MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.9.134.138

OPEN ACCESS

Key Words
Rhinosinusitis, considerable, investigative

Corresponding Author
B.K. Noorjihan,
Department of Otorhinolaryngology, Sree Mookambika Institute of Medical Sciences, Kulasekharam, Tamil Nadu, India
noorjihan11gvmc@gmail.com

Author Designation
[1]Assistant Professor
[2,3,4]Final year postgraduate
[5]Second year postgraduate
[6]First year postgraduate

Received: 10 June 2024
Accepted: 9 August 2024
Published: 12 August 2024

Citation: Lyra Joy, B.K. Noorjihan, Dayana Babu, V. Deepak Rajadurai, P.S. Raajan and S. Asmitha, 2024. Comparative study between diagnostic nasal endoscopy and CT Paranasal sinus in chronic rhinosinusitis in a tertiary care centre. Res. J. Med. Sci., 18: 134-138, doi: 10.36478/makrjms. 2024.9.134.138

Comparative Study Between Diagnostic Nasal Endoscopy and CT Paranasal Sinus in Chronic Rhinosinusitis in a Tertiary Care Centre

[1]Lyra Joy, [2]B.K. Noorjihan, [3]Dayana Babu, [4]V. Deepak Rajadurai, [5]P.S. Raajan and [6]S. Asmitha
[1-6]Department of Otorhinolaryngology, Sree Mookambika Institute of Medical Sciences, Kulasekharam, Tamil Nadu, India

ABSTRACT
Chronic Rhinosinusitis (CRS) is a chronic inflammation of nasal and paranasal sinus mucosa that affects the quality of life and causes considerable treatment costs. India is a country where almost 15% of the population is suffering from chronic rhinosinusitis. Computed Tomography scan of paranasal sinuses and diagnostic nasal endoscopy (DNE) are the two commonly used investigative modalities for chronic rhinosinusitis. The objective of this study is to compare the computed tomographic findings to the nasal endoscopy findings in patients with chronic rhinosinusitis. This study aims to compare CT PNS and DNE in chronic rhinosinusitis. 50 Patients attending ENT OPD, Sree Mookambika Institute of Medical Sciences, Kulasekharam with any sino-nasal complaints lasting for more than 12 weeks and not responding to medical line of management. Patients are selected by random sampling method. Patients were evaluated with CT scan and DNE. The most common age group found among the patients is 30-45 yrs (42%). Middle meatal purulent secretions are the most obvious finding in clinical evaluation seen in 33 (66%) cases. Maxillary sinus haziness is seen in 41 (82%) cases on CT scan with majority of cases showing associated sinus involvement. Thereby indicating that in all patients with chronic rhinosinusitis both CT scan and DNE has to be done, to know the exact pathology and to plan for further management. Both CT scan and DNE are complimentary to each other.

INTRODUCTION

Chronic Rhinosinusitis (CRS) is a chronic inflammation of nasal and paranasal sinus mucosa that affects the quality of life and causes considerable treatment costs[1]. India is a country where almost 15% of the population is suffering from chronic rhinosinusitis[2], Computed Tomography (CT) scan of paranasal sinuses and diagnostic nasal endoscopy (DNE) are the two commonly used investigative modalities for chronic rhinosinusitis. With the increased use of endoscopy for the evaluation and surgical treatment of paranasal sinus disease, attention is now directed towards the analysis of the lateral nasal wall and paranasal sinus anatomy. During foetal development, the paranasal sinuses originate as invaginations of the nasal mucosa into the lateral nasal wall, frontal, ethmoid, maxilla and sphenoid bones[3]. Infection of these sinuses is of the most common causes of patients to visit the otorhinolaryngologist.

Chronic rhinosinusitis (CRS) is characterized by symptoms including facial pain or pressure, facial congestion or fullness, nasal obstruction/blockage, nasal discharge, reduced or loss of smell, bad breath, fatigue, dental pain lasting for more than 12 weeks. The diagnosis of CRS for a long time has been based on clinical history of the nasal disease and physical examination alone. However, many complementary tests are required to come to the final diagnosis. The advent of the nasal endoscope has emphasized the importance of nasal endoscopy in CRS and imaging of the nose and paranasal sinuses have complemented the evaluation of diseases of the nose and paranasal sinuses. Routine use of a nasal endoscope and computed tomographic scanning (CT scan) of the nose and paranasal sinuses has opened new vistas in peeping into the inaccessible areas and niches of fronto-ethmoidal complex, sphenoethmoidal recess and sphenoid sinuses. Nasal endoscopy may help to identify the small lesions or anatomical variation which is undetected clinically or conventional radiography. It is always necessary to have a more objective methodology or investigative protocol for precised diagnosis and decision making. The CT scan paranasal sinus is considered as a gold standard diagnostic test for CRS[4]. Computerized Tomography (CT) provides essential preoperative information and aims to delineate the extent of the disease, define any anatomical variants and relationship of the sinuses with the surrounding important structures.

Objective:

- To evaluate the role of nasal endoscopy and computed tomography scan in diagnosis of CRS
- To compare the CT findings with endoscopic findings in patients with chronic rhinosinusitis
- To compare the mucosal edema in both the investigative modality
- To compare the anatomical variants in CT and DNE
- To compare which is a better in diagnosis or if both are needed.

MATERIALS AND METHODS

A prospective study done on 50 patients presenting with clinically diagnosed CRS in the department of Otorhinolaryngology and Head and Neck surgery, Sree Mookambika Institute of Medical Sciences, Kulasekharam, Tamil Nadu, during 6 months between January 2023-June 2023 study period. Informed consent was taken from each participant in the study.

Inclusion Criteria:

- Patients presenting with complaints like headache, nasal obstruction not responding to medical treatment for >12 weeks.
- Patients whose diagnosis is been established by CT PNS or DNE are investigated for the other modalities.
- Chronic inflammatory disease of Para-nasal sinuses.

Exclusion Criteria:

- Patients with acute attack of sinusitis.
- Patient with sinus malignancies which are confirmed with histopathology.
- Patients who are not willing to get CT PNS or DNE done.

The cases selected for the study were subjected to detailed history taking and examination. A routine haemogram (Hb%, TC, DC, BT, CT) and urine

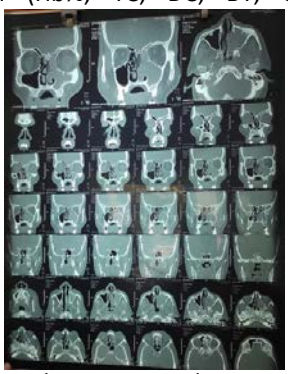

Fig. 1: CT PNS showing AC polyp arising from the left maxillary sinus

Fig. 2: DNE showing chronic rhinosinusitis with nasal polyp

Table1: Age distribution

Age (in years)	No. of patients	Percentage (%)
0-15	14	28
15-30	10	20
30-45	21	42
45-60	3	6
60-75	2	4
Total	50	100

Table 2: Sex distribution

Sex	No. of patients	Percentage (%)
Male	35	70
Female	15	30
Total	50	100

Table 3: Symptoms

Symptoms	No. of patients	Percentage (%)
Headache	40	80
Nasal obstruction	38	76
Nasal discharge	25	50
Post nasal discharge	21	42
Sneezing	15	30
Epistaxis	11	22
Others	7	14

Table 4: Signs on clinical examination

Signs	No. of patients	Percentage (%)
Nasal mucosa: congested	13	26
Nasal mucosa: pale	11	22
Nasal mucosa: edematous	8	16
Inferior turbinate hypertrophy	19	38
Middle turbinate hypertrophy	8	16
Middle meatus: non-purulent	14	28
Middle meatus: purulent	33	66
Nasal polyps	11	22
Sinus tenderness	15	30
Deviated nasal septum	31	62

Table 5: Comparative findings in CT and DNE of nasal cavity

Findings	Diagnostic nasal endoscopy				Computed tomography findings			
	Right	%	Left	%	Right	%	Left	%
Septal deviation	31	62	30	60	30	60	31	62
Uncinate attachments: to lamina papyracea	-	-	-	-	37	74	35	70
Uncinate attachments: to middle turbinate	15	30	16	32	15	30	16	32
Uncinate attachments: to skull base	-	-	-	-	10	20	10	20
Middle meatus secretions	26	52	29	58	-	-	-	-
Maxillary ostium patency	19	38	21	42	21	42	21	42

Table 6: Comparative findings in CT and DNE in relation to anatomical variant

Findings	Diagnostic nasal endoscopy				Computed tomography findings			
	Right	%	Left	%	Right	%	Left	%
Pneumatized uncinate	-	-	-	-	3	6	1	2
Aggernasi	9	18	11	22	9	18	12	24
Haller or infraorbital cells	-	-	-	-	7	14	5	10
Onodi or sphenoethmoidal cells	-	-	-	-	3	6	1	2
Accessory maxillary ostium presence	19	38	5	10	-	-	-	-
Middle turbinate paradoxical	1	2	4	8	1	2	4	8
Middle turbinate concha bullosa	22	44	14	28	30	60	16	32

Table 7: Comparative findings of CT and DNE of mucosal changes and other pathological conditions.

Findings	Diagnostic nasal endoscopy				Computed tomography findings			
	Right	%	Left	%	Right	%	Left	%
Middle turbinate hypertrophy	15	30	13	26	14	28	11	22
Inferior turbinate hypertrophied	32	64	30	60	31	62	28	56
Polyp	21	42	15	30	19	38	11	22
Frontal sinus haziness	NV	0	NV	0	15	30	14	28
Anterior ethmoidal cell haziness	NV	0	NV	0	31	62	29	58
Maxillary sinus haziness	NV	0	NV	0	41	82	40	80
Sphenoid sinus haziness	NV	0	NV	0	10	20	9	18
Posterior ethmoidal sinus haziness	NV	0	NV	0	21	42	19	38

Table 8: Diagnosis

Diagnosis	Number of patients	Percentage
Chronic rhinosinusitis	33	66
Fungal rhinosinusitis	8	16
Allergic rhinitis	11	22
Ethmoidal polyp	15	30
AC Polyp	6	12
Frontoethmoidal mucocele	1	2
Deviated nasal septum	31	62
Atrophic rhinitis	3	6

examination, swab from middle meatus for culture and sensitivity were done for the patients. All the patients in active stage of the disease were treated with course of suitable antibiotics, systemic antihistamines and local decongestants. Each patient underwent a systematic DNE and CT of nose and para-nasal sinuses.

RESULTS AND DISCUSSIONS

Most of the patients age group was between 30-45 years, least being >60 years (Table 1). Males were more common than females (70%) (Table 2).

Middle meatel purulent secretions are the most obvious finding in clinical evaluation seen in 33(66%) cases (Table 4). But uncinate attachment was consistent both on DNE and CT scan. Paradoxical middle turbinate was most consistent anatomical variant in CT as well as DNE (Table 6). Table 7 shows nasal mucosal changes are better visualized on endoscopy such as Inferior turbinate hypertrophy, pale inferior turbinate, middle turbinate hypertrophy whereas paranasal sinus changes are better appreciated on CT PNS such as haziness of sinuses. Maxillary sinus haziness is seen in 41 (82%) cases on CT scan with majority of cases showing associated sinus involvement.

In this study we found that majority of the patients affected were belongs to the age group between 30-45 years and we could infer that this age group is more exposed to the environment and recurrent upper respiratory tract infections. Among the study population, 70% of the patients were males.

In the current study, we observed that headache and nasal obstructions were the commonest symptoms occurred in the patients. Nasal discharge, sneezing and post nasal drip were also observed among the patients. Epistaxis was the least noted symptoms among the patient group. Most of the symptoms had lasted for >3 months. Similar findings were noted in the study conducted by Gautam[5]. They found that 84% of the patients in their study population had both a headache and nasal obstruction and nearly 70% cases had nasal discharge[5]. The current study also revealed that nasal septum deviation was the most common sign among the people with CRS followed by purulent middle meatal discharge. Other signs like hypertrophied inferior turbinate, congested nasal mucosa, non-purulent discharge and sinus tenderness were also noted among the recruited patients.

The septal deviation was one of the most common variations in both CT and DNE observed in our study. In the current study, we observed that the proportion of attachment of uncinate process to middle turbinate on right and left was same in DNE and CT. The uncinate process on DNE was commonly attached to the lamina papyracea (74% on the right and, 70% on the left), followed by the middle turbinate (30% on the right and 32% on the left).

The mucopurulent secretions in the middle meatus are seen in DNE, in which 52% cases had bilateral secretions, while it was not visualized in CT. Similarly, the study conducted by Patel *et al* could not visualize the mucopurulent secretions in the middle meatus and it was seen in DNE[6]. From the above studies, it is clear that middle meatal secretions cannot be visualized with CT scan., DNE is required to assess meatal secretions and mucosal changes.

Maxillary ostium patency clearly visualized in both CT and DNE. However, there was some difference in the percentage of right and left patency. In our study maxillary sinus patency in 42% on both right and left in CT and 38% on rights and 42% on left in DNE.

As far as the anatomical variation is concerned, the CT could visualize only 6% pneumatised uncinate. The Onodi or sphenoethmoidal air cells only visualised in CT scan and could not visualize in DNE. The middle turbinate concha bullosa and paradoxical turbinate had different findings in DNE and CT.

The current study showed that the middle turbinate hypertrophy was commonly seen in cases with allergic rhinitis. In DNE, 30% had middle turbinate hypertrophy on the right side and 26% on left side whereas in CT it was 28% and 22% right and left respectively. The condition of mucosa whether it is pale, congested or edematous could be clearly detected with DNE whereas CT scan could not detect mucosal changes in our study. The current study also identified that DNE is more accurate for detecting mild polyposis and CT scan detect only extensive polyposis[7]. In the study conducted by Duarte, *et al* number of nasal polyposis were evidenced in DNE but not in CT[8]. Evidence from both studies indicates that nasal polyps are visualized more in DNE when compared to CT. In our study, we noted that Sinus haziness could visualize only with CT scan and not with DNE.

CONCLUSION

From the current study, it is concluded that CRS has a higher preponderance in male patients and is commonly seen in the age group of 30-45 years. CT scan has got a better advantage compared to DNE in detecting the anatomical variations as well as to know the condition of the sinus cavity and the extent of disease in sinuses. DNE can prove to be a better diagnostic modality compared to CT scan when conditions like middle meatal secretions, the condition of the mucosa, polyps are looked for. It is mandatory to do both CT scan and DNE in patients with chronic sinusitis, those who are planned for functional endoscopic sinus surgery. Both CT scan and DNE are complimentary to each other in the diagnosis of CRS.

Nasal endoscopy should be performed in all patients who meet diagnostic criteria of chronic rhinosinusitis as an early diagnostic tool as it has an advantage of being harmless, no radiation exposure, less cost, less time consuming and is an OPD based procedure[9]. CT scan should be performed in all patients who are being

diagnosed by endoscopic findings as it helps in further management by diagnosing the extent of disease where nasal endoscopy has limited visualization and can also give 3D imaging of structures[9]. CT PNS is the road-Map for surgery in sinus diseases. Both diagnostic nasal endoscopy and CT PNS are important for preoperative evaluation in detecting pathology and both are complementary to each other[9].

REFERENCES

1. Bhattacharyya, N., 1999. Computed tomographic staging and the fate of the dependent sinuses in revision endoscopic sinus surgery. Arch. Otola Head amp Neck Surg., 125: 994-999.
2. Kirtane, M.V., 1991. Functional endoscopic sinus surgery (A preliminary study). Indian Jour Otol., 43: 126-129.
3. Dwivedi and K.K. Singh, 2010. CT of the paranasal sinuses: normal anatomy, variants and pathology. J Opto Biom Mat., 2: 281-289.
4. Zinreich, S.J., 1997. Rhinosinusitis: radiologic diagnosis. Otola Head Neck Surg., 117: 27-34.
5. Lohiya, S.S., S.V. Patel, A.M. Pawde, B.D. Bokare and P.T. Sakhare, 2016. Comparative study of diagnostic nasal endoscopy and ct paranasal sinuses in diagnosing chronic rhinosinusitis. Indian J. Otola Head amp Neck Surg., 68: 224-229.
6. Deosthale, N.V., S.P. Khadakkar, V.V. Harkare, P.R. Dhoke, K.S. Dhote, A.J. Soni and A.B. Katke, 2017. Diagnostic accuracy of nasal endoscopy as compared to computed tomography in chronic rhinosinusitis. Indian J. Otola Head amp Neck Surg., 69: 494-499
7. Zojaji, R., S. Naghibi, M.K. Hesari and A.H. Hashemi, 2008. Sinus CT scan and Functional Endoscopic Sinus Surgery findings in chronic sinusitis: A Comparative Study. Iranian J Radiol., Vol. 5, No. 1.
8. Duarte, A.F., R.D. Soler and F. Zavarezzi, 2005. Nasal endoscopy associated with paranasal sinus computerized tomography scan in the diagnosis of chronic nasal obstruction. Braz. J. Otorh., 71: 361-363.
9. Kumar, M., V. Satyarthy and R.P. Thakur, 2021. Diagnosing Chronic Rhinosinusitis: A Comparative Study between Diagnostic Nasal Endoscopy and Computed Tomographic Scan Paranasal Sinuses. Inter Jou Toxi Pharm Res., 11: 121-127.