Original Research Article

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Correlation between nasal endoscopy and computed tomography in a tertiary care hospital

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ABSTRACT

Background: Chronic rhinosinusitis is associated with morbidity and affects the quality of life of the affected persons and increases their treatment costs. Diagnosis is mainly by nasal endoscopy or by computed tomography which is considered to be the gold standard.

Methods: Nasal endoscopy was done for all the patients under local anaesthesia. All the patients also underwent computed tomography and paranasal sinuses and the findings were scored according to Lund Mackay scoring system. Results: The most common age group was 31-40 years and nasal discharge was the most common symptom seen in 82% of the patients. The paranasal sinuses that were involved were predominantly maxillary sinus in a total of 88% of the patients. 22% of the patients have sinusitis in the anterior ethmoid of the left nose and 20% on the right nose. Bilateral was seen in 22% of the cases. The sensitivity of nasal endoscopy over computed tomography was 95.6% while the specificity was 80%. The positive predictive value was 97.7% and the negative predictive value was 66.7%. The accuracy of the test was 94%.

Conclusions: Nasal endoscopy is found to be as good as the computed tomography for the diagnosis of chronic rhinosinusitis and can be used on a regular basis for its detection among the patients. It not only lacks radiation but is also economically viable.

Keywords: Computed tomography, Nasal endoscopy, Chronic rhinosinusitis

INTRODUCTION

Rhinosinusitis is one of the very common diseases that affects all population at some point of time or the other. Chronic rhinosinusitis (CRS) is associated with morbidity and affects the quality of life of the affected persons and increases their treatment costs. It is estimated to affect around 50 million persons each year. Although it had been prevalent for a very long time, its treatment is quite a challenge.1

In the past, the most common mode of diagnosis was based on patients symptoms. However, over time, the American Academy of Otorhinolaryngology had laid down a few guidelines to help in the diagnosis of this

disease. According to the academy, the diagnosis of chronic rhinosinusitis involves a combination of symptom and objective findings. A patient should have more than 2 major complaint or at least 1 major and 2 minor complaints which have been present for around 12 weeks or more to categorize them as chronic rhinosinusitis. Moreover, presence of other objective measures such as nasal polyps, mucus in the middle meatus and ethmoid region, paranasal sinuses are also considered.2-4

Thus presence of inflammation is essential in diagnosing the disease, either by direct visualization by anterior rhinoscopy or by means of nasal endoscopy (NDE). NDE helps in the direct observation of the endocavity as well

as its identification so that the secretions can be properly removed. The evaluation of the anatomical as well as the functional state if the sino nasal mucosa can be done.⁵

The advent of computed tomography has further improved the mode of diagnosis for CRS and detecting the complications. It not only detects the mucosal disturbances as well as the anatomical variations, identify the obstructive pathology, and see the posterior ethmoid and sphenoid sinuses. For functional endoscopic sinus surgery, both NDE and (computed tomography) CT have brought about a greater understanding of CRS. Now CT scan is considered to be a gold standard test for the diagnosis of CRS. ^{6,7}

Thus, the purpose of this study is to identify the role of nasal endoscopy and computed tomography in the diagnosis of CRS and to compare these findings.

METHODS

This hospital based cross sectional study was done in the Department of Ear, Nose and Throat at Mallareddy Medical College for Women between May 2017 to January 2019 over a period of 17 months on 50 patients with CRS. After clearing the study from the Institutional Ethical Committee, the nature of the study was explained to all the patients and their relatives and informed consent was obtained from all of them. In case of children, the consent was obtained from the parents or the legal guardians. 50 patients confirmed with CRS were included into the study.

Other causes of sinusitis, such as those due to dental origin, facial trauma or sino-nasal surgery, paranasal sinus tumor were excluded from study.

Detailed history and demographic details were collected from all the patients. They were all subjected to medical and clinical examination. Blood was collected for regular laboratory investigations. All the patients were subjected to rigid nasal endoscopy using 0^0 and 30^0 , 4mm endoscope under local anesthesia using 2% xylocaine for local anesthesia. All the findings were noted and scored using Lund-Kennedy endoscopic scoring system⁸. The

assessment was considered positive, if the score was more than 2.

Computed tomography and para nasal sinus was done for all the patients using CT scanner with the patients in supine position and head extended. In case of conditions such as cervical spondilytis, where the head cannot be extended, Gantry tilt was adjusted. Axial and coronal plane images were obtained with reconstruction in the sagittal image. This was done for both bony and soft tissues and the finding were scored using the Lund Mackay scoring system³. Involvement of anterior ethmoid, posterior ethmoid, maxillary, sphenoid and frontal sinuses was assessed using this scoring system and the score ranged from 0-24. If the score was more than 1, the findings were considered to be positive.

The statistical analysis was done using Microsoft excel and the significance was analyzed using Chi square test.

RESULTS

Out of the 50 patients who were confirmed with chronic rhinosinusitis, 28 (56%) of them were males and 22 (44%) were females (Figure 1).

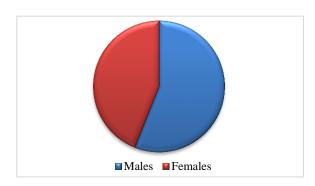


Figure 1: Sex wise distribution of patients.

The predominant age group who had CRS was 31-40 years, with 17 (34%) affected, followed by 41-50 years with 15 (30%) patients in the study. 8 (16%) of the patients belonged to 18-30 year age group and 7 (14%) to 51-60% age group (Figure 2).

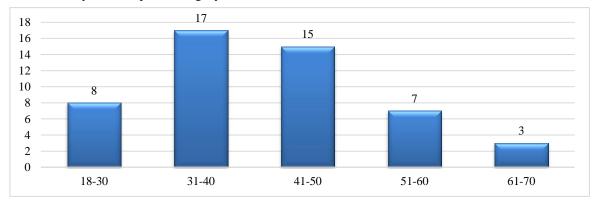


Figure 2: Age wise distribution of the patients.

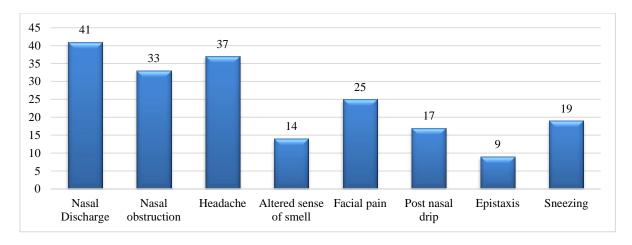


Figure 3: Symptoms of the patients.

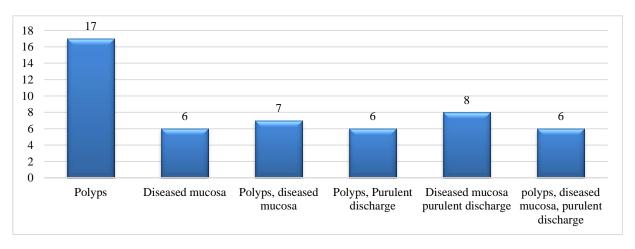


Figure 4: Pathology of osteomeatal complex as seen with nasal endoscopy.

Table 1: Involvement of paranasal sinuses in CT scan.

Sinusitis	Left nose	Right nose	Bilateral	Total
	N (%)	N (%)	N (%)	N (%)
Anterior ethmoid	11 (22)	5 (10)	11 (22)	27 (54)
Posterior ethmoid	8 (16)	5 (10)	9 (18)	22 (44)
Maxillary	14 (28)	11 (22)	19 (38)	44 (88)
Frontal	5 (10)	4 (8)	7 (14)	16 (32)
Sphenoid	4 (8)	2 (4)	6 (12)	12 (24)

Table 2: Correlation of nasal endoscopy and computed tomography.

Parameters	Endoscopy positive	Endoscopy negative	Total
CT positive	43	2	45
CT negative	1	4	5
Total	44	6	50

Table 3: Specificity and sensitivity of NDE and CT.

Parameters	Value (%)
Sensitivity	95.6
Specificity	80
Positive predictive value	97.7
Negative predictive value	66.7
Accuracy	94

Majority of the patients (n=41) had nasal discharge as the chief complaint, while 37 (74%) had headache. 33 (66%) had nasal obstruction and 25 (50%) had facial pain also. 19 (38%) in addition had continuous sneezing as one of the symptoms and 17 (34%) had nasal drip (Figure 3).

The paranasal sinuses that were involved were predominantly maxillary sinus in a total of 88% of the patients. Of these 14 (28%) had them in the left nose while in 11 (22%) it was in the right nose. Bilateral involvement was seen in 19 (44%) of the cases. 11 (22%) of the patietns has sinusitis in the anterior ethmoid of the left nose and 5 (10%) on the right nose. Bilateral was seen in 11 (22%) of the cases. Similarly, 8 (16%) had posterior ethmoid of the left nose involvement and 5 (10%) had right nose involvement and bilateral involvement was seen in 9 (18%) of the cases. Frontal and sphenoid involvement of the left nose was seen in 5 (10%) and 4 (8%) of the cases respectively, right nose in 4 (8%) and 2 (4%) respectively and bilateral in 7 (14%) and 6 (12%) respectively (Table 1).

The most common pathology of the osteomeatal complex was polyps on nasal endoscopy seen in 17 (34%) of the cases. 8 patients (16%) had diseased mucosa with purulent discharge, 7 (14%) had polyps with diseased mucosa, while there were 6 patients (12%) each with diseased mucosa, polyps with purulent discharge and all three i.e., polyps, diseased mucosa as well as purulent discharge (Figure 4).

43 of the DNE positive cases were also positive with CT, while 1 was negative with CT. Out of the 45 CT positive cases, 2 cases were not detected by endoscopy. 4 of the cases were negative with both endoscopy and CT (Table 2).

The sensitivity of NDE over CT was 95.6% while the specificity was 80%. The positive predictive value was 97.7% and the negative predictive value was 66.7%. The accuracy of the test was 94% (Table 3).

DISCUSSION

Chronic rhinosinusitis is a recurrent problem affecting most of the people throughout the world. Although this disease has been around for a very long time, it is still a challenge to diagnose it. Of late the diagnosis of CRS by CT has become a gold standard, and clinicians, especially ENT specialists heavily rely on CT for the accurate diagnosis².

In the present study, the most common age group to be affected was between 31-40 years followed by 41-50 years. Similar prevalence of age group was found in another study by Deosthale et al, where they found the 2nd and the 3rd decade to be the most common age group to be affected by CRS.⁹ Another study by Sinha et al also reported the most common age group to be 20-40 years, corroborating our study.¹⁰ However in another study by

Hwang et al, a higher range with a mean of 47.4 years was observed. 11

A slight preponderance of males to the females was observed in our study which was corroborated by studies of Deosthale et al and Sinha et al. ^{9,10} This preponderance was not significant.

The most common symptom was nasal discharge (82%) followed by headache (74%), nasal obstruction (74%) and facial pain (50%). Nasal discharge was a chief complaint in a study by Nayak etal. ¹² In our study, nasal discharge was seen in 82% of the patient and in the study by Nayak et al it was seen in 78.1% patients. Deosthale et al reported nasal discharge in 72.22%. Nayak et al reported 68.7% of the patients having headache and nasal obstruction in 68.7% of the cases. ¹² A study by Baruah et al also reported nasal discharge to be the most common symptom, seen in 87% of the patients, followed by nasal obstruction in 69.6% of the cases. ¹³ Levine et al, in a study of 250 patients, observed nasal discharge in 51% of the cases.

The paranasal sinuses that were involved was predominantly maxillary sinus in a total of 88% of the patients. Of these 14 (28%) had them in the left nose while in 11 (22%) it was in the right nose. Bilateral involvement was seen in 19 (44%) of the cases. Involvement of maxillary sinus was 80% in a study by Baruah et al, followed by anterior ethmoid in 63%. 13 However in a study by Bolger et al, anterior ethmoid were more commonly involved in 78.2% and Calhoun et al reported 84.3% of involvement of anterior ethmoids. 14,15 Frontal involvement was seen in 32% of the cases in the present study, while Baruah et al reported a 23% involvement of the same. 13 The least affected sinuses in our study was frontal an sphenoid. This was corroborated by studies by Baruah et al and Zojaji et al, who also reported the same. 13,16 Maxillary sinus involvement was observed in another study by Kaku and Harugop in 56.66% patients on the right side and in 60% of the patients on the left side. 17

The most common pathology of the osteomeatal complex was polyps on nasal endoscopy seen in 17 (34%) of the cases. 8 patients (16%) had diseased mucosa with purulent discharge. A study by Shahizon et al reported the most common findings in nasal endoscopy to be polyps, corroborating our study. 23% of the patients had diseased mucosa with polyps and 9% each had diseased mucosa, mucopus polyps and mucopus diseased mucosa. Hussain and Jaf also in their study reported polyps to be the most common findings. 19

The sensitivity of NDE over CT was 95.6% while the specificity was 80%. The positive predictive value was 97.7% and the negative predictive value was 66.7%. The accuracy of the test was 94%. In a study by Ramadhin et al, the sensitivity was 92.7%, specificity was 91.3%, and positive predictive value was 96.2% and negative

predictive value was $84\%.^{20}\,Kasapoglu$ et al reported the sensitivity to be $93\%.^{21}$

CONCLUSION

Nasal endoscopy is found to be as good as the computed tomography for the diagnosis of chronic rhinosinusitis and can be used on a regular basis for its detection among the patients. CT scan can be restricted to the patients and used only when there is strong clinical suspicion but the endoscopy results are negative. This will help the patients to not be unnecessarily exposed to radiation as well as lessen their economic burden.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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