



## A Prospective Study of Relationship between Chronic Rhinosinusitis with Allergic Rhinitis and Non-Allergic Rhinitis in a Tertiary Care Centre.

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### ABSTRACT

**AIM:** To study the relationship between Chronic Rhinosinusitis with Allergic and Non-allergic rhinitis and suggesting a treatment protocol for the same.

### OBJECTIVES:

- To study the prevalence of Allergic Rhinitis and Non-Allergic rhinitis in Chronic Rhinosinusitis patients and subjecting the patients to our treatment protocol.
- To assess the quality of life in patients before & after treatment using the SNOTT-22 questionnaire.

**NEED FOR THE STUDY:**The aim of our study is to bring out the relationship between Chronic rhinosinusitis with Allergic Rhinitis and Non-Allergic Rhinitis and to suggest a standard protocol for diagnosis and medical management of Chronic rhinosinusitis associated with Allergic rhinitis & Non-Allergic rhinitis. In addition, we need stringent criteria to categorize the disease based on the available and most appropriate diagnostic methods that will guide us in accurate diagnosis & further management.

**METHODS:**Study site: Apollo Main Hospitals, Greaves Road, Chennai, India.

Study Population: Patients above 18 years presenting in the Outpatient department of Apollo Main Hospitals, Chennai with symptoms suggestive of Chronic Rhinosinusitis.

Sample Size: 57

Study Design: Prospective study.

Study duration: February 2020 to July 2021.

Inclusion Criteria: 1. Patients >18 years of age 2. Patients with symptoms consistent with Chronic rhinosinusitis.

Exclusion Criteria: 1. Patients with acute upper respiratory infection, acute rhinosinusitis. 2. Tumours of Nose, Paranasal sinuses and

Nasopharynx. 3. H/o HIV, Pregnancy or Worm infestations. 4. Immunosuppressive / autoimmune diseases involving nose and Paranasal sinuses. 5. Chronic rhinosinusitis with nasal polyps. 6. SARS-COVID-19 Infection.

All patients diagnosed with Chronic rhinosinusitis were subjected to the basic investigations required to classify them as Allergic or Non-Allergic rhinitis. They were asked to answer the SNOTT-22 questionnaire. Patients were followed up for a period of three months. The pre-treatment and post treatment scores were compared and results computed.

### RESULTS:

- The primary objective of this study is to find the prevalence of Allergic and Non-Allergic rhinitis in Chronic rhinosinusitis. It was found that the prevalence of Chronic rhinosinusitis with non-allergic rhinitis is **35.1 % (20)** and that of Allergic rhinitis is about **64.9 % (37)**. Hence, **Allergic rhinitis** is found **more prevalent** in **Chronic rhinosinusitis**.
- The secondary objective of this study is to find the treatment response to the medical management of Chronic rhinosinusitis using the SNOTT-22 questionnaire. It was found that there was a **significant improvement (P<0.05)** in Pretreatment SNOTT-22 scores vs Post treatment scores.

### CONCLUSION:

- It was found that Intranasal corticosteroids with or without Saline nasal sprays are the mainstay of treatment in Chronic rhinosinusitis.
- It is also noted that addition of Antihistamines in patients with Chronic rhinosinusitis with Allergic rhinitis leads to significant improvement in symptoms.
- Chronic rhinosinusitis patients with non-Allergic rhinitis with predominant nasal block



were benefited with Topical/Oral decongestants.

**Key words:** Chronic rhinosinusitis, Allergic rhinitis, Non-Allergic rhinitis, SNOTT-22 Questionnaire

### I. AIM:

To study the relationship between Chronic Rhinosinusitis with Allergic and Non-allergic rhinitis and suggesting a treatment protocol for the same.

### II. OBJECTIVES:

- To study the prevalence of Allergic Rhinitis and Non-Allergic rhinitis in Chronic Rhinosinusitis patients and subjecting the patients to our treatment protocol.
- To assess the quality of life in patients before & after treatment using the SNOTT-22 questionnaire.

### III. MATERIALS AND METHODS:

Study site: Apollo Main Hospitals, Grems Road, Chennai, India.

Study Population: Patients above 18 years presenting in the Outpatient department of Apollo Main Hospitals, Chennai with symptoms suggestive of Chronic Rhinosinusitis.

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- Patients included in the study were explained about the purpose of study and it was ensured that information collected from them would be kept confidential and would be used only for academic purpose. Written informed consent was taken from each subject.
- A thorough history was taken from all the patients and routine ear, nose and throat examination was done.
- All patients participating in the study were subjected to
- Computed tomography of paranasal sinuses.

- Complete blood count including ESR
- Absolute Eosinophil count
- Serum Total IgE levels
- Patients who had already done a skin prick test (SPT) or Serum specific IgE levels, reports were documented.

All patients diagnosed with Chronic rhinosinusitis were subjected to the basic investigations required to classify them as Allergic or Non-Allergic rhinitis. They were asked to answer the SNOTT-22 questionnaire. Patients who have adhered to the treatment were followed-up for a period of three months. The pre-treatment and post treatment scores were compared and results computed.

### TREATMENT PROTOCOL:

- All patients diagnosed with Chronic rhinosinusitis received Intra-nasal corticosteroid (Mometasone/ Fluticasone furoate nasal spray 2 puffs (50 micro-grams per puff) each nostril once daily for 3 months) +/- Saline nasal spray 2 puffs each nostril once daily for 8 to 12 weeks.<sup>1</sup>
- Patients with Chronic rhinosinusitis associated with Allergic Rhinitis with predominant Nasal congestion were prescribed Topical decongestants (oxymetazoline nasal drops 3 drops twice daily for <math>\leq 3</math> days) in addition to the above.<sup>2</sup>
- Patients with Chronic rhinosinusitis associated with Allergic Rhinitis and predominant rhinorrhoea, intermittent sneezing and itching received an oral Antihistamine (Fexofenadine-180mg / levocetirizine-5mg one tablet at bedtime for 1 month)/ intranasal Antihistamine (Azelastine 0.1% with Mometasone/ Fluticasone furoate 50µg/puff nasal spray 1 puff twice daily for 3 months) in addition to the above.<sup>2</sup>
- Patients with Chronic rhinosinusitis associated with Non-Allergic Rhinitis with predominant or mixed congestion and rhinorrhoea received an Intranasal steroid and/or Topical Antihistamine (Azelastine 0.1% with Fluticasone 50µg nasal spray 1 puff twice daily for 3 months) +/- oral decongestant.<sup>3</sup>
- Patients with Chronic rhinosinusitis associated with Non-Allergic Rhinitis with predominant rhinorrhoea received Topical Antihistamine (Azelastine 0.1% nasal spray 1 puff twice daily for 3 months) in addition to the above-mentioned Chronic rhinosinusitis treatment.<sup>3</sup>

All the above guidelines were adopted from AAO-HNSF Updated Clinical Practice Guideline: Adult Sinusitis, April 1, 2015, AAO-



HNSF Clinical Practice Guideline: Allergic Rhinitis, February 2, 2015, and Vasomotor Rhinitis update by American family physician.

#### IV. INTRODUCTION

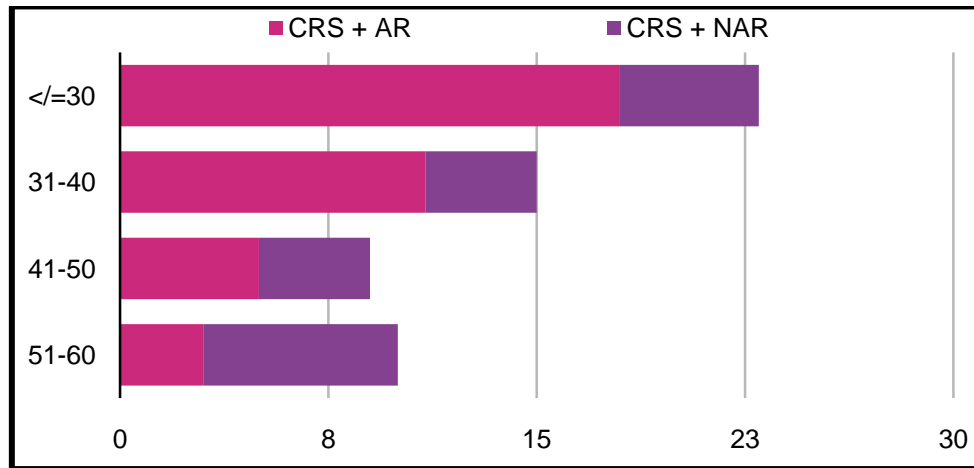
Chronic Rhinosinusitis is an inflammatory condition of the nose and para-nasal sinuses characterized by two or more of symptoms such as nasal block/congestion/obstruction or either anterior/posterior nasal discharge with or without facial pain/pressure with or without loss of sense of smell for more than or equal to 12 weeks. It can present with any of the following signs, on Endoscopic examination – nasal polyps with or without mucopurulent discharge or mucosal obstruction or edema in the middle meatus. It can also present with associated Computed tomography findings such as mucosal changes, inspissated mucin or thinning of the bones of the sinuses.<sup>4,5,6</sup> Chronic rhinosinusitis is recognized to be causing significant health problems and affecting the quality of life of people around the world even more than angina, chronic lung disease and heart diseases.<sup>7</sup> Rhinitis is defined clinically as having two or more symptoms of anterior/posterior rhinorrhoea, sneezing, nasal blockage with or without associated itching of the nose during  $\geq 2$  consecutive days for  $>1$  hour on most days.<sup>8</sup> Rhinitis and sinusitis are among the most common medical conditions which are frequently associated with each other<sup>9,10</sup>. Both rhinitis and sinusitis affect significantly the quality of life, direct and indirect medical expenditures to the patient and loss of school or work productivity.<sup>11</sup> Chronic Rhinosinusitis is associated with more workdays lost than is Allergic Rhinitis. This is even stated in a study by Bhattacharyya N.<sup>12</sup> It is seen that rhinitis affects both children and adults, but data regarding its prevalence in adults and standard diagnostic approach aiding in the recommended conservative management of the condition particularly in community setting in India is limited.

The aim of our study is to establish relationship between Chronic rhinosinusitis with Allergic Rhinitis and Non-Allergic Rhinitis and to suggest a standard protocol for diagnosis and

medical management for the same. In addition, we need stringent criteria to categorize the disease based on the available and most appropriate diagnostic methods that will guide us in accurate diagnosis & further management.

#### V. RESULTS

- Chronic rhinosinusitis with Allergic rhinitis is more prevalent (64.9%) than Chronic rhinosinusitis with Non-Allergic rhinitis (35.1%).
- There is no significant difference in co-existence of allergic rhinitis with Chronic rhinosinusitis between males and females ( $P>0.5$ ) and among different age groups ( $P>0.5$ ).
- Among the **64.9% males**, **64.86%** of them and in **females** about **65 %** of them had **Chronic rhinosinusitis with Allergic Rhinitis**. Hence, it may be noted that **Allergic rhinitis** co-exists in an average of about **64.93%** of study subjects of Chronic rhinosinusitis which is higher and significant compared to the co-existence with Non-Allergic rhinitis (35.1%)
- It is noted that the percentage of males affected with Chronic rhinosinusitis were more (64.9%) than that of female (35.1%). This may be attributed to the increased exposure of men to environmental pollution, dust exposure, smoke etc, whereas women are more confined to house.
- There is no significant difference in co-existence of allergic rhinitis with Chronic rhinosinusitis between males and females ( $P>0.5$ ) and among different age groups ( $P>0.5$ ). The same has been documented by Mehdi Bakhshae et al. in his study.<sup>13</sup> It's seen that most of the patients with Chronic rhinosinusitis about 42 (**68%**) are found to be **predominant Blockers**. Whereas only **34** people were predominant **sneeze-runners (32%)**. Various studies by Animesh Deb et al. and Sahay et al. from India also confirms the same.<sup>15,16</sup>



**Figure 1:** Age distribution in Chronic rhinosinusitis+ AR vs Chronic rhinosinusitis + NAR

- Younger Age group (<=30 years) were affected more (40.4%) with Chronic rhinosinusitis, more so with Chronic rhinosinusitis + Allergic Rhinitis 76.31% (<=40 years age) than the elderly age group >50 years with about 42.10% prevalence. This may be attributable to increased environmental pollution, smoke, dust exposure or use of perfumes, cosmetics etc. in younger age groups compared to elderly.

	MEAN	N	STANDARD DEVIATION	STANDARD ERROR	MEAN
PRE-TREATMENT SNOTT-22	26.39	57	9.814	1.300	
POST TREATMENT SNOTT-22	8.16	57	7.406	0.981	

**Table 1:** Pre-treatment SNOTT 22 vs Post treatment SNOTT 22

	N	CORRELATION	SIGNIFICANCE
PRE SNOTT 22 & POST TREATMENT SNOTT 22	57	0.472	0.0001

**Table 2:** Pre-treatment SNOTT 22 vs Post treatment SNOTT 22 significance

- There is a statistically significant ( $P < 0.05$ ) improvement in 3 months Post treatment SNOTT-22 scores validating the treatment protocol recommended in the study.
- The most predominant symptoms are found to be nasal block, runny nose, sneezing, postnasal discharge with a mean SNOTT 22 score of 2.5 and above. There is a statistically significant improvement ( $p < 0.05$ ) in all symptoms individually post treatment. The mean percentage of improvement is almost equal in patients with chronic rhinosinusitis with Allergic rhinitis and Chronic rhinosinusitis with Non-Allergic rhinitis. This



shows that atopy doesn't interfere in the treatment response of Chronic rhinosinusitis,

provided we categorize and treat them accordingly.

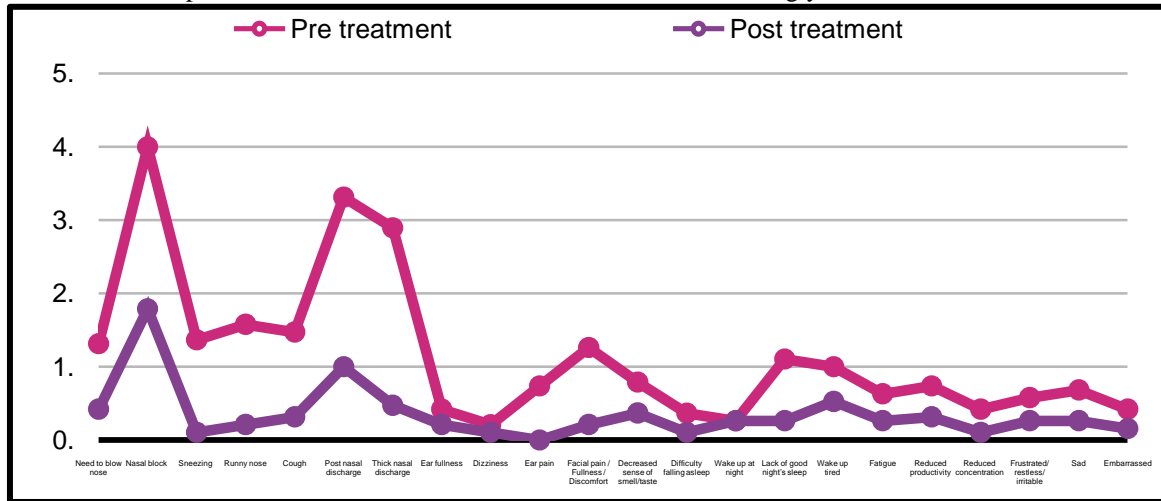


Figure 2: Improvement in symptoms score in Chronic rhinosinusitis + AR

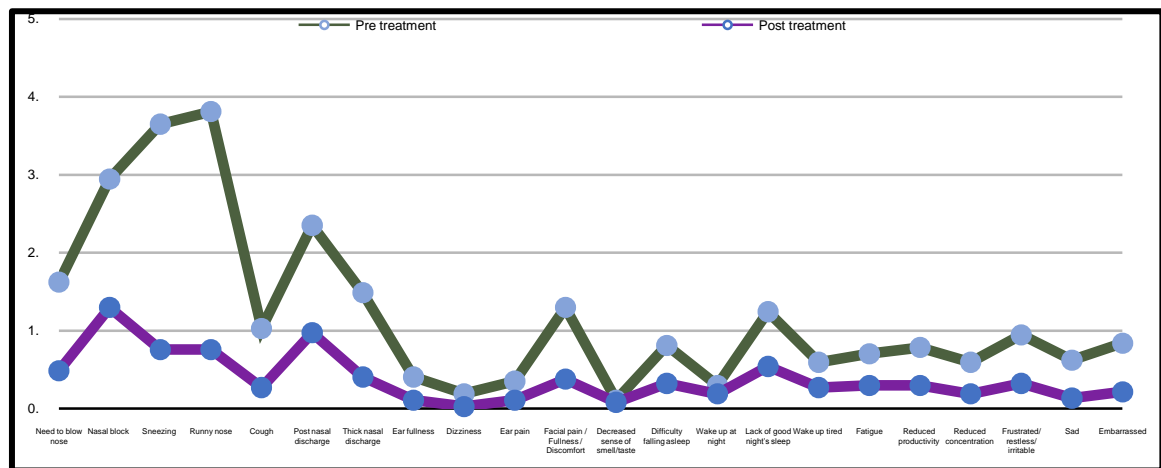


Figure 3: Improvement in symptoms score in Chronic rhinosinusitis + NAR

- Serum IgE levels are having a positive correlation with Sneezing and runny nose, but it's not statistically significant.

## VI. DISCUSSION

Chronic rhinosinusitis can have a substantial impact on the Quality of life. As there's an overlap of symptoms between Chronic rhinosinusitis and Allergic rhinitis so does the medical management. In this study, patients with Chronic Rhinosinusitis were classified into Allergic and non-Allergic rhinitis based on Serum total IgE levels. Patients with IgE levels >150 IU/ml were considered as Allergic rhinitis and the rest as Non-Allergic rhinitis.

It is important to know the association of Chronic rhinosinusitis with Allergic and Non-Allergic rhinitis as it will aid in providing symptomatic relief and improving the quality of

life of the patients. Allergy causes recruitment of the inflammatory cells and causes inflammation of the nasal and para-nasal mucosa which may lead to blockage of the sinus ostia. This in turn leads to stasis of secretions followed by secondary bacterial or fungal infections and cause sinusitis. Over a period there occurs mucosal thickening leading to Chronic Rhinosinusitis with and without polyps.

There is no significant difference in co-existence of allergic rhinitis with Chronic rhinosinusitis between males and females ( $P > 0.05$ ) and among different age groups ( $P > 0.05$ ). The same has been documented by Mehdi Bakhshae et al. in his study.<sup>13</sup> It is seen that most of the patients with Chronic rhinosinusitis about 42 (68%) are found to be **predominant Blockers**. Whereas only 34 people were predominant **sneeze-runners (32%)**. Various studies by Animesh Deb et al. and Sahay et al. from India also confirms the same.<sup>14,15</sup>



Among the **64.9% males**, **64.86%** of them had **Chronic rhinosinusitis with Allergic rhinitis**. In **females** about **65 %** of them had **Chronic rhinosinusitis with AR**. Hence, it may be noted that **Allergic rhinitis** co-exists in an average of about **64.93%** of study subjects of Chronic rhinosinusitis which is higher and significant compared to the co-existence with Non-allergic rhinitis (35.1%). A study by **Mehdi Bakhshae et al.** also confirms this by showing the **prevalence of allergies in Chronic rhinosinusitis** subjects which was found to be **64%** in their study.<sup>16</sup>

However, several other studies demonstrated **no association of Chronic rhinosinusitis with allergy**. In a study by **Gelincik et al.** it was noted that Chronic rhinosinusitis was

**equally prevalent** in patients with allergic and non-allergic rhinitis.<sup>17</sup> Therefore, conflicting data exists as to whether allergy impacts the development or course of Chronic rhinosinusitis.

Serum IgE levels are having a positive correlation with Sneezing and runny nose, but it's not statistically significant. The reason for the statistic insignificance could be attributable to the fact that this is a tertiary care hospital and most of the patients who present here are already undergoing allergy treatment elsewhere and present here with almost controlled symptoms.

The prevalence of Bronchial asthma in Chronic rhinosinusitis is found to be around 18 % compared to 25% in study by Seybt MW, McMains KC et al.<sup>18</sup>

		Lund McKay score	Improvement %
Lund McKay score	Pearson Correlation	1	-.030
	Sig. (2-tailed)		.825
	N	57	57
Improvement %	Pearson Correlation	-.030	1
	Sig. (2-tailed)	.825	
	N	57	57

**Table 3:** Lund McKay Score vs Percentage of improvement in symptoms

Lund McKay score<sup>19</sup> and Improvement percentage shows a negative correlation of -0.030. This implies that as the Lund scores are higher, there's not much improvement in symptoms with medical management alone and such patients require Functional endoscopic Sinus surgery.

**VII. CONCLUSION**

- It is found that **Allergic rhinitis** is **more prevalent** in **Chronic rhinosinusitis**.
- It is also noted that there is a **significant improvement (P<0.05)** in Pretreatment SNOTT-22 scores vs Post treatment SNOTT-22 scores.
- It is found that Intranasal corticosteroids with or without Saline nasal sprays are mainstay of treatment in Chronic rhinosinusitis.
- It is seen that addition of Antihistamines in patients with co-existing Allergic rhinitis leads to significant improvement in symptoms.

- Patients with co-existent Non-Allergic rhinitis with predominant nasal block were benefitted with Topical / Oral decongestants.

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