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CORRELATION OF DIAGNOSTIC NASAL ENDOSCOPY AND CT PNS FINDINGS IN PATIENTS OF CHRONIC RHINOSINUSITIS.

Otorhinolaryngology

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ABSTRACT

Aims : This study was conducted to establish Correlation between DNE and CT findings in Chronic Rhinosinusitis patients and to study the effectiveness and limitations of DNE and CT Findings in assessment of CRS patients. **Materials and methods :** The record of 105 patients of chronic Rhinosinusitis attending OPD in Tertiary Care Centre from August 2022-2024 have been included in this prospective observational study. All participants underwent CT of the nose and PNS, as well as DNE. Statistical analysis of documented findings was done. **Result :** Pearsons correlation coefficient r = 0.570 denoting Significant Correlation was seen between Lund and Mackay CT scoring and Lund and Kennedy endoscopy score. Maxillary sinus was the most common involved sinus, being involved in 89.52% of patients. Frontal sinuses were found to be least involved (18.09%) in our study population. The most common endoscopic finding was mucosal oedema followed by discharge followed by polyp. We conclude that it would be permissible to treat a patient with a clinically assumed diagnosis of CRS before having a paranasal sinus CT scan if they meet guideline symptom criteria and have positive diagnostic nasal endoscopic findings. Patients whose symptoms persist after receiving maximal treatment or who are planning surgery may benefit from sinus imaging.

KEYWORDS

INTRODUCTION

The majority of the world's population is now living with chronic rhinosinusitis, thus there's a pressing need to research effective ways to diagnose and treat this ailment. More than 37 million people get sinusitis every year, making it more common than asthma and heart disease combined, and it has a bigger impact on people's quality of life. [1]

Endoscopy was first performed by Hirschmann in 1903 with the use of a modified Nitze cystoscope, which he used in the nasal cavity and in the maxillary sinus via a tooth socket. In 1922, Speilberg introduced endoscope into the maxillary sinus via the inferior meatus. In 1950, Hopkins, Professor of optics , invented a superior system based on solid glass rods, which is now universally in use. A careful endoscopic examination will reveal disease not visualized by conventional anterior or posterior rhinoscopy.[2]

Computed tomography scanning of the paranasal sinuses has become the gold standard in CRS evaluation and surgical planning.[3] This study was conducted to establish Correlation between DNE and CT findings in Chronic Rhinosinusitis patients and to study the effectiveness and limitations of DNE and CT Findings in assessment of CRS patients.

MATERIALS AND METHODS

The record of 105 patients of chronic Rhinosinusitis attending OPD in Tertiary Care Centre from August 2022-2024 have been included in this prospective observational study at tertiary care centre.

INCLUSION CRITERIA

- Patients >18 years of age
- Patients have provided their consent for the study.
- Patients presenting with nasal obstruction, anterior or posterior nasal discharge , headache, facial pain, and/or abnormalities of smell for more than 3 weeks.

EXCLUSION CRITERIA

- Pregnant and lactating females
- Individuals under the age of 18.
- Patients not consenting to the study
- Individuals who have had previous sinonasal surgery
- Patients with malignancy, cystic fibrosis, autoimmune disease, or immunodeficiency disorder.
- Patients with symptoms for less than 3 weeks.

All participants underwent CT of the nose and PNS, as well as DNE.

CT Scan nose and PNS :

All participants were subjected to non-contrast CT of the nose and PNS and axial and coronal reconstruction images were obtained. Computed tomography of the nose and PNS was then staged with the help of the Lund–Mackay CT scoring system.[4]

Involvement of the paranasal sinuses (frontal, anterior, and posterior ethmoids, sphenoid and maxillary) was evaluated on the basis of opacity and was scored as 0, 1, or 2 for nil, partial, or complete opacification, respectively.

The osteomeatal complex was graded as 1 (no obstruction) or 2 (obstruction present) Bilateral evaluation was done for all, with the final score equivalent of points added from the right and left sides, which fell in a range from 0 to 24.

A Lund–Mackay CT score of 4 or more was defined as the diagnostic evidence of CRS. [4]

All the anatomical variations were also noted, but they did not contribute to the score.

Diagnostic nasal endoscopy (DNE):

Every individual participant was subjected to DNE which was performed after packing the nasal cavity with cotton pledgets soaked in 4% Lignocaine with 1:200,000 adrenaline for 7 to 10 minutes. The endoscopy, comprised of three passes, namely, first, second, and third performed using a 4 mm 0-degree rigid endoscope.

The first pass involved sliding the endoscope along the floor of the nasal cavities from an anterior to posterior direction. The structures examined include:

- The Floor Of The Nose
- Inferior Turbinate
- Meatus
- The Nasopharynx
- Eustachian Tube Orifice
- Torus Tubaris
- Fossa Of Rosenmuller.

In the second pass, the scope is directed along the floor up to the posterior choana. It is then moved upwards, medial to the middle turbinate along the roof of the posterior choana and the anterior surface of the sphenoid,visualising

- Superior turbinate
- Superior meatus
- Sphenoethmoidal recess
- Sphenoid ostium

The third pass involves studying the middle meatus area. The

structures noted,
- relation of the middle turbinate to the lateral wall
- uncinate process
- accessory Ostia if any
- nasopharynx
- concha bullosa
- bulla
- ethmoidalis [5]

The presence or absence of nasal polyps, oedema, and discharge was noted. DNE score was derived according to the Lund-Kennedy endoscopic scoring system. [6]
1) nasal mucosal oedema (0 = absent, 1 = mild to moderate, 2 = polypoid degeneration),
2) secretion (0 = absent, 1 = hyaline, 2 = thick/mucopurulent)
3) polyp (0 = absent, 1 = middle meatus only, 2 = nasal cavity extension).

Final score equivalent to points added from the right and left sides.

A Lund–Kennedy endoscopic score greater than or equal to 2 was defined as the diagnostic evidence of CRS. Descriptive statistical analysis was carried out. Pearson's correlation coefficient was used to find out the correlation between the two scoring systems.

DISCUSSION:

Chronic rhinosinusitis was found to be more common between the age group 36-45 years (28.6%). There was male preponderance in the incidence of chronic rhinosinusitis (55 males and 47 females, 55.2% and 44.8% respectively). Common clinical features of chronic rhinosinusitis were nasal obstruction, rhinorrhea, postnasal discharge, facial fullness/pain and disturbance of smell (hyposmia). Fever, halitosis and fatigue were complained by few patients.

In our study, on radiological evaluation, Maxillary sinus was the most common involved sinus, being involved in 89.52% of patients.

As depicted in Table 1, 38 (36.2%) and 41 (39%) patients had **total opacification right and left maxillary sinuses r**espectively.

38 (36.2%) and 35(33.3%) patients had **partial opacification of right and left maxillary sinuses** respectively. 29(27.6%) and 29(27.6%) patients were **without opacification** of right maxillary sinus left maxillary sinus respectively.

48 (45.7%) and 42 (40%) patients had **no opacification of right and left anterior ethmoid** sinuses respectively. There were 36 (34.3) and 41(39%) patients with **partial opacification of right and left anterior ethmoid sinuses** respectively.21(20%) and 22 (21%) patients had **total opacification of anterior ethmoid sinuses**.

62 (59%) and 56 (53.3%) patients had **no opacification of right and left posterior ethmoid sinuses** respectively.

25(23.8) and 29 (27.6%) patients had **Partial opacification of both right and left posterior ethmoid sinuses.**

18 (17.1%) and 20 (19%) patients had **total opacification of both right and left posterior ethmoid sinuses.**

There were 7 (6.7%) and 19 (18%) patients with complete opacification of right and left **sphenoid sinus** respectively. 23 (21.9%) and 16 (15.2%) patients had partial opacification of both right and left sphenoid sinuses. 75 (71.4%) and 70 (67.7%) patients had no involvement of right and left sphenoid sinuses respectively.

In this study, no opacification of right and left **frontal sinus** was present in 71 (71.6%) and 65 (61.9%) of patients respectively. Partial opacification of both right and left frontal sinus was present in 20 (19%) and 17 (16.2%) of patients. In 14 (13.3%) and 23 (21.9) patients had total opacification of right and left frontal sinuses respectively .

41(39%) and 54 (51.4%) patients out of 105 had complete occlusion of right and left **osteomeatal complex** respectively. 64 (61%) and 51 (48.6%) patients were without occlusion of right and left osteomeatal complex respectively.

As depicted in TABLE 2,
45.71% have total **Lund Mackay radiological score** 0-6
39.04% patients with score 7-12
9.52 % patients have scores 13-18
5.7% have scores in range 19-24.

In a study conducted by Krishna et al, maxillary antrum haziness was seen in 56% and 62% patients on the right and left side respectively. Haziness in anterior ethmoid sinuses was seen in 74% and 70% patients on the right and left respectively. Posterior ethmoid sinus haziness was seen in 38% and 24% patients on the right and left side respectively. Right frontal sinus haziness in 46% and left frontal sinus haziness in 54% patients. Right sphenoid sinus haziness in 24% and Left sphenoid sinus haziness in 16% patients.[7]

On endoscopy, 35(33.3%) and 28 (26.6%) cases had **polyp completely obstructing** right and left nasal cavity respectively.17(16.2%) had polyp **in the middle meatus but not completely obstructing the nose** on right side and 22 (20.9%) on left side. 53 (50.5%) and 55 (52.4%) had **absence of polyp** on right and left side respectively. In 33(31.4%) patients, polyp was present bilaterally.(TABLE 5)

Study by Sweta Lohiya et al found 4% polyps were seen on right, 6 % on left and bilateral in 17 %, with a total of 27 % subjects having polyps. 5 % subjects had polyp confined to middle meatus, and 22 % had polyp beyond middle meatus.[8]

As depicted in TABLE 4, 44 patients (41.9%) had **severe oedema** on right side and 17(16.2%) of patients had severe oedema on left side. 38 patients (36%) had **mild oedema** on right side and 49 patients (46.6%) had mild oedema on left side. 23 patients (21.9 %) and 39 patients (37.1%) had **no oedema** on right and left side respectively. 26(24.8%) patients had oedema (mild or severe) on the right side , while 13 (12.3%) patients had oedema in the left nasal cavity, while 55(52.4%) patients had bilateral oedema. Sweta S. Lohiya, Seema V. Patel and et al. found that oedematous mucosa was seen in 39 % subjects, mild oedema in 10 % and severe oedema in 29 % subjects.[8]

Out of 105, 40 patients (38.1%) and 20 patients (19.04%) had **thick purulent discharge** on right and left side respectively.22 (21%) and 40 (38.09%) patients had **clear, thin discharge** on right and left side respectively. 40(41%) and 45(42.8%) patients were with **no discharge**. In our study, 24(22.85%) patients had discharge (either clear thin or mucopurulent) only on right side, 22 (20.95%) had discharge(either clear thin or mucopurulent) only on left. Bilateral discharge (either clear thin or mucopurulent) in 38 (36.2%) patients. (TABLE 5)

In a study conducted by Krishna et al, discharge was seen in the middle meatus on Right side in 62% patients and on the left side in 54% patients.[7]

The most common endoscopic finding was mucosal oedema followed by discharge followed by polyp in our study.
- **40.95% patients have total endoscopic score 0-4**
- **50.50% patients have total endoscopic score 5-8**
- **10.50%patients have total endoscopic score 9-12 (TABLE 6)**

Mean and SD for total radiological score was 7.96 and 5.626 respectively.
Mean and SD for total endoscopic score was 5.31 and 2.541.
Pearsons correlation coefficient $r = 0.570$, $p < 0.01$
Significant Correlation seen between Lund and Mackay CT scoring and Lund and Kennedy endoscopy score.

Similarly, Caliaperoumel et al reported Lund Mackay scoring has significant correlation with Lund Kennedy Score and was statistically significant. ®= 0.755, p<0.001 [9]. Bulijcik-Cupic MM, Savovic SN et al and Deosthale et al. also found high degree of agreement between endoscopy and CT scan. [10,11]

CONCLUSIONS

Having a standard set of criteria for diagnosing CRS with or without sinonasal polyposis is very helpful clinically and academically. Nasal endoscopy, as an office-based procedure should be used early to enhance diagnostic accuracy in patients who satisfy guideline symptom criteria of CRS. CT was valuable in studying the involvement of various sinuses and their opacification, diagnose disease when endoscopic examinations are inadequate such as when polyps, septal deviation, blockage of the osteomeatal complex, and for anatomical variations like concha bullosa, haller cells, onodi cells.

DNE helps to reduce cost and radiation exposure due to CT utilisation in a large segment of the population being evaluated for CRS. It is less expensive and easily accessible.

Since significant correlation seen between the radiological and endoscopic scores, medical management of a patient can be started with a clinically assumed diagnosis of CRS before having a paranasal sinus CT scan if they meet guideline symptom criteria and have positive diagnostic nasal endoscopic findings. Patients whose symptoms persist after receiving maximal treatment or who are planning surgery may benefit from sinus imaging.

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Declarations:

Patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest:

There are no conflicts of interest.

Table 2: Percentage of patients falling in radiological score categories.

Total radiological score	Number of patients	Percentage
0-6	48	45.71%
7 to 12	41	39.04%
13-18	6	5.71%
19-24	10	9.52%

Table 6: Endoscopic scores

Total endoscopic score	Number of patients	Percentage
0-4	43	40.95%
5 to 8	51	50.50%
9 to 12	11	10.50%
	105	

Fig 1. Coronal section of CT Scan showing Right DNS, Left concha bullosa , Partial opacification of Bilateral maxillary sinuses .

Fig 2 .Polyp seen in the middle meatus on diagnostic nasal Endoscopy .

Fig. 3 . Middle turbinate hypertrophy seen on diagnostic nasal endoscopy.

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