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Original Research Article

Occurrence of deviated nasal septum in terms of angles and its relation with sinus disease in patients of chronic rhinosinusitis: a computed tomography scan study

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ABSTRACT

Background: The intention of this study was to evaluate angles of nasal septal deviation by measuring angle of nasal septal deviation on computerized tomography of the para nasal sinuses (CT PNS) and to study the effect of increasing septal angle on chronic sinusitis. No other study in the literature has measured exact angle of septal deviation in terms of degrees.
Methods: A prospective cross-sectional observational study was carried out from September 2015 to August 2017 and 57 patients with diagnosis of having chronic sinusitis, were evaluated with CT PNS (coronal and axial views).
Results: Most patients of chronic rhinosinusitis had septal deviation in grade III, followed by grade II, then grade I.
Conclusions: This study concludes that higher the angle of septal deviation, higher the incidence of CRS and vice versa.

Keywords: Chronic rhinosinusitis, Computed tomography, Nasal septal deviation, Osteomeatal complex

INTRODUCTION

Nasal septal deviations are quite common but rarely symptomatic. The deviated nasal septum is considered secondary to trauma during intrauterine life, birth, or trauma during later life. Childhood is the time when the nose is particularly liable to injuries which may produce nasal and septal deformities in a later stage in life.[1] At birth, nasal septum is usually straight and remains straight in the childhood. As age progresses, the septum has a tendency to bend on one or the other side. The presence of a deviated nasal septum (DNS) could be the cause of breathing impairments and changes in the nose. Significant differences in middle turbinate and lateral nasal wall abnormalities were noted contra lateral to the direction of septal deviation.[2] The same authors add that increasing angles of septal deviation were associated with bilaterally severe sinusitis. The incidence of DNS is higher in Europeans than Africans or Asians. DNS hampers nasal physiology and together with conchal hypertrophy or other anatomical variations.[3] It pushes the concha more laterally making middle meatus narrow. Besides nasal obstruction, it exerts pressure to surrounding structures. This in turn disturbs the drainage pathways, affects the mucosal ciliary function by contact and leads to obstruction and secondary nasal infections in all sinuses by disturbing normal mucus drainage.[4]

Various studies showed that it is a deviated septum, which results in the osteomeatal complex obstruction leading to chronic rhinosinusitis (CRS). Many studies have shown the relationship between nasal septal deviation and chronic rhinosinusitis but, in very few studies the effect of increasing angle of septal deviation

on rhinosinusitis has been studied. The aim of this study was to evaluate angles of nasal septal deviation by measuring angle of septal deviation on computed tomography (CT) scan and to study the effect of increasing septal angle on chronic sinusitis.

METHODS

A prospective cross-sectional observational study was conducted in ENT department of Mahatma Gandhi Institute of Medical Sciences, Sevagram, India from September 2015 to August 2017 and 57 patients with diagnosis of having chronic sinusitis, were evaluated with computerized tomography of the para nasal sinuses (CT PNS) (coronal and axial views). Exclusion criteria were patients with acute sinusitis, malignant disease, previous nasal or sinus surgery, either open or endoscopic. A coronal CT PNS image best defined the osteomeatal complex was utilised for calculation of degree of septal deviation. The crista galli, anterior nasal spine and apex of nasal septal deviation were identified and marked. The straight line drawn connecting cista galli and anterior nasal spine then tangent drawn starting from crista galli touching to point of maximum septal deviation. The angle between first straight line and tangent is calculated using a standard protractor as shown in (Figure 1).[5]

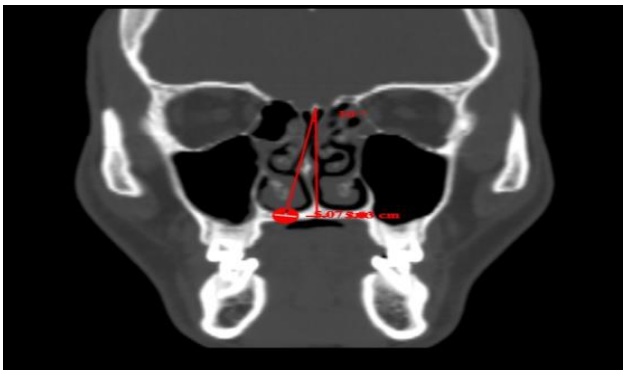

Figure 1: Method of measurement of septal angle on CT scan, between the apex of the septal deviation, crista galli and anterior nasal spine.

Table 1: Degree of DNS will be graded by the following classification.

Grade	Degree of DNS
Grade I	0^0-5^0
Grade II	6^0-10^0
Grade III	$>11^0$

Ethical approval

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional research committee of MGIMS, Sevagram and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study does not contain any studies with animals performed by any of the authors.

The relationship between nasal septal deviation and sinusitis were evaluated using analysis of variance (ANOVA).

RESULTS

The patients were divided into three categories according to their degree of DNS for presentation and comparison of data.

Group I include the patients with septal angles between 0° and 5°, whereas group II and group III accommodated patients with angles between 6°-10° and >10°, respectively. 15 patients were included in group I, 20 in group II, and 22 patients in group III. This implies that most patients had septal angulation in grade III (38.60%), followed by grade II (35.09%), then grade I (26.32%). Mean septal angle deviation in present study is 8.47^0 (Table 2).

Table 2: Distribution of patients according to angle of septal deviation in CRS.

Angle of septal deviation	No of patients	Percentage (%)
Grade I (0-5^0)	15	26.32
Grade II (6-10^0)	20	35.09
Grade III ($>10^0$)	22	38.60
Total	57	100
Mean ±SD	8.47±4.54 (0-17^0)	

DISCUSSION

The prevalence of nasal septum deviation varies from 18 to 80% according to various studies. DNS was found out to be 65% by Bharathi et al, 55.7% by Maru et al, 18.8% by Bolger et al, 44% by Dua et al, Tiwari et al, found out the prevalence of nasal septum deviation to be 88.2%, Aktas et al, reported incidence of DNS as 75.1%.[7-12] Studies of Azila et al, shows the prevalence as 5%.[13]

Table 3: Occurrence of deviated nasal septum in different studies in chronic rhinosinusitis.

Author	Year	Deviated nasal septum		
		Grade I (0^0-5^0) (%)	Grade II (6^0-10^0) (%)	Grade III ($>10^0$) (%)
Poorey et al	2014	20.9	56.7	22.4
Present study	2017	26.32	35.08	38.59

No other study in the literature has measured exact angle of septal deviation in terms of degrees except study conducted by Poorey et al and findings of our study correlates with them.[5]

Poorey et al found that patients with increasing angles are associated with a higher incidence of chronic rhinosinusitis.[5] Evidence of sinusitis on CT scanning had a higher degree of septal deviation.

In the present study, we have observed that with increasing angle of deviation of septum there is statistically significant increase in incidence of CRS.

CONCLUSION

Most patients of chronic rhinosinusitis had septal deviation in grade III, followed by grade II, then grade I. With increasing angle of septal deviation there is statistically significant increase in incidence of CRS.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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