

Relation Between the Nasal Septal Deviation and Chronic Rhinosinusitis

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Abstract

Purpose: The objective is to investigate the relation between the nasal septal deviation and chronic rhinosinusitis.

Methods: Two hundred and twelve patients with paranasal sinus computerized tomography (CT) images were examined under the INFINITT healthcare program. Lund-Mackay scoring system was used to define the chronic rhinosinusitis. As regards the nasal septal deviation, the nasoseptal angle $<5^\circ$ was accepted as normal, $5-10^\circ$ was accepted as mild NSD, $10-20^\circ$ as moderate NSD, and $>20^\circ$ was accepted as severe NSD. The findings were evaluated using the SPSS program Version 15.0.

Results: Two hundred and twelve patients, out of which 125 were males and 87 were females, ages ranging between 18 and 65 were evaluated. The nasal septum was evaluated as normal in 33.5% of the patients (n=71); while NSD was found in 66.5% of the patients (n=141). As regards the NSD grades, 31.1% of NSDs (n=66) was determined as mild NSD, 25.5% (n=54) as moderate NSD, and 9.9% (n=21) was determined as severe NSD. While chronic sinusitis was not found in 68.4% of the patients (n=145) based on Lund-Mackay scoring system, chronic rhinosinusitis was found in 31.6% (n=67). The frequency of chronic rhinosinusitis increased with the increasing NSD degree; however, the result was not found to be statistically significant (p=0.19). However, when we divided that patients as regards NSD as the patients with and without NSD, significant differences were found in the frequency of chronic rhinosinusitis (p=0.044).

Conclusion: Presence of NSD creates a risk factor for chronic rhinosinusitis.

Keywords: Septal deviation, chronic rhinosinusitis, anatomic etiologies, anatomic variations

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Introduction

Nasal septal deviation (NSD) is a rather frequent anatomic variation in the population, in can be seen in children with rates up to 30% and up to 80% in adults; its role in the chronic rhinosinusitis pathogenesis has not been determined clearly (1,2).

The classical definition of chronic rhinosinusitis is the inflammation of the nasal and paranasal sinus mucosa lasting for at least 12 weeks (3). Plain paranasal sinus x-rays fall short to show fine anatomic structures and important anatomic areas (4). Computerized tomography (CT) is the most useful method to show the existence and extent of sinus pathologies and to examine the risky areas (5).

The grading system with CT developed by Lund-Mackay allows the diagnosis of chronic rhinosinusitis with an accuracy rate of 97.7% (6).

To explain physiopathology of rhinosinusitis, and especially chronic rhinosinusitis is very difficult. Many different conditions can play a role directly or indirectly in the pathogenesis of chronic rhinosinusitis. Allergy, viruses, bacteria, super antigens, osteitis, bio-films, immunologic disorders and gastroesophageal reflux have been accused as the etiologic factors, and evidences have been shown for each (3,7). Many anatomic variations can cause chronic rhinosinusitis through obstruction in the osteomeatal complex (8). The objective of this study is to investigate the relation between the septum nasi deviation and chronic rhinosinusitis using the Lund-Mackay grading system.

Materials and Methods

Two hundred and twelve patients with paranasal sinus images taken with

computerized tomography (CT) were examined under the INFINITT healthcare program between May 2011 and May 2013. Lund-Mackay scoring system was used to define the chronic rhinosinusitis (4). To apply the Lund-Mackay scoring system, the right and left sinuses were divided into 6 areas as the maxillary sinus, anterior ethmoid sinus, posterior ethmoid sinus, sphenoid sinus, frontal sinus and the osteomeatal complex. Sinuses were graded as 0 (fully patent), 1 (partially patent) and 2 (full opacity) based on the mucosal thickening and presence of fluid within the sinus. Total scores equal to or greater than 5 and unilateral scores equal to or greater than 4 were accepted as chronic rhinosinusitis. As regards the nasal septal deviation (NSD), the nasoseptal angle $<5^\circ$ was accepted as normal, $5-10^\circ$ was accepted as mild NSD, $10-20^\circ$ as moderate NSD, and $>20^\circ$ was accepted as severe NSD (Figure 1). Findings were evaluated using the SPSS program version 15.0.

Results

Two hundred and twelve patients, out of which 125 were males and 87 were females, ages ranging between 18 and 65 were evaluated. The mean age was 35.29 ± 11.86 . The nasal septum was evaluated as normal in 33.5% of the patients ($n=71$); while NSD was found in 66.5% of the patients ($n=141$). As regards the NSD grades, 31.1% of NSDs ($n=66$) was determined as mild, 25.5% ($n=54$) as moderate NSD, and 9.9% ($n=21$) was determined as severe NSD. While chronic sinusitis was not found in 68.4% of the patients ($n=145$) based on Lund-Mackay scoring system, chronic rhinosinusitis was found in 31.6% ($n=67$). It was observed that frequency of chronic rhinosinusitis increased with the increasing grade of NSD; however, the results were not

statistically significant ($p=0.19$) (Table 1). However, when we divided that patients as regards NSD as the patients with and

without NSD, significant differences were found in the frequency of chronic rhinosinusitis ($p=0.044$) (Table 2).

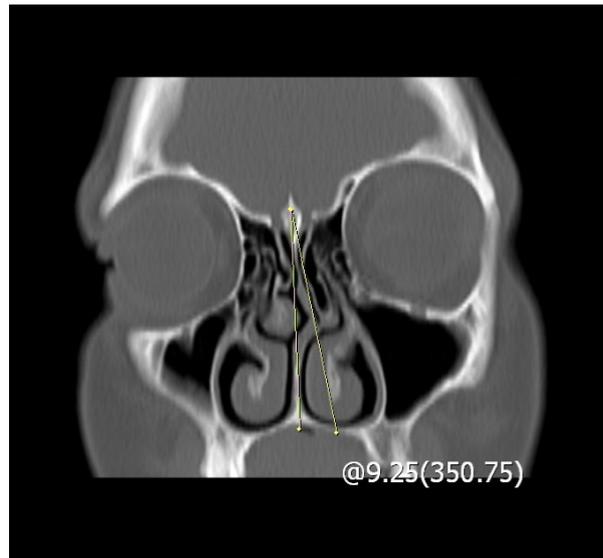


Figure 1: Measurement of the nasoseptal angle

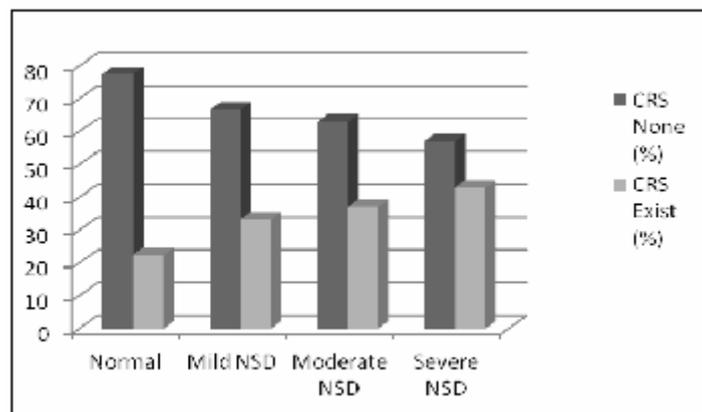


Table 1: Grade of NSD and existence of Chronic Rhinosinusitis

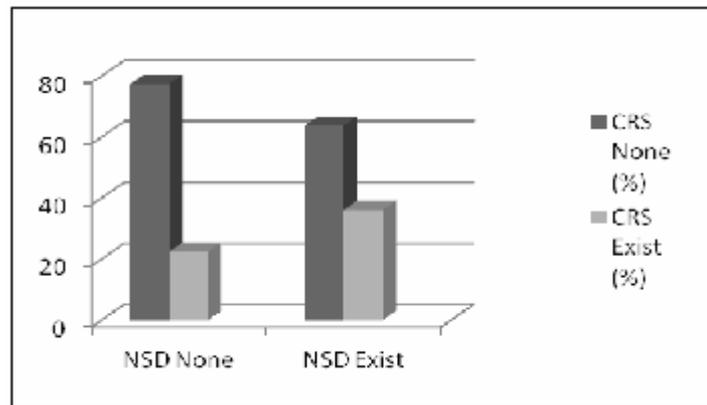


Table 2: Relation of NSD with Chronic Rhinosinusitis

Discussion

Nasal septal deviation is a rather frequent anatomic variation in the population, and its role in the pathogenesis of chronic rhinosinusitis has not been defined clearly (1). In a study carried out by Van der Veken et al., it was found that nasal septal deviation linearly increased with the increasing age, and reached up to 70% in the advanced ages (9). In a study carried out by Gray, nasal septal deviation was found in 30% level in children and 80% level in adults (2).

The classical definition of chronic rhinosinusitis is the inflammation of the nasal and paranasal sinus mucosa lasting for at least 12 weeks (3). The most valuable imaging method in paranasal sinus infections is computerized tomography (10). Plain paranasal sinus x-rays fall short to show fine anatomic structures and anterior and posterior ethmoid cells, frontal recesses, osteomeatal unit, mucosal pathologies and the bony anatomic variations of this area (4). The grading system with computerized

tomography (CT) developed by Lund-Mackay allows the diagnosis of chronic rhinosinusitis (6).

There are three theories explaining the physiopathological relation between the nasal septal deviation and chronic rhinosinusitis. The first of these is the mechanical theory of Stammberger (11). Secretion accumulates in the sinus as a result of the narrowing of the ostiomeatal complex, and causes chronic rhinosinusitis by being infected later on. The second theory is the aerodynamic theory (12). According to this theory, the mucociliary activity decreases following the nasal flow rate increase and mucosal dryness in relation with the nasal septal deviation and consequently, chronic rhinosinusitis develops. The third theory is the Bachert's pressure theory (13). According to this theory, deviation or the posterior nasal septum causes chronic rhinosinusitis by creating pressure and air flow changes within the maxillary sinuses.

A relation between chronic rhinosinusitis and NSD was found in many

studies in the literature (4,14,15). In some other studies however, opposite opinions have been stated (16). In a study carried out by Calhoun et al., nasal septal deviation was found with a ratio of 40% in patients with rhinosinusitis; while the same was 19.5% in the control group (14). In a study carried out by Cerrah YSS et al., NSD was found 34% in rhinosinusitis patients, while it was found 24.8% in the control group (4). It was concluded in a review published by Orlandi that there NSD and chronic rhinosinusitis are related; and this relation was more obvious particularly when the nasoseptal angle is greater than 10°. In the study of Elahi and Frenkiel, however, it has been stated that bilateral sinus involvement could be related to the presence of nasal septal deviation (8). In our study, it was observed that frequency of chronic rhinosinusitis appeared to increase with the increasing grade of SD; however, the results were not statistically significant because of the small number of our patients.

In conclusion, it was found in our study that the presence of SD created a risk factor for chronic rhinosinusitis. The reason of this can be the narrowing of the osteomeatal complex and the consequent impairment of the mucociliary function in the osteomeatal complex.

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