 9).

Facial Pain	No. of Patients	Percentage
No Facial Pain	173	55%
Mild Facial Pain	25	8%
Moderate Facial Pain	111	35%
Severe Facial Pain	5	2%
Total	314	100%

Table 10. Facial Pain Severity

Among 314 patients in the sample 55% patients did not have facial pain, 8% patients had mild facial pain, 35% had moderate facial pain and 2% of patients had severe facial pain (Table 10).

Facial Congestion	No. of Patients	Percentage
No Facial Congestion	135	43%
Facial Congestion	179	57%
Total	314	

Table 11. Facial Congestion

Among 314 patients, 57% patients had facial congestion and 43% of patients did not have facial congestion (Table 11).

Facial Congestion	No. of Patients	Percentage
No Facial Congestion	135	43%
Mild Facial Congestion	31	10%
Moderate Facial Congestion	137	44%
Severe Facial Congestion	11	3%
Total	314	

Table 12. Facial Congestion Severity

Among 314 patients in the study, 10% of patients had mild facial congestion, 44% had moderate facial congestion, 3% of patients had severe facial congestion and 43% patients did not have facial congestion (Table 12).

Nasal Discharge	No. of Patients	Percentage
Present	186	59%
Absent	128	41%
Total	314	100%

Table 13. Nasal Discharge

Among 314 patients in the study, 59% of patients had nasal discharge as one of the presenting symptom and 41% did not have nasal discharge (Table 13).

Hyposmia	Anosmia	Absence of Olfactory Disturbance
78	13	223
25%	4%	71%

Table 14. Olfactory Disturbance

While analysing 314 patients in the study, 71% of patients did not have any olfactory disturbance and 29% of patients were having olfactory disturbance, of which 4% of patients were having Anosmia and 25% of patients were having Hyposmia (Table 14).

Headache	No. of Patients	Percentage
No Headache	49	16%
Mild Headache	11	3%
Moderate Headache	71	23%
Severe Headache	183	58%
Total	314	100%

Table 15. Headache

Among 314 patients in the study, 16% did not have headache, 3% had mild headache and 23% had moderate headache and severe headache in 58% of patients (Table 15).

Halitosis	No. of Patients	Percentage
Present	133	42%
Absent	181	58%
Total	314	

Table 16. Halitosis

Among 314 patients in the study, 42% of patients had halitosis and 58% of patients did not have Halitosis (Table 16).

Dental Pain	No. of Patients	Percentage
No Dental Pain	303	96%
Mild Dental Pain	5	2%
Moderate Dental Pain	6	2%
Severe Dental Pain	0	0%
Total	314	100%

Table 17. Dental Pain

Among 314 patients in the study, 96% patients did not have dental pain, 2% had mild dental pain and 2% had moderate dental pain (Table 17).

Cough	No. of Patients	Percentage
Present	36	11%
Absent	278	89%
Total	314	100%

Table 18. Cough

Among 314 patients in the study, 11% of patients had cough and 89% of patients did not have Cough (Table 18).

Fatigue	No. of Patients	Percentage
Present	66	21%
Absent	248	79%
Total	314	

Table 19. Fatigue

Among 314 patients, 21% of patients had fatigue and 79% of patients did not have fatigue (Table 19).

Fever	No. of Patients	Percentage
Present	66	21%
Absent	248	79%
Total	314	100%

Table 20. Fever

Among 314 patients, 21% of patients had fever and 79% of patients did not have fever (Table 20).

Epistaxis	No. of Patients	Percentage
Present	45	14%
Absent	269	86%
Total	314	100%

Table 21. Epistaxis

While analysing 314 patients, it was found that 14% of patients had Epistaxis as one of the presenting symptom and 86% did not have Epistaxis (Table 21).

Asthma	No. of Patients	Percentage
Present	16	5%
Absent	298	95%
Total	314	100%

Table 22. Asthma

Among 314 patients in the study, 5% of patients had asthma and 95% of patients did not have Asthma (Table 22).

Allergy	No. of Patients	Percentage
Present	201	64%
Absent	113	36%
Total	314	

Table 23. Allergy

Among 314 patients, 64% of patients gave history of allergy and 36% of patients did not have allergy (Table 23).

Septum	Patients	Percentage
Deviated	253	81%
Not Deviated	61	19%
Total	314	100%

Table 24. Examination Findings of Septum

Distribution of sample according to position of septum. While analysing the septum of 314 patients, it was found that 81% of patients had a deviated nasal septum and in 19% patient's septum was central (Table 24).

Mucosal Congestion	Patients	Percentage
Present	262	83%
Absent	52	17%
Total	314	100%

Table 25. Mucosal Congestion

While analysing 314 patients, it was found that 83% of patients had mucosal congestion on examination and 17% of patients did not have mucosal congestion (Table 25).

Nasal Discharge		
98	158	58
31%	50%	19%

Examination Findings of Septum

Table 26. Other Examination Findings of Nasal Discharge

While analysing 314 patients 68% of patients had nasal discharge on examination, of which 50% had mucoid discharge and 19% had purulent discharge; 31% of patients did not have any nasal discharge (Table 26).

Absent	Unilateral	Bilateral
216	30	68
69%	9%	22%

Table 27. Polyp

Distribution of sample according to polyp. While analysing 314 patients in the study 31% of patients had nasal polyp on examination, of which 9% had unilateral nasal polyp and 22% had bilateral nasal polyp; 69% of patients did not have any nasal polyp (Table 27).

Posterior Rhinoscopy	No. of Patients	Percentage
Normal	146	47%
Discharge	106	34%
Polyp	42	13%
Discharge and Polyp	20	6%

Table 28. Posterior Rhinoscopy

Distribution of sample according to posterior rhinoscopy findings.

During posterior rhinoscopy examination of 314 patients, 47% patients were normal and 34% patients had discharge, 13% polyp and 6% with both polyp and discharge (Table 28). While analysing the endoscopic score of 314 patients, the average score was 5.59 which varied from 0 - 12. While analysing the CT score of 254 patients, the average score was 11.04, which varied from 2 to 22. CT was taken only in patients

whose symptoms persisted even after 3 months of medical treatment (Table 28).

Management	Patients	Percentage
Medical Management	60	20%
Medical + Surgical Management	254	80%
Total	314	100%

Table 29. Management

Distribution of sample according to mode of treatment. Among 314 patients included in the study, 20% of patients were managed medically and rest 80% were managed with combined medical and surgical management (Table 29).

Findings	No. of Patients	%
Oedematous mucosa	116	46%
Polyp	85	33.4%
Fungal debris	4	1.6%
Oedematous mucosa + Pus	11	4.3%
Oedematous mucosa + Polyp	7	2.8%
Oedematous mucosa + Fungal debris	13	5.1%
Oedematous mucosa + Fungal debris + Pus	8	3.1%
Polyp + Fungal debris	1	0.3%
Oedematous mucosa + Polyp + Fungal debris	7	2.8%
Polyp + Pus	1	0.3%
Oedematous mucosa + Polyp + Fungal	1	0.3%
Debris + Pus		

Table 30. Surgical Findings

Among 254 patients who underwent surgery, 46% of patients had oedematous mucosa, 33.4% of patients had polyp, 1.6% patients had fungal debris alone, 4.3% of patients had oedematous mucosa and pus, 2.8% of patients had oedematous mucosa and polyp, 5.1% of patients had oedematous mucosa and fungal debris, 3.1% of patients had oedematous mucosa, fungal debris and pus, 0.3% of patients had polyp and fungal debris, 2.8% of patients had oedematous mucosa, polyp and fungal debris, polyp and pus was present in 0.3% of patients and 0.3% of patients had oedematous mucosa, polyp, fungal debris and pus. Among 254 patients who underwent surgery, 34 patients had fungal debris (10.8% among total CRS patients) (Table 30).

Microbiology - Fungal Strain				
Aspergillus	Mucor	Candida	Curvularia	Bipolaris
32	1	1	0	0
94%	3%	3%	0%	0%

Table 31. Fungal Strain

Among 34 patient's sample sent for fungal culture and sensitivity, 94% of fungal species isolated were Aspergillus, 3% Mucor and 3% Candida (Table 31).

DISCUSSION

This study included 314 consecutively selected patients with chronic rhinosinusitis, who presented to the Outpatient Department of Otorhinolaryngology, Medical College, Thiruvananthapuram during the study period of 1 year from April 2014 to April 2015. In the present study, a humble

attempt was made to identify the clinical profile of patients with chronic rhinosinusitis. Patients who were taken up for surgery were followed up to operation table to find out the intraoperative findings and the patients with fungal sinusitis were noted and an attempt was also made to identify the species of fungus from microbiology. The results obtained were compared with many studies conducted previously. In the study, chronic rhinosinusitis was having an approximately equal distribution among males and females; Males 48% and Females 52% with a ratio of 1.08:1. Quing Ling Fu et al⁽⁹⁾ had 51.2% females in their study. Engin Dursun et al⁽¹⁰⁾ had a similar ratio of 1.1:1, Tomasz Grzegorzec et al⁽¹¹⁾ had a ratio of 1:1, Seyyed Abdollan Madani et al⁽¹²⁾ and Ayman Al Madani et al⁽¹³⁾ had males more than females in their study. Francis T K et al⁽¹⁴⁾ male-to-female ratio of 1.1:1. The mean age group of presentation was 40 years in the study with a standard deviation of 14.2, which coincides with studies of Ayman Al Madani et al⁽¹³⁾ where most common age group was 40 years. S P Gulati et al⁽¹⁵⁾ had it as 30 - 37 years of age. Tomasz Grzegorzec et al⁽¹¹⁾ had a mean age group of 46.5 years, Bhattacharyya et al⁽¹⁶⁾ had a mean age group of 42.3 years and James N Baraniuk et al⁽¹⁷⁾ had a mean age group of 45.1 years. In our study, the average duration of symptoms was 3.7 years. Majority of patients had a duration of 1 - 5 years. Arild Danielsen et al⁽¹⁸⁾ had mean symptom period as 2 to 12 years. In this study the common presenting symptoms were headache, nasal block and facial congestion, which coincided with studies of Bhattacharyya et al⁽¹⁶⁾; 58% patients presented with nasal block in our study, among which 42% had bilateral and 16% had unilateral nasal block. Andre Alencar et al⁽¹⁹⁾ had 83.7% of patients with nasal block. Bhattacharya N et al⁽¹⁶⁾ had 51.8% patients with nasal block. Mohammed Naieni et al⁽²⁰⁾ had 79.31% and T Shivakumar et al⁽²¹⁾ had 86.66% patients with nasal block. Y Bajaj et al⁽²²⁾ and S P Gulati et al⁽¹⁵⁾ showed the most common symptom as nasal block. Francis T K et al⁽¹⁴⁾ had 84% patients with nasal obstruction. In this study, 45% patients presented with facial pain which coincided with Bhattacharya N et al⁽²³⁾ with 47.3% patients with facial pain. Andre Alencar et al⁽¹⁹⁾ had a variable presentation of facial pain in up to 80% of patients. D Hastan et al⁽²⁴⁾ had 64.7% patients with facial pain. T Shivakumar et al⁽²¹⁾ had 73.3% patients with facial pain; 57% patients presented with facial congestion in our study. Bhattacharya N et al⁽²³⁾ had approximately 47% patients with facial congestion. Francis T K et al⁽¹⁴⁾ had 79% patients with facial congestion. In this study, 59% of patients had history of nasal discharge which coincides with the study of T Shivakumar et al⁽²¹⁾ where 58.09% patients had nasal discharge. Mohammed Naiemi et al⁽²⁰⁾ had 75.64% patients with nasal discharge. Tomasz Grzegorzec et al⁽¹¹⁾ had 67.92% patients with nasal discharge. Wilma T Anselmo et al⁽²⁵⁾ had 63.6% patients with nasal discharge. Olfactory disturbance was present in 29% patients in our study, of which 14% (13 patients) had anosmia and 86% (78 patients) had hyposmia. Wilma T Anselmo et al⁽²⁵⁾ had 46% patients with olfactory disturbance. Mohammad Naiemi et al⁽¹⁹⁾ had 87.18% patients with olfactory disturbance. T Shivakumar et al⁽²¹⁾ had 77.14% patients with olfactory disturbance. In our study, 84% patients presented with headache. Tomasz Grzegorzec et al⁽¹¹⁾ had 56.6% patients with headache. H Gheriani et al⁽²⁶⁾ had 43.5% patients who had

headache. T Shivakumar et al⁽²¹⁾ had 62.83% patients with headache and Mohammed Naeimi et al⁽²⁰⁾ had 38.46% patients with headache. In this study, 42% patients presented with history of halitosis. Mohammad Naeimi et al⁽²⁰⁾ had 50% patients with halitosis. T Shivakumar et al⁽²¹⁾ had 26.6% with halitosis, 5% patients had history of dental pain in our study. T Shivakumar et al⁽²¹⁾ had 10.4% patients with dental pain and Mohammad Naeimi et al⁽²⁰⁾ had 70% of patients with dental pain. It was observed that 11% of patients had history of cough in our study, which coincides with the study of T Shivakumar et al⁽²¹⁾ where 11.42% patients had history of cough. Mohammad Naeimi et al⁽²⁰⁾ observed 45% patients with cough. A H Morice committee members⁽²⁷⁾ had 4% patients with cough; 21% patients had fatigue in our study. James N Baraniuk et al⁽²⁸⁾ had 26% patients with fatigue. T Shivakumar et al⁽²¹⁾ had 30.47% patients with fatigue. In our study, 21% patients had history of fever (during acute exacerbations). Mohammad Naeimi et al⁽²⁰⁾ had 55% patients with fever; 14% of patients had history of epistaxis during the course of disease in our study. Isek K R et al⁽²⁹⁾ had 22% patients with epistaxis. In this study, 5% patients had history of asthma. Wilma T Anselmo et al⁽²⁵⁾ had 7% patients with asthma. Ahammed R Sedaghat et al⁽³⁰⁾ observed 19% patients with history of asthma. Tomasz Grzegorzec et al⁽¹¹⁾ had 26.8% with asthma. L Badia et al⁽³¹⁾ had 50% patients with coexistent asthma. D Jarvis et al⁽³²⁾ had a strong association between asthma and chronic rhinosinusitis. Jens U et al observed⁽³³⁾ 71% patients with history of asthma. In our study, 64% patients gave history of allergy. Engin Dursun et al⁽¹⁰⁾ observed coexistence of allergy in 36.2% of patients. Isek KR et al⁽²⁹⁾ observed 28.8% of patients with associated allergy. Ahmad R Sedaghat et al⁽³⁰⁾ observed an association of 27.5% patients with allergy; 81% patients had deviated nasal septum on examination in this study, which was similar to the study conducted by Seyyed Madani et al⁽¹²⁾ in which nasal septal deviation was observed in 81.7% of patients. V K Poorey and Neha Gupta⁽³⁴⁾ observed a strong correlation between nasal septal deviation and sinus disease. Similarly Calhoun et al, RPS Harar and Zachary M Sole^(35,36,37) also observed a strong association between sinonasal disease and deviated nasal septum. T Shivakumar et al⁽²¹⁾ had 51.42% patients with nasal septal deviation. In this study, mucosal congestion was observed in 83% patients. In this study, nasal discharge was observed in 69% of patients, of which 50% were mucoid and 19% were purulent which coincides with the study conducted by Tomasz Grzegorzec et al⁽¹⁰⁾ in which nasal discharge was observed in 67.92% of patients. T Shivakumar et al⁽²¹⁾ observed mucopus in 19.07% patients. In our study, nasal polyposis was observed in 31% of patients, of which 9% were unilateral and 22% were bilateral. Also in 19% of patients, polyp was visible on posterior rhinoscopic examination. This coincided with the observation made by Tomasz Grzegorzec et al⁽¹⁰⁾ in which nasal polyp was found in 31.13% of patients. James N Baraniuk et al⁽¹⁷⁾ observed nasal polyposis in 50% of patients. Observation made by W J Videler et al⁽³¹⁾ showed presence of nasal polyposis in 52% of patients and 44.7% of patients in the study by T Shivakumar et al⁽²¹⁾ Post nasal discharge was observed in 40% of patients in our study. Study conducted by A H Morice⁽²⁷⁾ committee members observed post-nasal discharge in 60% of patients. T Shivakumar et al⁽²¹⁾ observed post-nasal

discharge in 70.47% patients. In this study, the mean endoscopic score of the patients was 5.59. In the observation made by Kristen A Smith et al⁽³⁸⁾ the mean endoscopic score was 6.3 in Asians. Observation made by Kristen A Smith et al⁽³⁸⁾ in a study was 6.9. In the present study, the mean CT score by Lund McKay score was 11.04. The observations made in mean CT score in study by Mikah M Likness et al⁽³⁹⁾ was 14.33, Kristen A Smith et al⁽³⁸⁾ was 13.5, Zachary M Sole et al⁽³⁷⁾ was 14.6 and W J Videler et al⁽³¹⁾ was 13.5. Continued medical management were given for 20% patients and medical management followed by surgical management were given for 80% patients in our study, which almost coincides with the study of Enema Job Amodu et al⁽⁴⁰⁾ in which continued medical management was given for 20.7% patients and combined medical and surgical management for 79.2% patients. In a study conducted by Kristen A Smith et al⁽³⁸⁾ they came to the conclusion that continued medical therapy provides no additional benefits while Endoscopic Sinus Surgery provides significant improvement in several important clinical outcomes. In the present study, a humble attempt was also made to identify the percentage of fungal sinusitis among chronic rhinosinusitis and also to identify the species of fungi causing sinusitis. In this study, 10.8% of patients had fungal sinusitis. Engin Dursun and Hakan Korkmaz et al⁽¹⁰⁾ observed 13%, Seyyed Abdollah Madani et al⁽¹²⁾ observed 12.1% and Ayman Al Madani et al⁽¹³⁾ observed 16% prevalence of fungal sinusitis in their study. Study conducted by Arunaloke Chakrabarti et al⁽⁴¹⁾ observed a very high prevalence of 27.5% in the study. In the present study, 94% of fungi were *Aspergillus* species, 3% *Candida* and 3% *Mucor*. In a study conducted by Arunaloke Chakrabarti et al⁽⁴¹⁾ 97.6% of fungi were *Aspergillus* species.

CONCLUSION

The mean age group of patients with chronic rhinosinusitis was 40 years. Chronic rhinosinusitis have almost equal distribution among males and females. Common presenting symptoms were headache, nasal discharge and nasal obstruction. Anatomical variations like deviated nasal septum can predispose to chronic rhinosinusitis. Chronic rhinosinusitis is more common in patients with allergic rhinitis. Mucosal congestion, oedematous mucosa and polyp were the common findings during examination. Most common fungal species isolated in culture was *Aspergillus*. Surgery plays a significant role in the management of refractory cases of chronic rhinosinusitis.

Limitations

The sample size was very small compared to the global burden of chronic rhinosinusitis. The time period of study was limited. Being a tertiary care centre, we had a refractory group of patients. So a good number of patients needed surgical management. Allergic rhinitis was diagnosed by history, confirmatory tests were not performed. Long term followup is needed to assess the surgical results.

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