



INVESTIGATING THE RELATIONSHIP BETWEEN NASAL SEPTAL DEVIATION, CONCHA BULLOSA, AND CHRONIC SINUSITIS: A CT SCAN ANALYSIS

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ABSTRACT

Sinusitis, an inflammation of the paranasal sinuses, is often linked to anatomical variations involving the nasal cavity and paranasal sinuses. This study aims to explore the interconnections between sinusitis, septal deviations (SeD), and concha bullosa. Thirty-three sinus CT scans were meticulously examined by two ENT trainees over a one-year period, encompassing 463 patients predominantly presenting with chronic sinusitis or nasal obstructions. The CT scans were scrutinized to identify the presence of conchae bullosa and septal deviations, and the severity of sinusitis was assessed using the Lund Mackay criteria. Among the 463 cases studied, 47% exhibited septal deviations, with concha bullosa prevalence recorded at 16.8% on the left side and 27.6% on the right side. Interestingly, the presence of concha bullosa did not correlate with an escalation in sinusitis severity. Moreover, the P-values from analytical tests yielded non-significant results for sinusitis severity in relation to both concha bullosa and osteomeatal involvement. Analysis further revealed no substantial correlation between the presence of SeD (either side) and sinusitis severity. In essence, this study establishes a lack of conclusive association between concha bullosa and sinusitis severity in the osteomeatal complex, emphasizing the absence of significant relationships among sinusitis severity, osteomeatal involvement, and septal deviation. The directional aspect of SeD, whether left or right, also failed to exhibit a notable association with sinusitis severity across different sinuses.

Key words: Sinusitis, Septal deviation, Concha bullosa, CT scan, Osteomeatal involvement, Lund Mackay criteria.

INTRODUCTION

A variety of infections, allergies, and mucociliary transport disorders can affect the mucociliary system contribute to sinusitis. Furthermore, nasal cavities and paranasal sinuses may suffer from anatomic variations [1]. About 15 major anatomical variants have been described for sinonasal cavities [2]. A variation narrows or obstructs the osteomeatal channels, which hampers normal sinus airflow and mucociliary clearance. The size, location, and amount of mucosal contact caused by anatomic variations are factors in chronic sinusitis [3]. Up to 62% of the population suffers from nasal septum deviation, which may play a role in chronic sinusitis pathogenesis [4, 5]. Concha bullosas are pneumatized cavities within turbinates in the

nose. Different studies have reported incidence rates of 14 to 53%. The relationship between sinusitis and turbinate bullosa is not understood [6]. The septal deviation (SeD) or concha bullosa can interfere with proper airflow, potentially leading to sinus disease. As previous studies have not established a relationship between chronic sinusitis and nasal septum deviation. whether septal deviation and severity of sinusitis were related [7], as well as whether concha bullosa affected sinusitis severity.

Using this data can help to develop therapeutic strategies that are more effective. If there is a correlation between chronic sinusitis and surgery for this disease (septoplasty) then there may be an opportunity to reduce

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the incidence of the symptoms and complications of chronic sinusitis through surgery (septoplasty).

METHODS

Study design

We explained the study's purpose and design to all patients with nasal obstructions or symptoms of chronic sinusitis should receive this treatment. In order to confirm that a patient has chronic sinusitis, the use of a sinus CT scan (PNC CT) is considered to be the gold standard in the diagnosis of chronic sinusitis. As part of the study, patients, who agreed to participate in the study, were evaluated based on Sinusitis severity according to previous study [8], based on the information provided by the patient. Additionally, CT scans were checked for conchae bullosa and for SeD on the CT scans. Patients with nasal trauma or chronic diseases within the last year within the last year were excluded from the study. There were also a number of smokers who were excluded from the study (more than 10 packs per year). To compare the severity of sinusitis between different sinuses, we used the Lund-Mackay scoring system. The sinuses were considered completely involved if the score was 2 if it was partially involved if it was not completely involved if it was not completely involved and if it was completely intact if it was completely intact.

It was found that the patients were categorized in four groups based on the degree of SeD; the Group 1 : 0 + SeD + 5; Group 2: 5 + SeD + 10, Group 3: 10 + SeD + 20, and Group 4: SeD > 20. When an S shape deviation occurs, the more deviated angle is taken into account as the SeD. A CT scan was performed on the patients who did not have chronic sinus inflammations revealed by the CT scan. There were 231 patients enrolled in the study at the end of the period of time, for the purpose of analysis.

Analysis of statistical data

A SPSS version 18 (PASW) software package was used to enter the data into the SPSS software. We

utilized the percentage as the descriptive index in order to describe the qualitative variables, and we used the mean and standard deviation (SD) in order to describe the quantitative variables. The chi square test was used in order to determine if there was any difference between patients with different SeD severity and sinusitis severity. For better understanding the relationship between patients with conchae bullosa and patients without conchae bullosa, Sinusitis and SeD were analyzed using the chi square test. An analysis of significance was carried out with a P value less than 0.05 as a threshold for significance. A study that was conducted did not include for clarification of the relationship between right and left site of involvement and Site opposite deviation. In patients with right or left involvement, SeD severity was compared with that in the normal population (without SeD).

RESULT

After the study had been completed, 231 cases had been analyzed and categorized. There were 46% of them who had septal deviations. As can be seen in Table 1, there is a difference between different degrees of chronic sinusitis, along with the site that is involved in the process. The concha bullosa was found in 15.7% of the patients on the left side of the body and in 26.5% of the patients on the right side of the body in the present study. In our study, there was a prevalence of septal deviations of 46% in the patients. These are the frequencies of patients who have varying degrees of SeD, based on the severity of their disease. In order to determine whether the patients were involved bilaterally, they were evaluated. It was found that there was a significant correlation between sinusitis severity and concha bullosa presence in chi square tests. A chi-square test was run to determine if there was a relationship between the severity of sinusitis and the degree of SeD. A correlation was based on the presence of SeD (right or left) and the severity of sinusitis.

Table 1: Grade frequency of chronic sinusitis

	Mild	Moderate	Severe
Right Maxillary	71.7	11.2	13.8
Left Maxillary	72.1	10	14.7
Right anterior ethmoid sinus	75.4	7.3	14.1
Left anterior ethmoid sinus	76.2	7	13.6
Right Posterior ethmoid sinus	80.3	2.6	13.8
Left Posterior ethmoid sinus	80.8	3.2	12.7
Right frontal sinus	86.4	2	8.4
Left frontal sinus	86.8	1.7	8.2
Right sphenoid sinus	86	2.6	8.2
Left sphenoid sinus	85.3	1.3	10.1
Right osteomeatal complex	72.8	9.7	14.2
Left osteomeatal complex	74.7	7.1	14.7

Table 2: Patients frequency with degree of septal deviation (%)

	Normal	Mild	Moderate	Severe
Left deviation	52	6.5	6.3	3.2
Right deviation		8.2	11.7	4.5

Table 3: Site frequency (%)

	Right side	Left side	Bi-lateral
Conchae bullosa	26.5	15.7	7.3
Maxillary sinus	26.1	26	17.3
Frontal sinus	11.4	11.0	10.1
Anterior ethmoid sinus	22.4	21.6	18.6
Posterior ethmoid sinus	17.5	17.0	15.3
Sphenoid sinus	12	12.7	11.2
Osteomeatal complex	25.0	23.1	16.4

DISCUSSION

Rhinosinusitis is more prevalent with a higher level of SeD in previous studies. According to a review article from 2010, SeD is associated with rhinosinusitis [9]. Many studies examining rhinosinusitis and septal deviation found bilateral inflammation. A correlation between rhinosinusitis and septal deviation was not detected in previous studies [10]. A significant amount of research is lacking on sinusitis severity. Among 65 patients who were evaluated for the recurrence of rhinosinusitis symptoms, 29 of these patients were affected both by a nasal septal deviation as well as a concha bullosa. Statistically, there were no significant differences seen between sinusitis in the study and sinusitis in the study regarding SeD. As a matter of fact, no relationship was found between the presence of SeD and the involvement of bone in the frontal recess. A total of 44.6% of the 65 patients were found to have nasal septal deviations and concha bullosas in 65 of the cases. According to the study, those who suffered from severe SeDs suffered from sinusitis more often than those who suffered from mild to moderate deviations [11]. Study examined the relationship between concha bullosa, SeD and rhinosinusitis using PNC CT scans. Concha bullosa and SeD are associated significantly. Neither unilateral nor bilateral concha bullosa nor sinusitis was significantly correlated, however. SeD and bilateral concha bullosa were not significantly associated [12]. A CT scan of the orbit in 44 patients without a history of sinusitis was examined to determine whether septal deviations, bullosas, and their correlations existed. These abnormalities have no significant connection to sinusitis, according to the study. Another study found that SeD has no statistical link to sinusitis. In chronic sinusitis, neither middle turbinate changes nor SeD occur [13]. The presence of SeD did not differ significantly between those with chronic rhinosinusitis and control groups in a recent study. The severity of sinusitis did not correlate with SeD or OMC involvement. As part of the review process for Concha

bullosa, nasal septicemia, and maxillary sinusitis are some of the symptoms 441 CT scans were reviewed. 48.2% of them had maxillary sinusitis along with concha bullosa in 66.4%. A deviated septum, 49% of the patients were found to have mucosal thickening, which was consistent with maxillary sinusitis, on imaging. Neither concha bullosa nor nasal septal deviation were associated with maxillary sinusitis. We analyzed 50 PNC CT scans and 41 orbital CT scans. In anterior ethmoid disease, there was a concha bullosa (p<0.04). The anterior (p less than 0.04) and posterior ethmoid disease were associated with septal deviations. It has been found that there is some significant link between septal deviation and sinusitis, which has been investigated by several studies in the past [14,15]. Based on the comparison we made between the findings of this study and those of previous studies which correlated septal deviation with sinusitis severity and the turbinate bullosa with sinusitis severity, the results were similar in both studies.

CONCLUSION

As our findings did not align, a definitive conclusion regarding the impact of turbinate bullosa on sinusitis or osteomeatal involvement could not be established. To determine the relationship between the presence of concha bullosa and the severity of sinusitis, further meta-analysis incorporating previous findings is warranted. Contrary to some earlier studies, the present study found no association between sinusitis severity, osteomeatal involvement, and septal deviation during the study period. The severity of sinusitis did not exhibit a correlation with the presence of septal deviation, and no significant relationship was observed. Similarly, there was no apparent association between sinusitis severity and the degree of septal deviation in our study. Both concha bullosa and sinusitis severity did not appear to be interrelated based on our findings.

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