Correlation Study Between Nasal Septal Deviation and Rhinosinusitis

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Abstract Chronic rhinosinusitis (CRS) is a major cause of concern worldwide. Nasal septal deviation (NSD) may either cause osteomeatal obstruction or may interfere with proper airflow and potentially predispose to sinusitis. Due to the lack of a universally accepted classification on NSD it has not been established whether NSD influences the development of sinusitis or not. Mladina in 1987 proposed a classification in which he classified NSD into seven different categories. The aims and objectives of this study are to observe the correlation between NSD and CRS and to study the relation of different grades of NSD with sinusitis as per Mladina's classification. Patients above 18 years of age presenting to ENT OPD with complaint of nasal obstruction, nasal discharge and headache were subjected to CT scan (nose and paranasal sinuses) coronal section with contiguous 5 mm thickness slice perpendicular to the hard palate in prone position. Presence of NSD and sinusitis was observed. 120 cases were studied. The mean age was 28.7 ± 9.37 years with age range 18–58 years. There were 92 (76.6 %) males and 28 (23.3 %) females with a M:F ratio of 3:1. Out of 120 cases, 114 (95 %) cases had NSD. Sinusitis was present in 63 (52.5 %) cases on CT scan. Out of 57 (50.0 %) cases with NSD and sinusitis, 13 (11.4 %) cases had sinusitis on the same side of NSD, 14 (12.28 %) cases had sinusitis on the side opposite to NSD and 30 (26.31 %) cases had sinusitis on both sides of NSD. There was no statistically significant relationship between NSD and sinusitis. As per Mladina's classification vertical deviations accounted for

majority of patient's septal deviations with 31 (27.1 %) cases of type II NSD and 24 (21.1 %) cases of type I NSD. The maximum number of cases with sinusitis had vertical deviations with type I NSD in 17 (27.0 %) cases and type II NSD in 18 (28.5 %) cases. The present study reveals that there is no correlation between NSD and sinusitis. Vertical deviations type I and type II are more prone to sinusitis as they involve the nasal valve area.

Keywords Deviated septum · Rhinosinusitis

Introduction

Chronic rhinosinusitis (CRS) is a major cause of concern worldwide. In United States (US) 18–35 million visits to health care professionals, occur every year for chronic rhinosinusitis [1]. Nasal septal deviation (NSD) may either cause osteomeatal obstruction or may interfere with proper airflow and potentially predispose to sinusitis. Due to the lack of a universally accepted classification on NSD it has not been established whether NSD influences the development of sinusitis or not. Mladina in 1987 proposed a classification in which he classified NSD into seven different categories [2]. The purpose of this study is to observe the correlation between NSD and CRS and to study the relation of different grades of NSD with sinusitis as per Mladina's classification.

Mladina's classification: According to Mladina's classification NSD is classified into seven types:

Type I Refers to a vertical ridge of the septal cartilage in the nasal valve area. This ridge does not reach the dorsum and does not disturb the function of the valve.

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Type II Refers to a vertical ridge in the region of the nasal valve, but in this case it reaches the nasal dorsum and thus disturbs the functions of the valve.

Type III Refers to the vertical ridge but in the deeper areas of the nose.

Type IV Refers to vertical ridges, one to the left and the other to the right. One in the anterior part and the other in the deeper parts of the nose.

Type V Refers to a horizontal deformity which manifests itself in a sabre like shape. It begins in the anterior part of the septum and becomes lateral the deeper it continues. The other side of the septum is completely flat.

Type VI Refers to bilateral deformities in the horizontal plane with anterior dislocation to one side and the deviation to the other side.

Type VII Where there is a combination of multiple deformities.

Results

Total 120 cases were studied. The mean age was 28.7 ± 9.37 years with age range 18–58 years. There were 92 (76.6 %) males and 28 (23.3 %) females with a M:F ratio of 3:1. Out of 120 cases, 114 (95 %) cases had NSD. There was an equal distribution on right and left side with 57 (50 %) cases on each side. Sinusitis was present in 63 (52.5 %) cases on CT scan.

Correlation Between Sinusitis and Nasal Septal Deviation

In 114 (95 %) cases of NSD, sinusitis was present in 57 (50.0 %) cases and absent in 57 (50.0 %) cases. NSD on the right side was present in 57 (50 %) cases, out of

Materials and Methods

This study was conducted in the Department of Otorhinolaryngology at Himalayan Institute of Medical Sciences, Swami Rama Nagar, Dehradun (UK) from September 2011 to September 2012. Patients above 18 years of age presenting to ENT OPD with complaint of nasal obstruction, nasal discharge and headache were subjected to CT scan (nose and paranasal sinuses) coronal section with contiguous 5 mm thickness slice perpendicular to the hard palate in prone position. Presence of NSD and sinusitis was observed. Patients with history of nasal surgery, sinonasal masses, history of trauma to nose, allergic, vasomotor and atrophic rhinitis were excluded from the study.

these sinusitis was present to the ipsilateral side in 7 (12.8 %), to the contralateral side in 7 (12.28 %), bilateral in 14 (24.56 %) and was absent in 29 (50.87.36 %) cases. NSD on the left side was present in 57 (50 %) cases, out of these sinusitis was present to the ipsilateral side in 6 (10.52 %), to the contralateral side in 7 (12.28 %), bilateral in 16 (20.87 %) and was absent in 28 (49.12 %) cases. Thus in a total of 57 (50.0 %) cases with NSD and sinusitis, 13 (11.4 %) cases had sinusitis on the same side of NSD, 14 (12.28 %) cases had sinusitis on the side opposite to NSD and 30 (26.31 %) cases had sinusitis on both sides of NSD. There was no statistically significant relationship between NSD and sinusitis (Table 1).

Table 1 Correlation between sinusitis and nasal septal deviation

		Presence of sinusitis			Absence of sinusitis
		Ipsilateral	Contralateral	Bilateral	
NSD	Right (<i>n</i> = 57)	07 (12.28 %)	07 (12.28 %)	14 (24.56 %)	29 (50.87 %)
	Left (<i>n</i> = 57)	06 (10.52 %)	07 (12.28 %)	16 (28.7 %)	28 (49.12 %)
Total <i>n</i> = 114		13 (11.4 %)	14 (12.28 %)	30 (26.31 %)	57 (50.00 %)

Chi square with fisher exact test $x = 0.35$, $df = 3$, $p = 0.94$

Table 2 Correlation between different grades of NSD as per Mladina's classification and sinusitis

Type	Number	Sinusitis	Percentage of sinusitis in different grades
I	24 (21.0 %)	17 (27.0 %)	70.8 %
II	31 (27.1 %)	18 (28.5 %)	58.0 %
III	17 (14.9 %)	07 (11.11 %)	41.1 %
IV	17 (14.9 %)	05 (7.93 %)	29.4 %
V	11 (9.6 %)	10 (15.87 %)	90.9 %
VI	09 (7.89 %)	03 (4.76 %)	33.3 %
VII	05 (4.38 %)	00	0
Total	114 (100 %)	63 (100 %)

NSD with sinusitis and NSD without sinusitis

Correlation Between Different Grades of NSD as per Mladina's Classification and Sinusitis

Vertical deviations accounted for majority of patient's septal deviations with 31 (27.1 %) cases of type II NSD and 24 (21.1 %) cases of type I NSD followed by horizontal deviations-type III 17 (14.9 %), type IV 17 (14.9 %), type V 11 (9.6 %), type VI 09 (7.89 %) and type VII 05 (4.38 %). The correlation between various types of NSD and sinusitis is shown in (Table 2).

Discussion

The rate of anatomical variations in nasal structures is reported to be between 64.9 and 80 % [4]. In our study we found NSD in 95 % cases. These findings were not in accordance with the studies of Azila A et al. who reported an incidence of NSD in 50 % cases and Dua K et al. who

reported an incidence of NSD in 44 % cases [5, 6]. This high incidence of NSD can be explained on the basis that our study was a prospective study conducted only in symptomatic population while the study of Azila A et al. [7, 8] was a case control study and the study of Dua K et al. included only diagnosed cases of CRS posted for FESS. In our study sinusitis was present in 63 (52.5 %) cases on CT scan. These findings were not in accordance with the studies by Al Anzy et al. and Stallman et al. who reported sinus disease in 80.1 % cases and 64.3 % cases respectively. The maximum number of cases 32 (27.35 %) had type II NSD, followed by type I with 25 (21.36 %) cases. The least number of cases 5 (4.27 %) had type VII NSD. These findings were in accordance with the study of Kamal J Daghistani who reported maximum number of cases 205 (34.8 %) to be of type I, followed by type II with 181 (30.7 %) cases and the least number of cases 4 (0.6 %) to be of type VII NSD [9]. But these findings were not in accordance with study of Rao et al. who reported maximum number of cases 63 (63 %) as type V and VI deviations and the least number of cases 08 (8 %) as type III NSD. 90.9 % of cases with type V NSD had sinusitis. These findings were in accordance with the findings of Rao et al. [3]. This suggests that people with horizontal spurs have a significantly increased probability of developing osteomeatal disease. In our study 70.8 % cases of type I NSD and 58.0 % cases of type II NSD had sinusitis. These findings can be explained on the fact that due to involvement of the nasal valve area normal ventilation of nose was hampered leading to a high incidence of NSD in these groups.

Conclusion

A standard classification of NSD should be developed and followed so that it can be included in evaluating rhinosinusitis.

The present study reveals:

- There is no correlation between NSD and sinusitis.
- Horizontal deviations type V are more prone to sinusitis.
- Vertical deviations type I and type II predispose to sinusitis due to involvement of nasal valve area.

Many more such studies are required to determine if a particular type(s) is more likely to develop OMD than other types.

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