



A COMPARATIVE STUDY OF CHRONIC RHINOSINUSITIS EVALUATION BETWEEN CASES UNDERGOING CT SCAN OF PARANASAL SINUSES AND DIAGNOSTIC NASAL ENDOSCOPY

Dr Janhvi Alekar

Prof(Dr).Rajendra
Singh Rajput

ABSTRACT **Aim:** To correlate the clinical findings in Diagnostic Nasal Endoscopy and CT PNS of patients with Chronic Rhinosinusitis. **Methodology:** A total of 52 patients presenting with clinical manifestation of various types of sino nasal diseases were subjected to diagnostic nasal endoscopy along with CT PNS and the findings were analyzed in a prospective analytical study. Patient having history of previous surgery, age <15 or >60 years, facial trauma were excluded. **Result:** Deviated nasal septum was seen in 44 cases on DNE and in 42 cases on CT PNS. Similarly, some of the features like accessory maxillary sinus ostium, middle meatus polyp, paradoxical middle turbinate were seen equally well in both DNE and CT. However, some of the conditions like inferior turbinate hypertrophy, polypoidal inferior turbinate and middle meatus secretions were better diagnosed on DNE. Conversely, Haller cells, frontal recess findings, sphenoid sinus finding were only visualized on CT. **Conclusion:** Diagnostic nasal endoscopy has several advantages over CT PNS but couldn't totally replace the importance of CT PNS which acts as a roadmap for the management of various chronic Rhinosinusitis.

KEYWORDS : DNE, CT scan, CRS

INTRODUCTION:

Chronic Rhinosinusitis (CRS) is a common disease that affects the quality of life and causes considerable treatment costs. Although it is a frequently encountered disease affecting nearly 50 million individuals worldwide every year, its diagnosis and treatment still poses a challenge [1]. According to the diagnostic guidelines by the Rhinosinusitis Task Force of the American Academy of Otolaryngology, Head and Neck Surgery (AAO-HNS) and revised by the Sinus and Allergy Health Partnership (SAHP), Chronic Rhinosinusitis is diagnosed by clinical symptoms and signs which are divided into minor and major criteria [2,3].

The major symptoms of Chronic Sino nasal diseases according to Task Force Criteria include facial pressure or pain, nasal obstruction, nasal discharge or purulence on examination, fever and hyposmia or anosmia. The minor symptoms include headache, halitosis, fatigue and dental pain.

The bacterial biofilms probably play a significant role in the disease process. It is a common condition in medical practice, which affects many people worldwide and its prevalence is increasing day by day [4,5].

During fetal development, the paranasal sinuses are formed by invagination of the nasal mucosa into the lateral nasal wall, ethmoid, frontal, maxilla and the sphenoid bones.

Computed tomography (CT) is an excellent means of providing sinonasal anatomical information, assessing disease extent, assisting endoscopic evaluation and guiding treatment [6].

Messerklinger (1978) showed that the infundibulum and the middle meatus area are most commonly affected by anatomical variations that compromise ventilation and mucociliary clearance, Messerklinger developed a systemic endoscopic approach for diagnosis and treatment of CRS. (Messerklinger et al 1978)

Cold light nasal endoscopy along with computed tomographic scanning (CT scan) has led to opening of new scope to access the hidden areas of fronto ethmoid complex and sphenoid sinus [7].

In this study, we have compared the diagnostic nasal endoscopic findings and CT findings of the patients with para nasal sinus diseases and elaborated the importance of both.

AIMS AND OBJECTIVE:

To correlate the clinical findings in Diagnostic Nasal Endoscopy and CT PNS of patients with sino nasal diseases.

OBJECTIVES:

- To do rigid nasal endoscopy and Computed tomography of patient.

- To do and compare nasal endoscopy and computed tomography findings of the patient.
- To document anatomical variants in sinonasal anatomy in patient undergoing Computed tomography and nasal endoscopy.

Methodology:

This was a prospective hospital based comparative study. Ethical approval was obtained from ethical committee of the institution. A total of 52 patients at Department of Otorhinolaryngology at Index Medical College Hospital and Research Center, Indore presenting with clinical manifestations of various sinonasal diseases were subjected to Diagnostic nasal endoscopy along with CT PNS and findings were analyzed.

Inclusion Criteria:

- Patients presenting with Chronic Rhinosinusitis
- The data is collected on the basis of detailed history, systemic examination, ENT examination and investigations.

Exclusion Criteria:

- Age Criteria :- Less than 15 years and More than 60 years
- Nasopharyngeal tumor or carcinoma
- Intracranial complication and tumour

Once the diagnosis and extent of the disease is established, Informed written Consent was obtained from all patients.

The patients were taken up for Nasal endoscopy & CTPNS

Condition of nasal mucosa, septum, & turbinates were assessed and along with it condition of the nasopharynx and Eustachian tube opening.

For the presence of mucopus or polyp in the middle meatus/sphenoethmoidal recess/nasopharynx.

Also, any co-existing anatomical variations of the lateral wall of the nose will be noted and finding were correlated with CT PNS.

Statistical Analysis

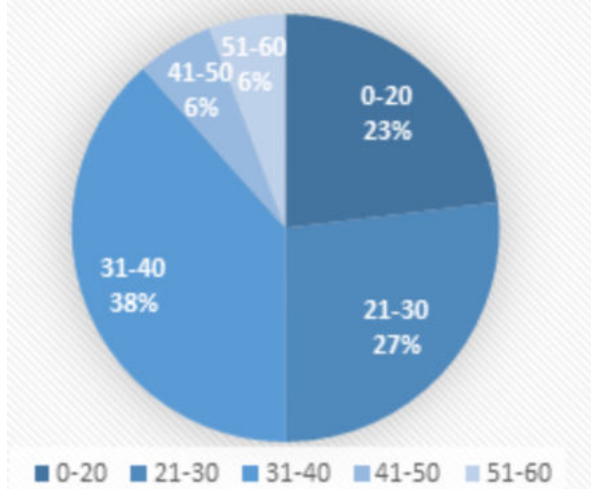
All the data analysis was done using IBM SPSS version 2.0 Software. Cross tabulation and frequency distribution was used to prepare tables. Microsoft office 2013 was used to prepare the graphs. Paired sample t test was used to compare the mean where as categorical data was compared using Chi square test. Level of significance was assessed at 5%.

OBSERVATIONS AND RESULTS:

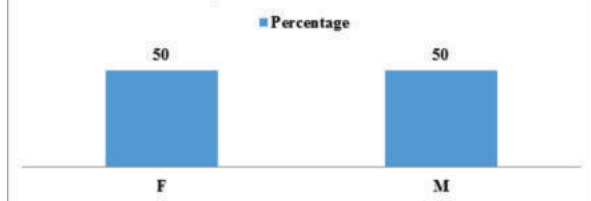
In our study a total of 52 patient data was collected and analyzed with findings of CT PNS and DNE, which showed maximum subject fall in category of 31-40 year age group while minimum subjects belonged to 51-60 year age group and also in 41-50 years age group. The gender

distribution however was that of equal number of male and female subjects. The observations were tabulated and analyzed.

Graph 1: Age Distribution

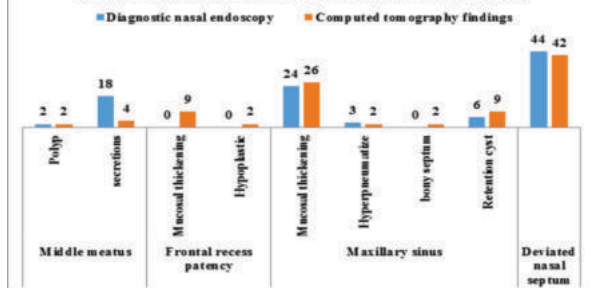


Graph 2: Gender distribution



There were equal number of males and females in present study that is 26 (50%) each.

Graph 3: Comparative findings in CT and DNE of nasal cavity



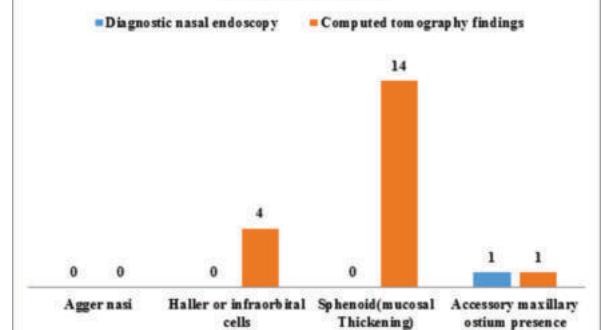
In our study we could find Deviated nasal septum in 44 cases while doing DNE whereas only in 42 cases on CT scan. While Mucosal thickening of Maxillary sinus was well appreciated in 26 cases on CT scan compared to 24 cases on DNE. However mucoid secretions were noted in 18 cases on DNE while only in 4 cases on CT scan.

Table 1: Comparative Findings In CT And DNE In Relation To Anatomical Variant.

Findings	Diagnostic nasal endoscopy	Computed tomography findings
Uncinate process		
Pneumatization	0	3
Hypertrophy	3	0
Paradoxical	1	1
Polypoidal	2	0
Agger nasi	0	0
Haller or infraorbital cells	NV	4
Sphenoid(mucosal Thickening)	NV	14
Accessory maxillary ostium presence	1	1
Middle turbinate		
Paradoxical	3	3
Concha bullosa/hypertrophy	22	27
Inferior turbinate		
Hypertrophy	22	15
Polypoidal	02	00
Atrophy	02	02

Findings of anatomical variant using CT and endoscopy revealed that uncinate process consistent in both the findings, however two patients had polyp in endoscopy compared to none in the CT findings. Accessory maxillary sinus ostium presence and paradoxical middle turbinate also consistent between two modalities whereas more patients had middle turbinate concha bullosa in CT findings (n=27) as compared to endoscopy (n=22). Endoscopy has revealed more patients to have inferior turbinate hypertrophy (n = 22) as compared to CT findings (n = 15).

Graph 4.1: Comparative findings in CT and DNE in relation to anatomical variant.



Graph 4.2: Comparative findings in CT and DNE in relation to anatomical variant.

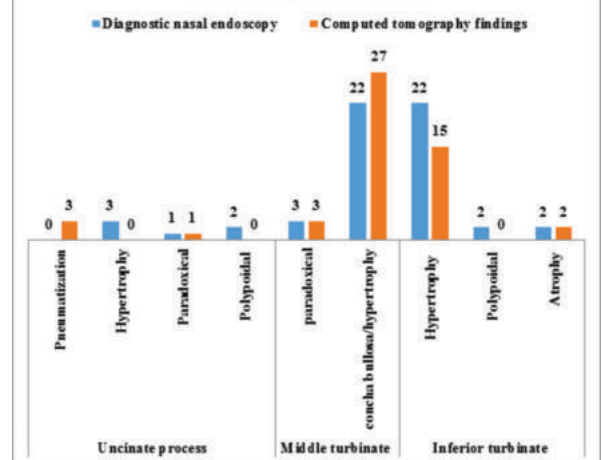


Table 5: Comparative Findings Of CT And DNE Of Mucosal Changes And Other Pathological Conditions.

Findings	Diagnostic nasal endoscopy	Computed tomography findings
Middle turbinate hypertrophy	17	4
Inferior turbinate		
Atrophy	2	2
Hypertrophy	23	13
Polyp	2	2
Benign nasal growth	0	0
Frontal sinus opacity	NV	9
Anterior ethmoidal cell haziness	NV	14
Maxillary sinus mucosal thickening	NV	40
Sphenoid sinus mucosal thickening	NV	14
Posterior ethmoidal sinus mucosal thickening	NV	6

Comparison between CT and DNE for mucosal changes and other pathological conditions revealed that middle turbinate hypertrophy was better diagnosed in endoscopy (n=17) as compared to CT (n=4). Similarly, inferior turbinate hypertrophy was better diagnosed in endoscopy (n=23) as compared to CT findings (n=13).

Deviated nasal septum was seen in 44 cases on DNE and in 42 cases on CT PNS. Similarly, some of the features like accessory maxillary sinus ostium, middle meatus polyp, paradoxical middle turbinate were seen equally well in both DNE and CT. However, some of the conditions like inferior turbinate hypertrophy, polypoidal inferior turbinate and middle meatus secretions were better diagnosed on DNE. Conversely, Haller cells, frontal recess findings, sphenoid sinus finding were only visualized on CT.

DISCUSSION:

With the help of CT scanning and nasal endoscopy it may be possible to have an access and visualization of the niches and narrow spaces of the para nasal sinuses.

Osteomeatal complex is the key area in which maxillary sinus drains through its ostium inferiorly and frontal sinus through frontal recess superiorly.

Any anatomical variation or pathology in the narrow area of infundibulum is likely to clog the sinuses and lead to malventilation. The presence of narrow spaces also precludes establishing of close contact of opposing mucosal surfaces which in turn hinder the normal flow of mucous blanket. Consequent to impaired ciliary mobility the stagnant mucus blanket acts as nidus for infection. A vicious cycle of congestion, mucosal oedema, resultant mechanical pressure and / or narrowing of ostia and malventilation may set in consequently. Depending upon the state of anatomical disposition and pathology the patient may present with frank disease or manifest as nasal discomfort, fullness or headache.

Rhinosinusitis is a broad diagnostic term that encompass a spectrum of disorders involving concurrent inflammation of the mucosa of the nose and paranasal sinuses [8]. Past attempts at defining Rhinosinusitis have been purely symptom based. Approximately 87 % of visits for the diagnosis and management of Rhinosinusitis are in the primary care setting where nasal endoscopy and computed tomography (CT) imaging are not routinely used for diagnosis. Consequently, a variety of national and international consensus meetings have developed symptom based definitions for the initial diagnosis of Rhinosinusitis [9]. (Lanza DC 1997, Kaliner MA, 1997, Fokkens W 2005).

In present study maximum patients were in the age group of 31-40 years [20 (38.5%)]. Study done by Tegnoor et al reported that most of the patients age group was between 20-40 yrs, least being >60 yrs [10]. In study with 45 patients the majority of patients is in the age group of 20 to 40 years. This age group is predominant because they are more exposed to the environment, recurrent upper respiratory tract infections, irregular check-up and treatment. (Sheetal D 2011) Mean age of study cohort in present study was 31.33±11.36 years (Range 08- 60) which is in agreement to the study done by Naghibi et al who included 51 patients and found mean age of the patients as 33 years.[11] Bohra et al studied the etiopathogenesis of chronic nasal obstruction evaluating with help of CT and endoscopic findings reported that among 50 cases of chronic nasal obstruction highest incidence were found in 3rd decade of life i.e. 16 cases (32%) followed by 4th (20%) and 5th (18%) decade. (Bohra R 2016)

In present study there were equal number of male and female [26 (50%) in each]. However study done by Tegnoor et al reported that males were more common than females [10]. In a similar study by Sheetal et al reported male preponderance (62%). (Sheetal D 2011) The study of Naghibi et al there are 35 male (69%) and 16 female (31%) [11]. Though present study have shown equal distribution of the gender, others have reported male preponderance. In a similar study by Bohra et al reported that male were preponderance i.e. 29 (58%) males and 21 (42%) were female with male to female ratio 1.38:1 [12]. (Bohra R 2016).

Bohra et al also found that comparing the findings of DNE and CT PNS no significant statistically correlation seen between them which shows there is close association between the findings of endoscopy and CT scan [12]. In study by Priyanjal Gautam et al reported that (Pokharel M 2013) among the parameters that were correlated, CT scan PNS was found to be most sensitive investigation for middle meatus 89.28%, frontal recess 88%, middle turbinate 87%, hiatus semilunaris 86.66% and both sphenoethmoid recess and bulla ethmoidalis 80% respectively. The specificity of CT scan PNS for middle meatus was 90.90%, hiatus semilunaris 90%, sphenoethmoid recess 89%, both bulla ethmoidalis and middle turbinate 84% and frontal recess 80% respectively.

Concha Bullosa -

The definition of concha bullosa used in various studies is the main reason for this variation. In present study we defined concha bullosa as presence of any kind of air cell in middle turbinate. Accordingly concha bullosa was seen in 64 (61.53%) cases. It was bilateral in 30 (28.85) cases, on right side in 22 (21.15%) cases, and on left side in 12 (11.54%) cases.

CONCLUSION:

Present study findings has revealed that sino nasal pathology has male preponderance and is mainly observed in patients who were in second to fourth decade of their life. CT scan has got a better advantage in detecting the anatomical variants, also in condition of sinus cavity and the extent of disease in sinuses as compared to DNE.

DNE proved to be a better diagnostic modality compared to CT scan when conditions like condition of mucosa, middle meatus secretions, mucosal contact point and polyps are looked for. Thereby indicating that in all patients with sino nasal disease both DNE and CT scan has to be done, to know the variation in anatomy, exact extent of pathology and to plan for further management. Both DNE and CT scan are complimentary to each other and serve as roadmap for further surgical management.

REFERENCES:

- Battacharyya N. Computed tomographic staging and the fate of dependent sinuses in revision endoscopic sinus surgery. Arch Otolaryngol Head Neck Surg. 1999;125:994-999. doi: 10.1001/archotol.125.9.994.
- Lanza DC, Kennedy DW (1997) Adult rhinosinusitis defined. Otolaryngol Head Neck Surg 117: 1-7.
- Benninger MS, Ferguson BJ, Hadley JA (2003) Adult chronic rhinosinusitis: Definitions, diagnosis, epidemiology and pathophysiology. Otolaryngol Head Neck Surg 129: 1-32.
- Duarte AF, Soler Rde C, Zavarezz F (2005) Nasal endoscopy associated with paranasal sinus computerized tomography scan in the diagnosis of chronic nasal obstruction. Rev Bras Otorhinolaringol (Engl Ed) 71: 361-363.
- Jones NS (2002) CT of the paranasal sinuses: A review of the correlation with clinical, surgical and histopathological findings. Clin Otolaryngol Allied Sci 27: 11-17.
- Amit N D Dwivedi (2010) CT of the Paranasal sinus: Normal Anatomy, variants and pathology. Journal of Optoelectronics and Biomedical Methods 281-289.
- Eli o Meltzer (2004) Rhinosinusitis: Establishing definitions for clinical research and patient care. Otolaryngol Head Neck Surg. 2004 Dec;114(6):155-212.
- Fokkens W, Lund V, Mullol J; European Position Paper on Rhinosinusitis and Nasal Polyps group. European position paper on Rhinosinusitis and nasal polyps 2007. Rhinol Suppl. 2007;20:1-136.PMID: 174844873
- Donald C. Lanza, David W. Kennedy; Adult Rhinosinusitis defined. Otolaryngol-Head and Neck Surg. 1997 Sep;117(3 Pt 2):S1-S7. doi:10.1016/s0194-5998(97)70001-9.
- Tegnoor MS, George JW, George W, Joshi R. Comparative study between diagnostic nasal endoscopy and computed tomography of PNS in sinonasal disease. Int J Otorhinolaryngol Head Neck Surg 2017;3:972-8.
- R Zojaji, S Naghibi; Comparative evaluation of preoperative CT scan and intraoperative endoscopic sinus surgery findings in patients with chronic Rhinosinusitis. 2008. Iranian Journal of radiology 5(2), 77-82.
- R Bohra, R Pastapurkar. A Comparative Study between nasal endoscopy and CT PNS in evaluation of chronic nasal obstruction. MedPulse- International Medical Journal. April 2016;3(4):379-32.