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A Comparative Study Between Subjective and Objective Findings of Chronic Rhinosinusitis

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ABSTRACT

Background & Objective: Chronic rhinosinusitis is common cause of morbidity and impaired performance at school or workplace. The disease is extremely common. A definitive diagnosis and timely intervention can reduce morbidity of disease. Primary objective is to correlate the subjective symptoms with objective findings. **Methods:** A cross sectional study with 50 patients who is diagnosed of CRS based on Taskforce criteria. Then they were subjected to nasal endoscopy and computed tomography and scores noted. The scores were compared with respect to symptoms. **Results:** In this study, total patients studied were 50. Mean age was 35.88 years (SD-14.84428) with male to female ratio 1.5:1. The most common symptom was nasal obstruction (84%), followed by headache (80%), nasal discharge (68%), hyposmia/anosmia (56%), facial pain and pressure (28%). The mean CT scan score for all symptoms was found to be 6.42 and the endoscopic score mean was 3.00. **Conclusion:** Both nasal endoscopy and CT are important preoperative evaluation tools in detecting pathology and both are complementary to each other.

Keywords: Chronic rhinosinusitis; TFR criteria; CT scan; DNE; Paranasal sinus

INTRODUCTION

The term ”rhinosinusitis” is used to designate a group of problems characterized by inflammation of the ciliated respiratory mucosa of the nose and the paranasal sinuses[1]. The duration of symptoms for more than 12 weeks is indicative of chronic rhinosinusitis. A number of symptoms may manifest themselves in these patients, which includes facial pain or pressure, ear congestion or fullness, nasal obstruction, nasal discharge, hyposmia/anosmia, fever, headache, halitosis, fatigue, tooth pain and cough on nasal examination. It is possible to classify these symptoms as either major or minor. Two major symptoms, or 1 major symptom and 2 minor symptoms, are needed for a clinical diagnosis of chronic rhinosinusitis[1].

Many triggers are found that may lead to nasal and paranasal sinusinflammation. Some of the most prevalent reasons include genetic factors like cystic fibrosis, morphological anomalies like concha bullosa, septal spur, paradoxical turbinate, allergy or immunological conditions, trauma, toxic chemicals, infections, drugs used after surgery, and so on[1].

The current symptom-based diagnostic criteria from the Task Force on chronic rhinosinusitis (TFR) may not be enough for identifying the entire extent of the disorder[2,3]. CT scan is the gold standard for diagnosis, yet it has been proven to have limitations in certain studies. CT scans and nasal endoscopies are two examples of the diagnostic techniques that may be used to further confirm a diagnosis, assess a patient's health, and plan the definitive line of management[2,4].

Research has demonstrated that nasal endoscopy isn't able to precisely characterize the structural variations. It seems from the available data that TFR's symptom-based diagnostic guidelines may not always correspond with the diagnostic modalities. Diagnosis techniques have a lot in common with one another[3,5,6].

The main aim of this research is to find the correlation between subjective sino-nasal symptoms and objective sino-nasal examination.

METHODS

A study was conducted and data was collected from patients with chronic rhinosinusitis who visited our hospital's ENT department throughout the research period were included in the cross-sectional analysis. A total of 50 patients were studied after obtaining Institutional Ethics Committee permission. Patients were diagnosed as CRS based on TFR criteria. Then the patients were subjected to nasal endoscopy and CT scan and the scores were noted. The scores were compared with respect to symptoms.

On the basis of the Lund and Kennedy staging method, the results of the nasal endoscopy are put meticulously into a proforma for the left and right sides.

- Polyps were scored from 0-3 with, 0 indicating absence of polyps, 1 as polyps in the middle meatus only, 2 as polyps beyond middle meatus but not completely obstructing the nose and 3 as polyps completely obstructing the nose.
- Edema was scored from 0-2 with, 0 indicating no edema, 1 as mild edema and 2 as severe edema.
- Discharge was scored from 0-2 with, 0 indicating absence of discharge, 1 as clear thin discharge and 2 as thick purulent discharge.

The proforma also included Lund-Mackay sagittal and sagittal axial scores for CT scan findings.

The maxillary, anterior ethmoidal, posterior ethmoidal, frontal, and sphenoid sinuses were ranked on a scale from 0 to 2. 0 was no opacification of sinus cavity, 1 being partial opacification and 2 was complete opacification. Osteomeatal complex was scored as 0 or 2. 0 if it is not blocked and 2 if it is.

Data collected is entered in MS EXCEL and analysed using SPSS version 24.0. Descriptive statistics will be represented using mean SD, percentage and proportion. Association between any categorical variable with the two groups will be analysed using Chi Square test. P value is less than 0.05, which indicates that there is an association between the groups and categorical variable. Statistically significant difference among the two groups with respect to any continuous variable will be analysed using Independent Sample t test. Statistically significant difference among more than two groups with respect to any continuous variable was analysed using ANOVA test.

RESULTS

The male to female ratio was 1.5: 1 (Male = 30, female = 20). Patients between the ages of 21 and 30 made up the biggest age group (24%), followed by those between the ages of 41 and 50 (22%). Symptom-wise distribution of patients, the most common presenting complaint was nasal obstruction (84%), followed by headache (80%), nasal discharge (68%), hyposmia/anosmia (56%), Facial pain and pressure/pain (28%), Purulent nasal discharge (26%), fever (non-acute) (20%), ear ache (10%) and rest other symptoms being <10%.

Average DNE and CT scores were calculated and correlated with the symptoms. Patients reported high average symptom scores for all major symptoms (e.g., facial pain: 6.64 (SD-2.81), anosmia: 6.96 (SD-2.48) in CT scores), suggesting severe subjective burden. However, CT findings show statistical significance only for anosmia ($p < 0.001$), not for other major symptoms. This shows that subjective complaints are often not confirmed by CT scans, reflecting a disconnect between perception and radiologic evidence.

In contrast, DNE correlates significantly with patient-reported symptoms: Facial pain ($p < 0.001$), Nasal discharge ($p < 0.001$), Anosmia ($p < 0.001$) (Table 1). This indicates that DNE is more sensitive to correlating patient symptoms with actual clinical findings in CRS. For many symptoms (e.g., acute fever, purulent nasal discharge), average subjective scores are high, but neither CT nor DNE shows statistical significance. This reflects the well-known issue in CRS where symptom severity does not always correlate with objective disease, especially on CT scans.

Among the minor criteria, headache had a subjective average score of 5.85 (SD-3.03), and was the only symptom significantly correlated with DNE findings ($t = -2.216$, $p = 0.031$), while CT showed no significance ($p = 0.816$). Cough, despite being the most reported symptom, showed no significant correlation with either CT ($p = 0.521$) or DNE ($p = 0.927$), reflecting a disconnect between subjective burden and objective evidence. Other symptoms such as: Halitosis (avg score: 6.38), Fever (non-acute) (6.20), Fatigue (5.5), Dental pain (5.17), and Ear ache (5.6), also showed no significant correlation with CT or DNE (all $p > 0.2$), despite moderate to high subjective reporting (Table 2).

This suggests that the presence of major symptoms is a better predictor of the condition than minor symptoms. There is some correlation between major and minor criteria, but it is weak because only headache from the minor criteria shows statistical significance. Major symptoms like anosmia, facial pain, and nasal discharge are much stronger indicators, while most minor symptoms do not show meaningful changes.

DISCUSSION

Care for patients with chronic rhinosinusitis may vary greatly since patients often consult multiple professionals, including emergency medicine, internal medicine, allergy medicine, and otolaryngology[4,7]. Although many research have been conducted on the aetiology, medical vs. surgical treatment, and sensitivity/specificity of CT Scan and

Table 1: CT and DNE scores of Major symptoms

	CT			DNE		
Symptom	**Mean**	**Standard deviation**	**p value**	**Mean**	**Standard deviation**	**p value**
		Major				
Facial pain			.279			.000
Absent	5.6111	3.05219		1.8194	1.59532	
Present	6.6429	2.81089		3.7857	1.77281	
Nasal obstruction			.279			.544
Absent	4.1250	3.42000		2.0000	1.58114	
Present	6.2381	2.82678		2.4405	1.91338	
Nasal discharge			.120			.000
Absent	4.9375	3.02696		.9063	.58363	
Present	6.3529	2.91425		3.0588	1.85360	
Purulent nasal discharge			.154			.063
Absent	5.5405	3.03081		2.0811	1.80860	
Present	6.9231	2.74504		3.1923	1.80899	
Hyposmia/Anosmia			.005			.000
Absent	4.5909	3.12302		1.2045	1.16148	
Present	6.9286	2.48966		3.2857	1.79726	
Acute fever			.877			.208
Absent	5.8804	3.08614		2.2717	1.79415	
Present	6.1250	1.88746		3.5000	2.48328	

Table 2: CT and DNE scores of Minor symptoms

	CT			DNE		
Symptom	**Mean**	**Standard deviation**	**p value**	**Mean**	**Standard deviation**	**p value**
		Minor				
Headache			.816			.031
Absent	6.1000	2.98887		1.2500	1.39940	
Present	5.8500	3.03230		2.6500	1.86465	
Fever (all non-acute)			.727			.274
Absent	5.8250	3.21365		2.2250	1.85690	
Present	6.2000	1.98886		2.9500	1.83258	
Halitosis			.745			.674
Absent	5.8587	3.04898		2.3370	1.83198	
Present	6.3750	2.59406		2.7500	2.39792	
Dental pain			.666			.779
Absent	5.9468	3.01848		2.3511	1.85600	
Present	5.1667	3.05505		2.6667	2.25462	
Fatigue			.894			.736
Absent	5.9082	3.02537		2.3571	1.87361	
Present	5.5000			3.0000		
Cough			.521			.927
Absent	5.8438	3.04078		2.3750	1.88922	
Present	7.2500	1.06066		2.2500	1.06066	
Ear ache			.816			.832
Absent	5.9333	3.11448		2.3889	1.87958	
Present	5.6000	1.74642		2.2000	1.82346	

endoscopy for diagnosis or symptomatology alone, studies co-relating the symptoms along with the investigative modalities are few, especially in Indian literature.

Fifty participants who were diagnosed with chronic rhinosinusitis by TFR, were seen on OP and IP basis at our hospital are included in the study.

With early diagnosis and treatment, morbidity and mortality with the disease burden is reduced. In fact, chronic rhinosinusitis is a problem for individuals of all ages. Our study group ranged in age from 11 to 70, with a 1.5:1 ratio of males to females and a median age of 24. (30 men to 20 women).

The average age of the patients in research by Wabnitz et al and Wormald et al[8] was 44.5, and the ratio of M:F was 1.33 to 1. A separate study by Ling et al and Kountakis et al[9] found that their patients had a mean age of 49.4 and a M:F ratio of 1.1 to 1. According to our data, 27% of our patients were in 2nd decade, which is consistent with a study done in India by Kirtane et al[10].

The most common presenting complaints was nasal obstruction (84%), headache (80%), nasal discharge (68%), hyposmia (56%), facial pain/ pressure (28%). In a study done by da Lilly-Tariah et al[11], it was shown that 97.4% of subjects reported nasal obstruction, 54.8% had anosmia, 54.8% had a headache, 67.6% had sneezing and 100% had rhinorrhea. However, no correlation was found between the number of symptoms and their duration.

Twenty-five patients out of 50, where (78.1%) complained of nasal discharge, followed by 22 (68.7%) who had headache and 22 (68.7%) who experienced nasal obstruction.

Six patients (18.7%) experienced sneezing whereas two patients (6.25% each) had anosmia and two patients (6.25% each) experienced cacosmia. In a study by Gandotra et al[12] postnasal drip and nasal obstruction were the most common symptoms.

Studies by Mógica et al[13], and team found that cough, halitosis, postnasal discharge, fever, headache, sore throat, facial sensitivity, and periorbital edema were the most frequently reported symptoms.

However, only 29% of participants in a different study on the prevalence of facial pain by Jones NS reported experiencing any of the mentioned symptoms. The difference between Studies ranging in length from months to several years report varying rates of symptom recurrence. However, it should be noted that the diagnostic criteria established by TFR have been adopted in almost all research. The present TFR criteria may lack adequate specificity and predictability to serve as a diagnostic criterion for rhinosinusitis, as shown by radiologic assessment of symptom-based diagnostic criteria for chronic rhinosinusitis by Hwang et al, Irwin et al, and Nesbit et al.

After evaluating the efficacy of endoscopic sinus surgery for chronic rhinosinusitis, Dr. Bhattacharyya N. observed that the preoperative CT scan stage based on three arranging methods could not reliably predict outcomes. Although CT scans are often seen as a precise diagnostic device for chronic rhinosinusitis, a recent investigation by Lund-MacKay, Kennedy, and Harvard demonstrated that CT scan staging alone could not be used as a precise diagnostic tool and does not predict symptoms outcome after CRS regardless of the staging system utilized[5].

Although numerous reports demonstrate that the degree of illness on CT of the sinuses does not co- relate with patients' subjective symptom scores, Arango et al[14] and Kountakis et al[15] note in their review "Significance of computed tomography pathology in constant Rhinosinusitis" that the presence of CT disease means higher patient symptom scores in comparison to the symptomatic scores of patients without CT disease. The correlation we found between a higher symptom score and CT findings is in line with this theory[16].

CONCLUSION

This comparative study highlights the relationship between subjective symptomatology and objective diagnostic tools—Computed Tomography (CT) and Diagnostic Nasal Endoscopy (DNE)—in the evaluation of chronic rhinosinusitis (CRS).

Among the major symptom criteria, DNE demonstrated superior correlation with patient-reported symptoms. Statistically significant associations were observed for hyposmia/anosmia (CT: $p = 0.005$; DNE: $p = 0.000$), facial pain ($p = 0.000$ on DNE), and nasal discharge ($p = 0.000$ on DNE), whereas CT showed limited significance beyond anosmia. This suggests that DNE is more reflective of the inflammatory changes that contribute to major symptom burden in CRS.

For the minor symptom criteria, only headache showed a statistically significant correlation with DNE ($p = 0.031$). Other commonly reported symptoms, including cough (mean subjective score: 7.25), halitosis (6.38), and fever (non-acute) (6.20), lacked significant correlation with either CT or DNE. CT did not significantly correlate with any minor symptoms, underscoring its limited role in validating patient-reported complaints of this nature.

Overall, DNE was found to be a more reliable objective tool than CT in correlating with subjective symptom scores, particularly for major diagnostic criteria. CT, while valuable for anatomical assessment, demonstrated poor correlation with symptom severity and should not be solely relied upon for clinical decision-making. The findings support the routine use of DNE as part of a comprehensive diagnostic workup for CRS, especially when patient symptoms are prominent but CT findings are inconclusive.

Conflict of Interest

None.

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