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CORRELATION BETWEEN PATIENT SYMPTOM SCORES AND COMPUTED TOMOGRAPHY SCORES IN CHRONIC RHINOSINUSITIS

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ABSTRACT

Chronic Rhinosinusitis (CRS) is a common medical condition that challenges both specialists in rhinology and general otolaryngology. The diagnosis relies on clinical judgment and symptoms rather than on objective tests. Very few investigators have attempted to characterize the severity of this condition based on patient symptom scores and computed tomography (CT) scores. The aim of this study was to determine the correlation between patient symptom scores and CT scores in Chronic Rhinosinusitis patients. Patient symptom scores were recorded from the 16- item sinonasal outcome test (SNOT-16) inventory. Computed tomography scans were graded according to the Lund-Mackay system. The leading symptoms of CRS were "headache", "need to blow nose" and "post-nasal discharge". Correlation was assessed by the Pearson correlation coefficient (r). 60 patients were included in the study with a mean SNOT-16 symptom score of 16.1667 and the mean computed tomography score of 6.9333. Patient symptom scores correlate positively with CT scores with r = 0.825 (p <.001). The severity of symptoms as assessed by the SNOT-16 inventory in patients with CRS predict the severity of the disease in computed tomography scan.

Introduction

CRS has remained a clinical diagnosis based on patient symptoms to which most studies have failed to correlate the symptoms with objective measures. A classification of Rhinosinusitis symptoms has been described by the Rhinosinusitis Task Force (RSTF) established by the American Academy of Otolaryngology Head and Neck Surgery (AAOHNS). In this, major and minor symptoms were defined with definite criteria for diagnosis of CRS [1],[2].

CT scan of paranasal sinuses is the gold standard diagnostic radiological tool for Chronic Rhinosinusitis (CRS). CT plays two main roles in regard to CRS. One is to elucidate the anatomy of paranasal sinuses prior to Functional Endoscopic Sinus Surgery (FESS) thereby providing the surgeon information that will enable a safe and sufficient approach to the sinuses [3]. The second is to assess the extent and the severity of the lesion in CRS to aid in diagnosing and deciding the treatment of the disease. In the medical literature, there are studies in which patients had CT scan of paranasal sinuses which were graded and scored using different scales, of which the most important is Lund Mackay system of staging (Table 1) recommended by American Academy of Otolaryngology to stage Chronic Rhinosinusitis. Some of the authors have subjectively assessed the presenting symptoms and severity of the disease by various systems one of them being the Sino-nasal Outcome Test-16 (SNOT-16) and they have done correlation studies between severity of symptoms / disease severity and CT scores [3]. Here we attempt to find the correlation of patient symptom scores severity with CT grading score.

Methods

This is a prospective study of clinical records of the patients with Chronic Rhinosinusitis conducted on 60 patients attending ENT OPD of Jubilee Mission Medical College and Research Institute, Thrissur from February 2016 to July 2017. Patients with Chronic Rhinosinusitis presenting with various major & minor symptoms refractory to medical treatment for a minimum period of 12 weeks, patients above 12 years of age and who are willing to undergo the study were included. Patients who are below 12 years, patients with sinonasal mass lesions, comorbidities like diabetes, HIV, renal disease, history of facial trauma, previous sinonasal surgery and who are not willing to undergo the study were excluded. Clinical diagnosis of Chronic Rhinosinusitis was made using the guidelines by Rhinosinusitis Task Force of American Academy of Otorhinolaryngology, Head and Neck Surgery (AAOHNS). Patient symptom scores were recorded from the 16 item Sino-nasal Outcome Test (SNOT 16) inventory system (Table 2). Radiological evaluation of paranasal sinuses was done with the help of Computed Tomography (CT). Preoperatively Computed Tomography scans were graded according to the Lund-Mackay staging system for paranasal sinuses.

Table 1 : Lund – Mackay CT grading

Paranasal sinuses	Right	Left
Maxillary		
Anterior ethmoidal		
Posterior ethmoidal		
Sphenoidal		
Frontal		
Ostiomeatal complex		
Total score for each side		

- Scoring: For all sinuses : 0 = no abnormalities, 1 = partial opacification , 2 = total opacification
- For the Ostiomeatal complex : 0 = not occluded, 2 = occluded

CT grading (severity)	Score
1 (Mild)	< 8
2 (Moderate)	8 – 16
3 (Severe)	>16

Table 2 : Sinonasal Outcome Test-16 (SNOT -16) inventory

1.Considering how severe the problem is when you experience it and how frequently it happens, please rate each item below on how "bad" it is by circling the number that corresponds with how you feel using this scale:►	No Problem	Mild Problem	Moderate Problem	Severe Problem
1. Need to blow nose	0	1	2	3
2.Sneezing	0	1	2	3
3.Runny nose	0	1	2	3
4.Cough	0	1	2	3
5.Post –nasal discharge	0	1	2	3
6.Thick nasal discharge	0	1	2	3
7.Ear Fullness	0	1	2	3
8.Headache	0	1	2	3
9.Facial pain/pressure	0	1	2	3
10.Wake up at night	0	1	2	3
11.Lack of a good night's sleep	0	1	2	3
12.Wake up tired	0	1	2	3
13.Fatigue	0	1	2	3
14.Reduced productivity	0	1	2	3
15.Reduced concentration	0	1	2	3
16.Frustrated/restless/irritable	0	1	2	3

2.Please mark the most important items affecting your health (maximum of 5 items)_____ Guidelines validated by Washington university in St.Louis, Missouri 1996

Symptom score	Severity grading
Mild	<12
Moderate	12-24
severe	>24

Statistical analysis

Gathered data were entered in Microsoft excel and analyzed using SPSS. Means, proportions and its dispersions are presented in appropriate graphs and charts. Qualitative data was expressed in percentage and proportion. Association was measured by Pearson correlation.

Results

Among the 60 patients, 34 (56.6%) were males and 26 (43.3%) were females. The male female ratio was 1.30:1. Age group between 21-30 years had the highest frequency with mean age of 25 years. Headache of variable severity was the commonest symptom present in 38 (64% of cases) patients followed by "need to blow nose" among 31 (52% of cases) patients. Patient symptom score (SNOT-16) grading showed, 35 patients having a severity of 1 (mild), 18 cases with severity score of 2 (moderate) and 7 cases with a severity score of 3 (severe). The mean symptom score symptom score was 16.1667. The mean CT score among the patients was 6.933, with a maximum recordable score of 24 for an individual. Radiologicaly (as per the Lund-Mackay grading), maxillary sinus is the most commonly diseased sinus followed by Anterior ethmoid sinus. About 33 (55%) had unilateral disease involvement as compared to 27 (45%) who had bilateral disease in CT. Distribution of CT score severity, revealed 36 (60%) cases having a CT severity score of 1 (mild), 19 (31.66%) with severity score of 2 (moderate) and 5 cases (8.33%) having a severity score of 3 (severe). The mean patient symptom score and the mean CT score had a positive correlation of 0.825 (Table 3)

Table 3 : Correlation between mean Patient symptom score and mean CT score.

	N	Mean	Std. Deviation	Pearson correlation (r)	P value
CT score	60	6.9333	4.83233	0.825	0.001
Patient symptom score	60	16.1667	10.35009		

Discussion

Rhinosinusitis is the inflammation of nasal and paranasal sinus mucosa, and it is a common disorder affecting approximately 20% of the population at some point in their lives. In tropical countries like India, the prevalence is even more. A significant number of patients diagnosed with CRS often tend to be refractory to medical therapy [4],[5],[6]. Literature review revealed that Chronic Rhinosinusitis is distributed equally among males and females. In this study also almost equal distribution of gender was obtained with 34 (56.66%) males and 26 (43.33%) females and the male female ratio obtained was 1.30:1, which was similar to a study conducted by Wabnitz, Nair and Wormald were the ratio was 1.3:1 [7]. In another similar study by Bradley et al no significant gender preponderance was noted [8]. The age of the Chronic Rhinosinusitis patients in our study range from 16 to 60 years, with mean age of 34 years compared to 44.5 years in a study by Wabnitz, Nair and Wormald [7]. The age group with the highest frequency was among 21-30 yrs (18 cases), with a mean age of 25yrs. The mean patient age was 49 years (range, 18–80 years) in study by Bradley and Kountakis [8]. "Headache" of variable severity was the commonest symptom and was experienced by 38 cases, followed by "Need to blow nose" among 31 cases and "Postnasal discharge" among 29 cases. Nasal congestion had the highest frequency, followed by fatigue and headache in a study by Soler et al even though Visual Analogue Scale (VAS) was the scoring system used [9]. Most of the patients presented with nasal obstruction and headache in a study by Rathor and Bhattacharjee [10]. Among the Patient symptom severity score, 35 cases had severity of 1 (mild), 18 cases had severity score of 2 (moderate) and 7 cases had a severity of 3 (severe).

The Mean patient symptom score was 16.1667 compared to 30.6 in the study by Bradley and Kountakis, even though that study used a SNOT-20 scoring system [8],[11]. Another study by Deepthi et al. used a Symptom Score (SS) questionnaire and had a mean value of 2.103 ± 0.38 [12].

In this study, among the total 60 cases of Chronic Rhinosinusitis 36 (60%) cases were having CT score severity grading of 1 (mild), 19 (31.66%) cases were having CT score severity of 2 (moderate) and 5 (8.33%) cases were having CT score severity of 3 (severe). Only 1 case had the highest CT score (22) and 5 cases had the least score (1). No cases had a CT score of 0 when compared to a study by Hwang et al where 40 out of 115 patients who met the criteria for Chronic Rhinosinusitis had no radiological finding [13]. The Mean CT score in our study was found to be 6.9 ± 4.8 as compared to 13.2 ± 0.8 in a study by Bradley and Kountakis, 12 in a study by Wabnitz et al and 9.8 by Bhattacharyya and Fried [7], [8],[14]. Another study by Moghaddasi et al, the mean Lund Mackay CT score was 18.5 ±5 [15]. The patients included in our study were found to be less diseased radiologically than the previously mentioned studies.

In this study there is a positive correlation (Table 3) between mean CT score with mean patient symptom scores with p value = 0.001 which is <0.05 and is strongly significant. This was similar to the study by Pokharel et al when overall symptom score was correlated with radiological score and was found to be statistically significant [16]. There was no significant correlation between the CT score and patient symptom scores in the study by Wabnitz and Kountakis, Stewart et al, Holbrook et al and Basu et al [7],[17],[18],[19],[20]. Another study by Deepthi et al, there was significant positive correlation between radiology score and patient symptom score [12].

Conclusion

Detailed recording of clinical symptoms through a validated questionnaire like *Sinonasal Outcome Test-16* (SNOT-16) followed by Computed Tomography evaluation by *Lund-Mackay* grading system plays a crucial role in the diagnosis of Chronic Rhinosinusitis. In the present study, the commonest symptoms observed were headache, postnasal discharge and "Need to blow nose". We also observed that allergy is a significant factor in the development of Chronic Rhinosinusitis.

Maxillary sinus and Anterior Ethmoid sinus were the most frequently diseased sinuses in our study according to CT of Paranasal sinuses. Both extent of the disease and severity of disease in each sinus were very well recognized in CT scans.

Allergic patients demonstrated advanced disease on CT scans when compared to non-allergic patients. In this study Lund-Mckay CT scores positively correlates with patient symptom scores. Incorporation of radiographic characteristics of sinus opacification in Lund-Mckay CT scores offers greater predictive power of patient's subjective symptoms (disease severity) and also may predict the magnitude of symptom improvement following surgical management.

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