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Otolaryngology

Chronic Rhinosinusitis: Study of Clinical Feature and Management

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Abstract		**Original Research Article**

The prospective study was conducted on 100 patients of chronic rhinosinusitis, diagnosed on basis of clinical symptoms more than three month according to guidelines of AAO-HNS. All patients was undergoes nasal endoscopic examination and endoscopic appearance score evaluation (EAS) was done. At the same time CT scan of PNS and Nose in coronal and axial view has taken.56 patients were surgically treated and remaining 44 were medically managed. As per our observation all patients of chronic rhinosinitis should go for nasal endoscopy then medically manage, if not respond then go for CT scan and plan surgery accordingly.
Keywords: Chronic rhinosinusitis, nasal endoscopy, CT Scan PNS.

INTRODUCTION

Despite extensive research efforts the pathophysiology of Chronic rhinosinusitis is not well understood. The contribution of anatomic, environmental and host immunological factors implicated in the pathogenesis are difficult to clearly separate and identifie hence management is a challenge to the physician [1]. The role of bacteria as a primary or exacerbating factor in the etiology/pathogenesis of chronic rhinosinusitis remain still controversial. Nevertheless, there is increasing evidence implicating bacterial biofilms in particular staphylococcal biofilms, in severe and recalcitrant form of disease.

Chronic rhinosinusitis often occure in association with nasal polyp in 4% entire population and associated with bronchial asthma in 7-13% of cases and aspirin exacerbated respiratory disease (AERD) and nasal polyp are present in 36-96%of patients [2].

The osteomeatal complex is a small compartment located in the region between the middle turbinate and the lateral nasal wall in the middle meatus -represents the region for drainage of anterior ethmoid, maxillary and frontal sinuses. The variation in any one of the component of osteomeatal complex causes improper drainage of these sinuses causing chronic sinusitis.

Anatomical variation of uncinate process was defined as Stammberger and Bolger [3].

- Superior attachment of uncinate process could be to a Type I –inserted in to lamina papyracea. Type II- extand to the roof of ethmoid that is skull base. Type III- Attach to middle turbinate.
- Medially bend uncinate process
- Laterally bend uncinate process
- Hypertrophied uncinate process
- Pnuematised uncinate process

Osteomeatal complex represents the final common pathway for drainage and ventilation of frontal, maxillary and anterior ethmoid air cells [4, 5]. The obstruction of this narrow region is a key factor in the development of chronic sinusitis [6]. Presence of pnuematisation in the middle turbinate, orbital floor and first ethmoturbinal constitutes concha bullosa, haller cells and agger nasi cells respectively and regarded as variants among the distribution of structures of interest around osteomeatal complex. The association of nasal polyp, bronchial asthma and AERD is called Samter's triad.

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 every year, its diagnosis and treatment still poses a challenge [7].

It is not only causes significant physical problems but also results in substantial functional and

emotional impairment. In the present day scenario surgical clearance of these chronically infected sinuses while maintaining their ventilation and drainage is the treatment of choice.

Diagnosis is an important aspect to get a clue to cure the disease. In 1997, criteria for diagnosis of chronic rhinosinusitis were developed by AAO-HNS. According to guidelines of AAO-HNS published in 2007, a combination of symptom criteria and objective finding are required to diagnose of Chonic rhinosinusitis. A positive diagnosis of chronic rhinosinusitis was defined as complains of 2 or more major criteria or 1 major and 2 or more minor criteria lasting for 12 weeks or more. In addition, objective measures such as evidence of nasal polyps or purulent mucus in the middle meatus and ethmoid region on nasal endoscopy or radiological evidence of paranasal sinus inflammation are also recommended [8].

To achieve this goal, both computed tomography of PNS and nasal endoscopy have been used successfully as diagnostic modality in sinus diseases. Stammberger proposed that stenosis of the osteomeatal complex and stagnation of secretion. Which may than become infected [9].

Computed tomography plays an important vital role in the diagnosis of chronic rhinosinusitis and in detecting its complications. It has the ability to detect mucosal disease and anatomical variations, to demonstrate a primary obstructive pathology and visualize posterior ethmoid, Sphenoid sinus and thus helps in the management of CRS.

Nasal endoscopy helps in evaluation of the osteometal complex for the evidensde of the disease and to detect anatomical defects that comprise ventilation and mucosilany clearance. To perform functional endoscopic Sinus Surgery effectively, the surgeon must have detailed knowledge of the anatomy of lateral nasal wall, PNS and surrounding vital structures.

The CT scan is considered as a gold standard diagnostic test of Chronic rhinosinusitis [10, 11]. Its sensitivity and specificity is more than plain film radiology [12]. But performing CT scan just to confirm Chronic rhinosinusitis preoperatively unnecessarily increases the risk of exposure ionizing radiation, also adds cost of procedure:

Nasal endoscopy is a valuable diagnostic test in individuals presenting with symptoms of Chronic rhinosinusitis. It can be used as a good predictor of sinus disease to confirm the diagnosis and to know the severity of the disease. This can help the initial of medical management of chronic rhinosinusitis.

CT scan should be reserved to those with negative endoscopy but high clinical suspicious and those who are not responding to medical management and need surgical intervention.

MATERIALS & METHODS
This is a prospective study conducted on 100 patients in NIMS Medical College and RUHS College of Medical Sciences, Jaipur. Conducted over a period of two and half years from July 2016 to December 2018, in the department of Otolaryngology, of tertiary teaching hospitals in Jaipur, Rajasthan. Institutional Ethics Committee approval was obtained beforehand. Informal written consent was obtained from all participating patients.

All patients with clinically/symptomatically proved Chronic Rhinosinusitis as per criteria of task force of Rhinosinusitis. The patients who represented with 2 or more major criteria or 1 major criterion and 2 or more minor criteria were enrolled into the study. All patients who were suffering from more than three month were included. Patients who were excluded from study are Acute Rhinosinusitis, Sinus malignancy and age below 15 yrs.

Detailed history and clinical examination of each patient was done. All routine investigations, cases were subjected to Diagnostic nasal endoscopy (DNE) AND Computed Tomography of Nose and PNS same day.

Rigid nasal endoscopy was performed in all subjects under local anesthetist with topical application of 4% Xylcaine 30 ml and 2 ampule adrenalin soaked in cotton strips or 10% lox spray. Topical nasal decongested also used. Using 0*& 30*, 4mm diameter rigid nasal endoscope (stroz).

Nasal endoscopy was done by using the standard three pass technique as described by kennedy [13]. Nasal endoscopy Finding was noted using Lund kennedy Endoscopic scoring system [14]. To assess the following parameter:

Table-1

	0	1	2
Nasal mucosa edema	Absent	Mild to moderate	Polypoid
Secresion	Absent	Watery	Thick/mucopurulent
Presence of polyp	Absent	Limited to middle meatus	Extended to nasal cavity

The assessment was performed bilaterally with total points corresponding to the som of values obtained in both sides. Total score >2 was considered as positive.

Nasal endoscopy also noted deviational nasal septum, concha bullosa, Uncinate process anatomy /OMC Anatomy or blockage.

Plain CT scan nose and DNS was done in coronal and axial view with reconstruction in sagittal images using in raw data. The thickness of section was 3 mm at osteomeatal complex and 5 mm for rest of the structures with small shift to get continuous sections. CT scan was done for both bony and soft windows.

RESULTS

Out of 100 cases, 56 were surgically treated and 44 medically managed. All patients underwent diagnostic nasal endoscopy and CT scans PNS before managed. The patient's age varied from 16 yrs to 70 yrs. Maximum patients were between 31-40 yrs. There was male preponderance with male to female ratio 1:8:1.

In the present study 84% of patients had both headache and nasal obstruction 70% had nasal discharge, postnasal discharge was seen in 44% and sneezing in 30%. The commonest sign was deviated nasal septum in 76%, followed by Mucoid discharge from middle meatus 56%, oedematous nasal mucosa 56%, hypertrophy of inferior turbinate 42%, hypertrophy of middle turbinate 40%, nasal polyp 12% and maxillary sinus tenderness 40%. The various anatomical variations detected on CT Scan PNS were deviated nasal septum in 76% patients followed by agger nasi cells in 40 patients. Other variations were pneumatised ethmoid bulla 18%, concha bullosa 16%, haller cells 14%, paradoxical middle turbinate 12%, bent uncinate process 10%, odoni cells 6%, lamina papyracea pushed laterally 4% and pnuematised vomer bone in 2% patients.

The various mucosal abnormality that were detected on CT scan PNS were maximum is in osteomeatal complex 72%, followed by maxillary antrum 50%, anterior ethmoidal 40%, frontal sinus 36%, posterior ethmoid 30% and sphenoid sinus 16% respectively.

Among the parameters that were correlated, Diagnostic nasal endoscopy was found to be the most sensitive investigation for hiatus semilunaris 92%, sphenoethmoid recess 90%, middle turbinate 88%, bulla ethmoidalis 80% and frontal recess 70% respectively. The specificity of DNE for middle meatus was 86.95%, frontal recess 86%, hitus semilunaris 81.82%, bulla ethmoidalis 80.76%, middle turbinate 80% and sphenoethmoidal recess 73% respectively.

In the present study CT Scan PNS was found to be the most sensitive investigation for middle meatus 89.28%, frontal recess 88%, and middle turbinate 87%, and hiatus similarities 86. 66% and both sphenoethmoidal recess and bulla ethmoidalis 80% respectively.

The various operative procedures performed were septoplasty with middle meatus antrostomy in 16 patients, septoplasty with middle turbinate turbinoplasty in 4 patients, frontal recess clearance with anterior ethmoidectomt and MMA done in 10 patients. In 14 Patients total ethmoidectomy with MMA along with frontal recess clearance was done. FESS was done in 12 patients.

DISCUSSION

In the present study, majority of patients 38% in the fourth decade of life. A study conducted by Kirtane *et al*. the ages ranged from 16 to 52 years, with majority of patients(46.78%) in the third decade of life with the male preponderance like our study [15]. In the present study in the nasal obstruction and headache were the commonest symptoms followed by nasal discharge. In the majority, duration of symptoms was present for more than 3 months. In the study conducted by Kirtane MV *et al.* the commonest complaints was Nasal discharge present in 25 patiens (78.1 %) followed by headache in 22 patients 68.7 % and nasal obstruction in 22 patient 68.7%. The Other complaints were sneezing in 6 patients 18.7 percent and anosmia in two patients 6.25% .The duration of symptoms varied from 6 months to 30 years.

The commonest sign was deviated nasal septum 76%, followed by new mucosal discharge from middle meatus 56%, oedematous nasal mucosa 56 %, hypertrophy of inferior turbinate 42%, hypertrophy of middle turbinate 40%, maxillary sinus tenderness 40% and nasal polyp in 12% patients. In a study conducted by Venkatachalam VP *et at*. Clinical findings were hypertrophied inferior turbinate (10%), Hypertrophied middle turbinate (17, 14%), congested mucous membrane 15.71%, sinus tenderness 7.14% and ethmoidal polyp 12.8% [16].

In the present study the various anatomical variations that were detected on CT Scan PNS were deviated nasal septum 56%, followed by agger nasi sells 40%. In a study by Dua K *et al*. The maximum anatomical variations that was comparable to our results [17].

The various mucosal abnormalities detected were maximum in osteomeatal complex 72%, followed by maxillary antrum 50%, anterior ethmoid 48%, frontal sinus 44%, posterior ethmoid 36% and a sphenoid sinus 20%. These findings are similar to the study conducted by Dua K *et al*. [17].

Among the parameters that were correlated, the Diagnostic nasal endoscopy was found to the most sensitive investigation for hiatus semilunaris 92.85%, middle meatus 92.59%, Sphenoethmoidal recess 92%, middle turbinate 90%, bulla ethmoidalis 83.33% & frontal recess 81.48% respectively. The specificity of diagnostic nasal endoscopy for middle meatus was 86.95%, frontal recess 86%, hiatus semilunaris 81.82%, bull ethmoidalis 80.76%, middle turbinate 80% and sphenoethmoidal recess was 73% respectively. As all these parameters are considered at the key Areas where all major sinuses drain, it can be inferred that Diagnostic nasal endoscopy can be definitely used as a very sensitive tool towards diagnosing the infection in adjacent sinuses.

The most sensitive investigation for middle meatus 89.28%, frontal recess 88%, middle turbinate 87%, hiatus semilunaris 86. 66% and both sphenoethmodal racess & Bulla In the present study among ethmoidalis 80% respectively. The specificity of CT scans PNS for middle meatus was 90. 90%, hiatus semilunaris 90%, sphenoethmoidal recess 89%, both bulla ethmoidalis & middle turbinate the parameters that were correlated, CT Scan PNS was found to be 84% and frontal recess 80% respectively. The association between Diagnostic nasal endoscopy and CT Scan PNS was calculated using chi-square test. Since $P = 1E-11$ to $1-11$ smaller than 0.05 indicates there is a high Association between Diagnostic nasal endoscopy and CT scan PNS.

CONCLUSION

In the present study commonest symptoms observed nasal obstruction and headache along with nasal discharge; with commonest sign being deviated nasal septum, mucoid nasal discharge from middle meatus and oedematous nasal mucosa. Maxillary sinus and anterior ethmoid sinus was the most frequently encountered disease sinus in our study according to the CT Scan PNS. Nasal endoscopy can detect congestion and oedema of nasal mucosa precisely. CT scan PNS can detect and accurately diagnosed concha bullosa, agger nasi cells, onodi cells and haller cells. Extent of the disease and density in each sinus is very well recognised in CT Scan PNS. Both diagnostic nasal endoscopy and CT Scan PNS is an important evaluating tool for detecting pathology and managing patients with chronic rhinosinusitis either medically or surgically and both are complementary to each other.

Recommendation

Clinically diagnosed cases of chronic rhinosinusitis, all cases should go for diagnostic nasal endoscopy. On the basis of finding medical management priscribe.

If not responded then go for CT scan PNS and nose, if found variation of anomalies then surgically manage. Advice Medical manages to prevent recurrence.

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