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DIAGNOSTIC ACCURACY OF NASAL ENDOSCOPY AS COMPARED TO COMPUTED TOMOGRAPHY IN CHRONIC RHINOSINUSITIS: A PROSPECTIVE STUDY

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Abstract:

Background: Chronic rhino sinusitis is a common disease that affects the quality of life and causes treatment costs. Although it is frequently encountered disease affecting nearly 50 million individuals every year in india, its diagnosis and treatment still poses a challenge. This aim of the present study is to "Diagnostic Accuracy Of Nasal Endoscopy As Compared To Computed Tomography In Chronic Rhinosinusitis"

Methods: By simple random sampling method 100 subjects were included. Each patient underwent a systematic diagnostic nasal endoscopy and computed tomography of nose and Para nasal sinuses. Obtained values are subjected to statistical analysis.

Results:obtained results were interpreted in the percentages. Benign nasal growth on right is seen in 8(16%) cases both in DNE and CT and 6(6%) cases have benign growth on left side in both DNE and CT. The integrity of bone such as erosions, expansion or dehiscence is only visualized using CT scan.

Conclusion: Endoscopy is valuable diagnostic test in indivuals with symptoms of CRS.It can be used as a predictor of sinus disease to confirm the diagnosis and to know the severity of the disease.Endoscopy helps in the initiation of Medical management of CRS

Clinical significance : CT scan should be reserved to those who are not responding to medical treatment and need surgical intervention. This will reduce monetary burden over patient and prevent unnecessary radiation exposure.

Introduction:

In clinical medicine, diagnosis is an important aspect to get a clue to cure the disease.In the Year 1997,criteria for diagnosis of chronic rhino sinusitis were developed by American Academy Of Otorhinolaryngology-Head and Neck surgery according to the guidelines of American academy of Otorhinolaryngology-Head and Neck surgery published in 2007, a combination of symptoms

criteria and objective findings are required for diagnosis of Chronic rhino sinusitis. A positive diagnosis of Chronic rhino sinusitis was defined as complaints of 2 or more maior criteria and 2 or more minor criteria lasting for a period of 12weeks or longer. In addition obiective measures. such as evidence of nasal polyps or purulent mucous in middle meatus or ethmoid region on nasal endoscopy or radiological evidence of paranasal sinus inflammation are also recommended. [1]

The management and diagnostic modalities of sinonasal pathologies have undergone a drastic change in the past two decades. These dramatic changes initiated by the pioneering studies of Messerklinger, in which he demonstrated that each sinus has a predetermined mucociliary clearance pattern draining towards its natural ostium irrespective of additional openings that may have been created into the sinuses[2] . This philosophy of opening the natural ostium of the diseased sinus was popularized by Stammberger[3] and Kennedy[4]. ESS is now accepted as the surgical management of choice of chronic sinusitis.

Nasal endoscopy helps in evaluation of Osteomeatal complex for evidence of disease and to detect anatomical defects that compromise ventilation and mucociliaryclearance. Hence nasal endoscopy and computed tomography have brought revolution in understanding the Chronic rhino sinusitis and the prerequisites for Functional Endoscopic Sinus Surgery(FESS). Computed topographyc(CT) scan plays a vital role in diagnosis of Chronic rhino sinusitis and detecting its complications. It has the ability to detect mucosal disease and anatomical variations, to demonstrate a primary obstructive pathology and visualise posterior ethmoid and sphenoid sinuses and thus help in management of Chronic rhino sinusitis.[5]

The computed tomography scan is considered as gold standard diagnostic test for Chronic rhino sinusitis. Its sensitivity and specificity is more than plain film radiography but performing CT scan just to confirm Chronicrhino sinusitis preoperatively can unnecessarily increase the risk of exposure to ionising radiation, also adds cost of procedure.

The severity of Chronic rhino sinusitis on CT of paranasal sinuses was assessed by Lund Mackay scoring system and severity of chronic sinusitis on DNE was assessed by Lund Kennedy scoring system

The main objective of the study is to evaluate the accuracy of nasalendoscopy compared to CT PNS in Chronic rhino sinusitis by correlating the endoscopy score with CT score.

Methodology:
After obtaining the institutional ethical clearance, 100 subjects were included from the ENT OPD for sinus related problems at SVS Hospital/Medical college,Yenugonda,Mahabubnagar.

Inclusion Criteria:
1. Patients presenting with complaints like headache, nasal obstruction suchsymptoms are difficult to diagnose by anterior rhinoscopy and posteriorrhinoscopy, not responding to medical treatment for more than fourweeks, are selected for Computerised Tomography (CT) paranasal sinus anddiagnostic nasal endoscopy (DNE).
2. Patients whose diagnosis is been established by CT PNS or D N E areinvestigated for the other modalities, for example a patient with recently doneCT PNS diagnosed as DNS to left with bilateral maxillary sinusitis is againsent for DNE and both modalities are compared and vice versa
3. Chronic inflammatory diseases of Para-nasal sinuses.

Exclusion Criteria:
1. Patients with acute attack of sinusitis.
2. Patient with sinus malignancies which are confirmed with histopathology isexcluded.
3. Patients below the age of 15 years.
4. Patients who are not willing to get CT PNS or DNE done.

Methods of Collection of Data:
1. The cases selected for the study were subjected to detailed history taking and clinicalexamination.
2. A routine haemogram (HB%, BT, CT, TC, DC) and urine examination(albumin,sugar, microscopy), X-ray Para nasal sinuses were done.
3. All the patients in active stage of the disease were treated with course ofsuitable antibiotic, systemic antihistamines and local decongestants. Theywere also treated for medical conditions like diabetes mellitus, hypertension,and nasal allergy.
4. Each patient underwent a systematic diagnostic nasal endoscopy andcomputed tomography of nose and Para nasal sinuses.

Equipment used for **DNE**
1. Nasal endoscopes: 0 degree, 30 degree and 45 degree Hopkins rod endoscopes
2. Cold light source
3. Fiber optic light cord
4. Karl storz single chip camera
5. Sony 14 inch color monitor
6. Savlon as antifog solution
7. Standard endoscopic sinus surgery instruments which are used forManipulation

The method of diagnostic nasal endoscopy used
After testing the patient for lignocaine sensitivity, diagnostic endoscopy wasperformed.

Position: The examination was done with the patient in supine position and headturned towards the examiner standing/ sitting on the right side of the patient.

Anaesthesia: Topical decongestant with anaesthetic agent 4% lignocaine with1:100000 adrenaline. This was first used as a spray and then applied intranasally aswet cottonoid strips.

Procedure: endoscopy was performed using the standard three pass technique.**During the 1stpass,** the endoscopes was passed along the floor of the nasalcavity noting the status of the inferior turbine septum, Eustachian tube orifice ,fossaofRosenmuller, nasopharyngeal mucous and nasolacrimal duct orifice.**During the 2ndpass,** the scope was introduced along the superior surface ofthe inferior turbinate and directed into the sphenoethmoidal recess. Whilewithdrawing the scope, the sphenoid ostium, sphenoethmoidal recess and superiorturbinate were visualized and any variations noted.**During the 3rdpass** endoscope is passed along the middle turbinate intomiddle meatus and is done to visualize the frontal recess. A gentle medial subluxationof middle turbinate or use of a cannula placed under middle turbinate helpstheintroduction of the scope in middle meatus.

Technique of CT scanning performed:
Before undergoing CT scanning, the patients were instructed to clean theirnose blowing out any secretions. Xylometazoline 0.1 % drops were instilled to bothnasal cavities 30 minutes before scanning.Scanning was done on Somatom Spiral CT scanner.

Patient position: supine with head extension. In patients in whom head extension was Contraindicated due to cervical spondylosis, galantry tilt was suitably adjusted.

Angulation: perpendicular to hard palate

Extent: from the nasion to posterior extent of sphenoid.

Thickness: 5mm/ 2mm thickness with same shift to get continuous sections.

Exposures: 120 kV, 4.5 sec scan time, 300 mA, and window width of 2500 to 3000BU and window level of 250 to 300 HU.

The images were recorded onto compact disc and photographic plates

RESULTS:

The age of the patient in the present study is from 15 years to 70 years. Maximum numbers of patients are in 20 to 40 years of age group; therefore 46% of patients are in 2nd&3rddecade of age. The mean age of the patients is 34.4 years(Table 1&2) .

Table 1: Age distribution

Age (Years)	**Number of Patients**	**Percentage**
0 – 20	**26**	**26**
20-40	**46**	**46**
40-60	**24**	**24**
60-80	**04**	**04**
Total	**100**	**100**

Table 2: Sex distribution

Sex	**Number of Patients**	**Percentage**
Male	66	66
Female	34	34
Total	100	100

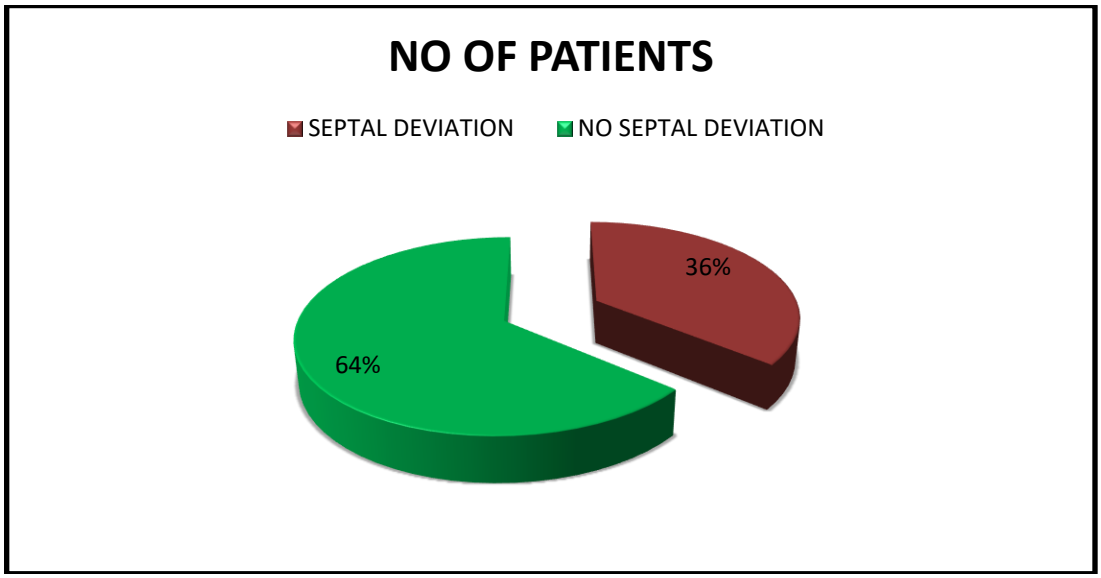
The present study shows male preponderance i.e. 66% male and 34 % femalepatients. Thus male to female ratio is 1.9:1.

Table 3 shows Common symptoms of the patients in the present study are Headache 78% , Nasal obstruction 74. Nasal discharge 40%, epistaxis 18% and other symptoms 8% like ear block, foul smell etc, are less common. Postnasal discharge is seen in 38% of patients, sneezing in 26% with other symptoms

Symptoms	**Percentage**
Headache	78
nasal obstruction	74
nasal discharge	40
Post Nasal discharge	38
Sneezing	26
Epistaxsis	18
Other symptoms(Hard of hearing,Foulsmell,etc)	8

Table 3: common Symptoms showed by subjects

In the present study, out of 100 cases, 36 cases have septal deviation under CT scan –
33 cases have septal deviation under DNE.



Comparative findings of DNS in CT and DNE of nasal cavity(100 cases)
46(46%) cases show attachment of uncinate process to lamina papyracea on right and left in DNE as well as in CT. 18(18%) cases show uncinate attachment to middle turbinate on right side and 20(20%) caseson left using DNE whereas in CT-PNS 18(18%) cases show the attachment to middle turbinate on the right side and 20(20%) cases on left .Uncinate attachment to the skull base is seen in 36(36%) cases each on the right and 34(34%) left side inboth DNE and CT.

Secretions in the middle meatus is visualized in 62(62%) on right and 54(54%)cases on the left side in DNE while it is not visualized in CT.

Frontal recess patency is seen in 50(50%) cases on right side and 56(56%) cases on left side in DNE while 30(60%) cases has patency in right and left side each in CT.

Maxillary ostium patency is established in 36(36%) cases on the right and 38(38%)cases on the left using DNE whereas in CT 44(44% cases on right and 34(34%) caseson left have patency.

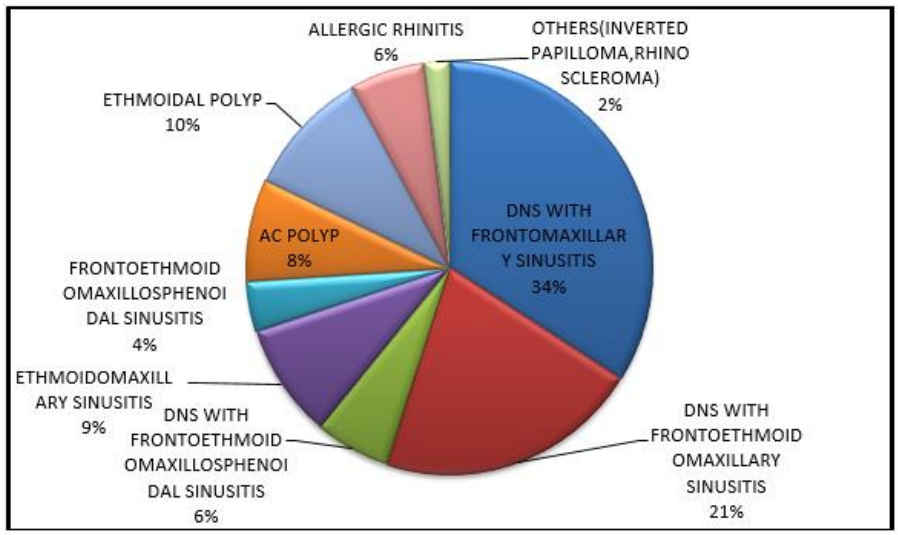
In DNE 14(14%) cases show middle turbinate hypertrophy on right side and12(12%) cases show on left side whereas in CT 16(16%) cases show hypertrophy ofmiddle turbinate on right and 10(10%) cases on the left44(44%) cases show hypertrophy of inferior turbinate on right and left sideeach in DNE whereas 40(40%) cases show hypertrophy of inferior turbinate on rightand left side each in CT.

Pale inferior turbinate was visualized in 62(62%) cases both on right and leftnasal cavity.26(26%) cases have a polyp on right side and 28(28%) cases on the left sidein DNE whereas 16(16%) cases have polyp on right and 24(24%) cases on left usingCT. Benign nasal growth on right is seen in 8(16%) cases both in DNE and CT and6(6%) cases have benign growth on left side in both DNE and CT. The integrity ofbone such as erosions, expansion or dehiscence is only visualized using CT scan.46(46%) cases have right frontal sinus haziness and 54(54%) cases have lefthaziness in CT. 74(74%) cases have right ethmoid sinus haziness and 70(70%) caseshave haziness on the left side in CT.

56(56%) cases showed haziness in maxillary antrum on right and 62(62%)cases showed on left.
38(38%) cases show posterior ethmoid sinus haziness on right side and24(24%) cases on left side in CT.

Sphenoidal sinus is hazy in 24(24%) cases on right and 16(16%) cases on the left.

Diagnosis



DISCUSSION:

Rising prevalence of rhinosinusitis is a significant health problem and still poses a challenge for the ENT surgeons in terms of its diagnosis and treatment.We extremely rely upon CT PNS to confirm the diagnosis of chronic rhinosinusitis to assess its severity and in management decision.Endoscopic findings are often used to support a diagnosis of Chronic Rhinosinusitis,But the true diagnostic value of Nasal endoscopy in diagnosing CRS has not yet been clearly defined.In this study we tried to find out the correlation between nasal endoscopy and CT in diagnosis and Assesment of severity of Chronic Rhinosinusitis.

In the present study 100 cases are taken with different Sino nasal pathology. Maximum cases are in the age group of 20-40 years with male predominance, due to more exposure rate of the male patients compared to females.More number of patients is seen with complaints of headache which is one of the main symptom of Chronic Rhinosinusitis. Sinus tenderness is seen to be the most predominant sign seen in all the patients which is one of the commonest sign seen in all Sino nasal pathology with infections. Majority of the patients had septal deviation either an anterior or posterior deviation but majority of the cases is asymptomatic for the deviation. CT scan is having a better diagnostic value for Deviated nasal septum than DNE mainly in cases of gross anterior DNS and extensive nasal mass occupying lesion.Superior attachment of uncinate process can be appreciated both in CT scan and DNE. But DNE being a blind procedure to assess the attachments to lamina papyaracea and skull base, thus CT scan gives a much better visualization of its attachments. Pneumatiseduncinate process is better seen in CT scan than DNE that too in few cases. It is an anatomical variation that causes narrowing of the infundibulum there by leading to CRS[6.]Middle meatal secretions which are one of the diagnostic criteria for Chronic Rhinosinusitis which is seen only in DNE and not by CT scan thereby indicating DNE has to be done in all cases of sinonasal pathology[7]**.**Frontal recess patency can be evaluated in both DNE and well as CT scan in all cases.

Maxillary ostium patency can only be partly visualized by DNE even if an angled scope is used there by indicating CT scan has a better diagnostic tool to see for maxillary ostium patency. Aggernasi cells are well assessed by CT scan but only over pneumatisedaggernasi cells are appreciated on DNE. Thereby indication CT scan has a better diagnostic value in viewing for aggernasi cells.Haller cells and Onodi cells could only be appreciated by CT scan. Thereby indicating DNE has no diagnostic value at all for evaluating Haller cells and Onodi cells.Accessory

maxillary ostium are better visualized by DNE which are seen in few cases but CT scan can miss it due to the cuts taken, 2-5mm.Middle turbinate variations like concha bullosa and paradoxical could both be seen in CT scan and DNE. Both identifying almost all the cases shows that both the diagnostic modality could be used[8,9]**.** Hypertrophy of the middle and inferior turbinate both could be visualized and analyzed by CT scan as well as DNE but DNE has a better diagnostic value than CT scan because it shows the mucosal changes. Thereby giving a better insight to the disease process and the present condition of the pathology. Polyps and benign nasal growth are pathological conditions of the nasal cavity as well as the paranasal sinus. It can be visualized both on CT scan as well as DNE but DNE gives a better understanding of the condition of polyp or growth, its origin and its mucosal condition and if needed biopsy can also be taken to confirm the diagnosis. To know the extent and spread of the disease CT scan gives a better understanding than DNE[10]**.**

Sinus haziness could only be seen with CT scan thereby knowing the extent of the disease and plan for better management of the disease.

Conclusion:

From the present study it is concluded that sino nasal pathology has a higher preponderance in male patients and is commonly seen in the age group of 20 to 40 years.

CT scan has got a better advantage compared to DNE in detecting the anatomical variants as well as to know the condition of 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, condition of mucosa, polyps are looked for.In pathological benign nasal mass histopathological is essential for its diagnosis. Thereby indicating that in all patients with sino nasal disease 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**.**

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