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ASSOCIATION BETWEEN THE SEPTAL ANGLE DEVIATION AND SEVERITY OF THE DISEASE IN PATIENTS OF CHRONIC RHINOSINUSITIS.

Radiodiagnosis

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ABSTRACT

Aim: To study the association between the septal angle deviation and severity of the disease in patients of Chronic Rhinosinusitis.
Materials and methods: This is a descriptive observational study with cross-sectional design conducted on 65 adult patients attending ENT OPD and diagnosed with Chronic Rhinosinusitis. Informed consent was taken from all patients before CT examination. The included patients underwent a complete otorhinolaryngological examination. Non-contrast computed tomography was performed on all patients.
Result: Out of 65 patients, majority had the nasal septum deviated towards left side and the mean septal angle deviation was found to be 8.2. The most frequently involved sinus was the maxillary sinus (83.1 %), followed by anterior ethmoid sinus region (61.5 %).
Conclusion: We concluded that there is no association between increasing angle of septal deviation and occurrence of ostiomeatal complex obstruction. However, higher incidence of lateral nasal wall abnormalities like, concha bullosa and bulla ethmoidalis was found on the contralateral side of nasal septal deviation as compared to the ipsilateral side.

KEYWORDS

Septal deviation, Septal angle, Lateral nasal wall, Chronic Rhinosinusitis, NCCT scan PNS.

INTRODUCTION:

Deviated nasal septum (DNS) refers to displacement of the nasal septum from its normal position which may lead to deformities of lateral nasal wall structures. Patients with increasing septal deviation are associated with higher incidence of bilateral ostiomeatal complex (OMC) obstruction and bilateral chronic sinus disease. Various studies had shown that OMC obstruction ipsilateral to the side of deviated septum is attributable to the nasal septal deformity itself and on the contralateral side it is due to lateral wall changes such as middle turbinate hypertrophy /pneumatisation (concha bullosa) [1].

Chronic rhinosinusitis (CRS) is a common disease, associated with at least one of these symptoms viz. nasal congestion, hyposmia, facial pain or nasal discharge [2]. Various studies had concluded that the disease secondary to the OMC obstruction on the side of the deviated nasal septum is due to the deformity, whereas on the contralateral side it is attributable to lateral nasal wall abnormalities such as middle turbinate hypertrophy/ pneumatization [3]. CRS can be diagnosed using clinical symptoms and signs which are categorized into minor and major criteria on the basis of The American Academy of Otolaryngology- Head and Neck Surgery Task Force criteria.

However, in some cases clinical symptoms and signs alone may not be adequate to make the diagnosis of chronic rhinosinusitis because of the overlap with other benign sino-nasal diseases. Hence, the European Academy of Allergy and clinical immunology included the nasal endoscopy and/ or computerized tomography scan findings in the diagnosis.

Diagnostic nasal endoscopy is the gold standard investigation for chronic rhinosinusitis. CT scan of the paranasal sinuses is also contemplated to assess ancillary pathologies such as obstructive middle turbinate hypertrophy, concha bullosa, bulla ethmoidalis, mucosal changes and other causes of obstruction. Hence, making it the gold standard diagnostic radiological tool for chronic rhinosinusitis.

The Lund and Mackay CT Scoring System (LM score) is the widely used radiological scoring system for staging of chronic rhinosinusitis [4]. Each paranasal sinus is assessed and a score is assigned; 0 for no abnormality, 1 for partial opacification and 2 for complete opacification. Each side is graded separately. Whereas, the ostiomeatal complex is assigned either a score of0 (non-obstructed) or 2 (obstructed).

AIM

- To study the association between the septal angle deviation and severity of the disease in patients of Chronic Rhinosinusitis.

OBJECTIVES

- To measure the septal angle deviation on NCCT of Nose and PNS in cases of Chronic Rhinosinusitis.
- To study the association between nasal septal deviation and severity of Chronic Rhinosinusitis.

METHODOLGY

This is a descriptive observational study with cross-sectional design conducted on 65 adult patients attending ENT OPD and diagnosed with Chronic Rhinosinusitis. The included patients underwent a complete otorhinolaryngological examination. Non-contrast computed tomography was performed on all patients on Siemens Somatom 16 slice MDCT Scanner using 5mm contiguous slice thickness in supine position.

A coronal CT image best demonstrating the ostiomeatal complex was selected for calculation of direction and degree of nasal septal deviation (Figure 1). The angle of septal deviation was determined by the angle between the line drawn from the superior insertion of nasal septum at the crista galli to the inferior insertion of the septum at the anterior nasal spine and the line drawn from the superior insertion of the nasal septum at the crista galli to the apex of the septal deviation. On the basis of the angle of septal deviation the patients were divided into three groups (Table 1.)

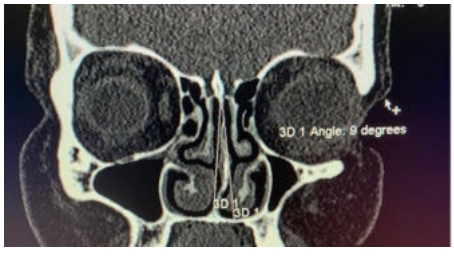

Figure 1. NCCT Nose and PNS (Coronal image) demonstrating method of measuring angle of septal deviation on CT scan.

The data from each of the patient CT scans was analysed, comparing ipsilateral and contralateral structural and pathologic processes as a function of septal deviation like concha bullosa, bulla ethmoidalis, uncinate process deviation. The paranasal sinuses i.e. maxillary sinus, anterior ethmoid sinus, posterior ethmoid, frontal sinus and sphenoid sinus were evaluated for mucosal abnormalities and the patency of the ostiomeatal complex was also assessed.

STATISTICALANALYSIS

ANOVA (Analysis of variance) was applied to see the relationship between nasal septal deviation and ipsilateral or bilateral occurrence of occurrence of concha bullosa, bulla ethmoidalis, OMC obstruction and uncinate deviation.

Pearson's chi square test was applied to see the association between angle of septal deviation and severity of disease radiologically by observing Lund Mackay score in Chronic Rhinosinusitis.

INCLUSION CRITERIA:

- Patients in age group of 18-50 years attending ENT OPD, diagnosed with Chronic Rhinosinusitis and coming to radiology department for NCCT NOSE & PNS.

EXCLUSION CRITERIA:

- Pediatric patients.
- Patients with any kind of sino-nasal mass.
- Patients with history of past surgery of Nose and PNS.
- Patients not giving consent.

RESULTS

NCCT Nose and PNS Findings

1. Angle of nasal septal deviation:

All the 65 patients who underwent NCCT scan of Nose and PNS for Chronic Rhinosinusitis were divided into three categories depending on the degree of septal angle deviation.

There were 13 patients in group I, 36 patients in group II, and 16 patients in group III (Table 1). This implies that most patients had septal angulation in moderate range (55.4%), followed by severe (24.6%), then mild (20.0%).

The nasal septum was deviated predominantly towards left side and the mean septal angle deviation was found to be 8.2.

Table 1. Angle Of Nasal Septal Deviation

	GROUP I (0°-5°)	GROUP II (6°-10°)	GROUP III (≥11°)
NO. OF PATIENTS	13	36	16
PERCENTAGE	20.0%	55.4%	24.6%

2. Abnormalities of lateral wall of nose

Table 2 shows the result of OMC obstruction in relation to the three groups of nasal septal angle deviation. In this study there was no statistically significant difference in ostiomeatal complex obstruction between ipsilateral and contralateral sides in relation to direction of septal deviation($p>0.05$), though the incidence of OMC obstruction was little higher on contralateral side in group II and III. There was increased incidence of OMC obstruction in group II patients compared to the group I and group III patients.

In evaluation of the middle turbinate for presence of concha bullosa, there was increased incidence of concha bullosa on the contralateral side among all the three groups. However, statistically significant difference was noted only in group II patients ($p<0.05$).

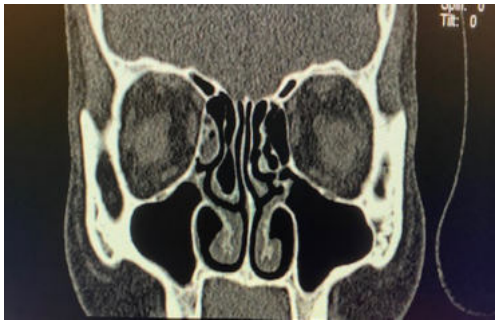

Figure 2. NCCT Nose and PNS (Coronal image) showing occurrence of concha bullosa contralateral to the direction of septal deviation.

Similar to concha bullosa there was higher incidence of occurrence of bulla ethmoidalis on contralateral side among all the three groups of nasal septal deviation. However, statistically significant increase in occurrence of bulla ethmoidalis was observed on the side opposite to the direction of septal deviation in Group II ($p<0.05$). There was no statistically significant increase in comparing ipsilateral and contralateral discrepancies in uncinate process deviation among all groups ($p>0.05$).

Table 2. Lateral Wall Abnormalities Versus Degree Of Septal Deviation

	GROUP I (0°-5°)		GROUP II (6°-10°)		GROUP III (≥11°)	
	IPSILATERAL	CONTRALATERAL	IPSILATERAL	CONTRALATERAL	IPSILATERAL	CONTRALATERAL
OSTIOMEATAL COMPLEX OBSTRUCTION	3	2	6	11	6	8
CONCHA BULLOSA	0	3	2	8	0	2
BULLA ETHMOIDALIS	0	2	2	8	0	3
UNCINATE DEVIATION	0	0	1	2	0	1

3. Mucosal abnormality

The most frequently involved sinus was the maxillary sinus (83.1 %), followed by anterior ethmoid sinus region (61.5 %). Sphenoid sinus was least commonly involved (10.8%) (Table 6). Figure 3 shows opacification of paranasal sinuses on NCCT.

No significant statistical correlation was found between the degree of nasal septal deviation and the severity of Chronic Rhinosinusitis assessed by LM scoring on NCCT Nose and PNS ($p>0.05$). However, nasal septal deviation was associated with chronic rhinosinusitis

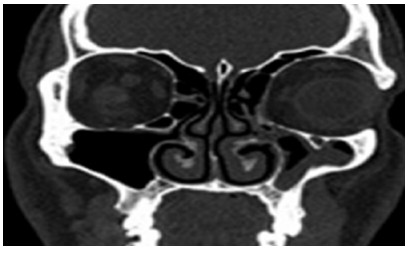

Figure 3. NCCT Nose and PNS (Coronal image) showing partial opacification of left maxillary sinus with ostiomeatal complex obstruction.

DISCUSSION

In this study, majority of patients had nasal septal deviation towards left side.

The incidence of OMC obstruction, in our study was higher on the contralateral side and maximum in group II as compared to ipsilateral side. No association was found between increasing angle of septal deviation and occurrence of OMC obstruction, which is similar to the results of few previous studies.

Our study shows higher incidence of concha bullosa and bulla ethmoidalis on the contralateral side of nasal septal deviation as compared to the ipsilateral side among all the three groups, parallel to the study results of Bagri N et al and Stallman et al. While, Elahi et al on evaluating the association of septal deviation and chronic sinus disease concluded that the increasing angle of septal deviation is associated with bilateral sinus disease, contralateral middle turbinate abnormalities and prominent ethmoidal bulla. However, in our study, this relationship was not observed as there was increased incidence of concha bullosa in group II patients compared to the group I and group III patients.

There was no statistically significant difference ($p>0.05$) in comparing ipsilateral and contralateral occurrence of uncinate process deviation in relation to the deviated septum.

In this study mucosal abnormalities were most frequently seen in the maxillary sinus (83.1%) which is in parallel to the study of Mamatha et al, Poorey et al and Bagri N et al No significant association was seen between increasing angle of septal deviation and the severity of CRS. In a previous study by Bagri N et al no significant association was found between increasing angle of septal deviation and the incidence of CRS. However, severity of the disease was not considered.

On comparing the same findings on Diagnostic Nasal Endoscopy (DNE) and CT it was found that OMC obstruction and mucosal changes in middle turbinate are diagnosed better on DNE. Whereas concha bullosa and bulla ethmoidalis were better identified on CT.

Nasal endoscopy showed advantage over CT for assessment of localised changes and the condition of nasal mucosa while CT gave a better idea of the condition of paranasal sinuses and anatomical variations.

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