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Research Article

The Effect of Septorhinoplasty on Allergic Nasal Symptoms in Asymptomatic Patients

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Abstract

Objective: To investigate the impact of nasal plastic surgery on allergic rhinitis symptoms in patients with a personal history of allergic rhinitis.

Study Design: A prospective observational study, consecutive sampling of patients indicated for septorhinoplasty with concomitant positive personal history of allergic rhinitis over a 12-month period.

Setting: Academic tertiary otolaryngology clinic.

Subjects and Methods: Seventy-three patients with positive personal history of allergic rhinitis underwent septorhinoplasty for structural nasal deformities. No turbinate manipulation was performed. Symptoms associated with allergic rhinitis were quiescent in those with personal history. A visual-analogue-scale (VAS), a symptom scoring system (TSS), and also the degree of nasal deviation and turbinate hypertrophy were used to evaluate the patients preoperatively and six months postoperatively.

Results: The mean TSS score and the severity of septal deviation were significantly reduced after the surgery ($P=0.009$ and $P<0.0001$ respectively); while VAS scores, severity groups of TSS, and also severity of turbinate hypertrophy were not significantly changed ($P=0.515$, $P=0.654$ and $P=0.146$ respectively).

Conclusion: Surgical nasal intervention in patients with quiescent allergic rhinitis does not necessarily trigger the disease. Taken in combination with other studies, we suggest a more cautious approach must be taken in candidates for rhinoplasty with active allergic rhinitis.

Keywords: Allergic rhinitis; Nasal surgery; Rhinoplasty; Septoplasty; Nasal obstruction

Introduction

Allergic rhinitis is a mucosal inflammation of intranasal airways due hyper-responsiveness to certain allergens through an IgE-mediated immunologic interaction [1-6]. The process starts when airborne allergens are first exposed to the immune system at the nasal mucosa. Thereafter, through a sensitization process, some allergen-specific IgE are generated which circulate in the peripheral blood and attach to the surface basophils and mast cells [5]. From the second exposure on, the allergens activate local immune cells and subsequently lead to the "allergic response" at the site of exposure. This, in the nose, is expressed as acute nasal symptoms and dominantly as nasal obstruction [5,7-11].

As one of the septorhinoplasty outcome, the surgery of deviated septum is effective in relieving nasal obstruction symptoms. However, given the high incidence of allergic rhinitis in the general population, a large subset of patients with either cosmetic nasal deformities or structural nasal obstruction requiring surgical intervention may be at risk for exacerbation of allergic rhinitis. The effect of nasal surgery on allergic rhinitis in this patient population has not been examined. The majority of studies have focused on the effect of active allergic rhinitis on surgical outcomes, such as the study by Karatzanis and Stoksted, which reported poorer outcomes of nasal surgery in patients with concomitant allergic rhinitis [12,13]. A study by Kim at Inha University in Korea, demonstrated less patient-satisfaction in those undertaking nasal surgery merely for their allergic rhinitis compared to those with concomitant nasal deformities and allergic rhinitis [10]. These studies provide evidence that the outcomes of nasal surgical interventions are poorer in patients with allergic nasal disease, or more specifically, that patients with allergic rhinitis do not necessarily get better results from their surgeries than normal patients [10,12-17].

We sought to determine prospectively if surgical intervention in patients at-risk for allergic rhinitis symptoms (those with a personal history but currently quiescent) triggers an allergic-type mucosal response or aggravates the pre-existing condition and finally what is its effect on nasal airflow after surgery.

Subjects and Methods

A prospective observation study was conducted at a tertiary academic center (ENT- clinic of Imam Khomeini Hospital, an affiliate of Tehran University of Medical Sciences - TUMS) through March 2011 to March 2012.

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Table 1: Comparison of Pre- and Post-op Variables.

Variable	Pre-op Value	Post-op Value	Test / P value
Mean VAS[1] scores for Nasal Symptoms	3.82±2.86	3.6±2.66	Paired Sample T-Test / P=0.515
Septal Deviation			
Normal	21 (28.8%)	69 (94.5%)	Chi-Square / P<0.0001*
Mild	26 (35.6%)	3 (4.1%)	
Moderate	16 (21.9%)	0	
Severe	10 (13.7%)	1 (1.4%)	
Turbinate Hypertrophy			
Mild	51 (69.9%)	61 (83.6%)	Chi-Square / P=0.146
Moderate	17 (23.3%)	9 (12.3%)	
Severe	5 (6.8%)	3 (4.1%)	

[1]VAS: Visual Analogue Scale; *: Significant

Study subjects

Seventy three consecutive patients were chosen among septorhinoplasty candidates referred to our clinic (Cosmetic or Functional reason). The patients were all positive for personal history of allergic rhinitis. We used patients' history to documentation allergic rhinitis. The purpose of the surgery was not to treat the allergic rhinitis but to correct anatomical deformities (cosmetic or functional) for which septorhinoplasty was indicated. Exclusion criteria included patients with inferior turbinate hypertrophy requiring turbinoplasty, patients with pronounced symptoms of allergic rhinitis (overlapped with other nasal symptoms due to anatomical problems), and those with concomitant sinusitis, nasal polyposis, cases of revision-surgeries, as well as all patients with an underlying systemic disease other than atopia.

Ethical approval: The protocol of this study was approved by the Institutional Review Board of the Tehran University of Medical Science. Detailed information about the study was given to the participants and a written informed consent was obtained from each one. All aspects of the study were conducted according to the Declaration of Helsinki.

Type of procedures and medical treatment: We used the external rhinoplasty approach in all cases and controls. All procedures were performed under general anesthesia by one of the senior authors. Internal lateral osteotomy was performed in all procedures, and no packing was used. Antibiotic prophylaxis (Cephalexin 500 mg/QID for five days) was prescribed to all patients and the only prescribed analgesic was acetaminophen. Subsequently, their nasal splints were removed after 7 days but taping was continued for 4 weeks thereafter. There was no usage of corticosteroid or antihistamine drugs in perioperative or postoperative periods.

Variables

The diagnosis of allergic rhinitis in patients was according to patients' history. The state of nasal symptoms and its intensity was evaluated once one month prior to the surgery and once six months after the surgery via a subjective visual analogue scale (VAS) and also an objective symptom scoring system (total nasal symptom score – TNSS). The states of septal deviation and turbinate hypertrophy were also evaluated at the same time.

Visual analogue scale (VAS): The patients used a visual analog scale (VAS) to subjectively determine the intensity of their nasal obstruction. These results were translated into a 0 to 10 numeric scale, with a value of "10" being the strongest symptoms.

Total nasal symptom score (TNSS): Seven symptoms, which were the most common areas of complaint by patients, were objectively addressed by one of authors. In this scale, the absence of a symptom scored 0 while the presence of a symptom was categorized either as mild (1 score), moderate (2 scores), or severe (3 scores); accordingly, with seven questioned items and by adding the scores, a scoring system with a total score ranging from 0 to 21, named as "Total Nasal Symptom Score or TNSS" [18], was formed that identified the clinical severity of the symptoms each patient had. Based on the final TNSS, the patients were categorized into four symptom severity groups: patients with no symptoms (scores of 0), mild symptoms (scores of 1-7), moderate symptoms (scores of 8-14), and severe symptoms (scores of 15 to 21) [18]. We asked the patients to answer the TNSS questions according to their previous six months symptoms. Changes in the "*mean TNSS*" and also "*TNSS groups*" were used to evaluate the changes in the pre- to post-operative symptoms.

Septal deviation

As a factor that the septorhinoplasty intends to correct surgically, septal deviation was defined as any significant deviation could be found in anterior rhinoscopy [16].

Turbinate hypertrophy: The inferior turbinates were not operated on, and thus changes in turbinate hypertrophy could reflect the effect of surgery on exacerbating or alleviating nasal mucosal swelling. The severity of turbinate hypertrophy was referred to as "mild" for those occupying 0 to 30% of nostril cavity, "moderate" for 31-60% occupation, and severe for 61-100% , which was evaluated by anterior rhinoscopy.

Statistical methods: The data were analyzed using SPSS version 15.0 for Windows (SPSS Inc., Chicago, IL). Comparative studies were performed by Chi-Square and Paired Sample T-Test. The values were evaluated using descriptive statistical methods (mean ±SD) and p value < 0.05 was significant.

Results

Seventy three patients who were candidate septorhinoplasty entered to the study. Twenty one patients (28.8%) were male and the rest 52 (71.2%) were female. The mean age was calculated as 26.63±4.62 years ranging from 18 to 45. Table 1 outlines the results comparing the pre- and post-op status of nasal symptoms and outcomes.

Moreover, pre- operative (4.33±3.92) and post-operative (3.22±3.52) TNSS was compared, which showed there was a reduction after surgery, which was near to significant (p value=0.07). Also, the

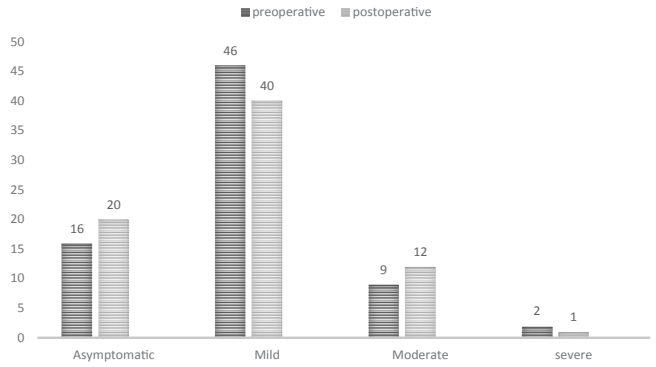

Chart 1: Comparison of Pre- and Post-op Mean Total Symptom Score in different groups.

preoperative and postoperative mean TNSS compared in different groups in Chart 1, which did not have significant difference. (Chi-Square/ P=0.654).

In our study group 7(9.6%) of patients stated allergic symptoms for the first time after surgery and also 12(16.4%) of them indicated aggravating of preoperative allergic symptoms.

One complication was reported in this study group, (synechia), which was corrected in the post-operative period.

Discussion

Implicit to all nasal surgeries may have a list of intra- or post-operative complications such as infection, peri-orbital edema, ecchymosis, bleeding, chronic postoperative nasal obstruction, septal perforation, olfactory alterations, and finally enhanced allergic rhinitis leading to chronic nasal mucosal edema [15-22]. Considering all these for nasal surgeries, the patient selection gets a bit harder, but one of patient's major concerns among above mentioned possible complications is nasal obstruction due to rhinitis. Therefore, this study was aimed to investigate the impact of nasal surgery on inducing or aggravating of rhinitis. The results of our study showed that the surgery does not necessarily deteriorate the preexisting allergic rhinitis or does not trigger the disease in those with family history of allergic rhinitis.

The subjects of our study were patients with diagnosed allergic rhinitis but not in their active period of the disease (e.g. seasonal allergic rhinitis which were undertaking the surgery in an earlier or later season), so the nasal symptoms were more attributable to the structural deformity than the underlying atopia. This gave us a purified patient series, all undergoing nasal surgeries for structural deformity, none suffering from active allergic rhinitis, and all with potentiality to develop the allergic rhinitis if the surgery could trigger the disease. However, the presence or absence of symptoms could be a consequence of the survey being performed when the patients' symptoms were not active (or vice versa). Since, the patients were observed over a one year period, and also the patients had surgery at varying times, so this effect should be negated.

Previous studies on the effect of underlying allergic rhinitis on the outcomes of nasal surgery [12,13], or those investigating the role of surgery on patients with allergic rhinitis [10] demonstrated poorer outcomes in actively allergic patients [10,12-15]. This may be because the inflammation associated with surgical intervention was superimposed on pre-existing mucosal inflammation due to active allergic disease, enhancing the symptoms of allergic rhinitis and leading to chronic nasal mucosal edema state [19]. Our study, in contrast to this, showed that if the nasal mucosa is not actively inflamed due to allergic disease, the inflammation associated with surgery itself does not necessarily exacerbate the nasal allergic symptoms. Rather, as theoretically predicted, varying degrees of relief from nasal obstruction are obtained.

We found that allergic rhinitis symptoms improved significantly after surgical intervention, concomitant with an improvement in septal deviation scores. This could be interpreted to mean that the improved space intranasally is masking some of the allergic rhinitis symptoms. However, given the range of symptoms gauged by the TNSS, we feel that this is probably not the case. Rather, we take this as a positive demonstration that the septal correction itself, as well as structural changes associated with rhinoplasty, did not exacerbate or activate allergic rhinitis symptoms at a time point six months after surgery. Furthermore, the insignificant change in VAS scores in addition to TSS categorization groups demonstrate that the surgery has not made the symptoms of allergic nasal disease worse. Taken together, these data show that the surgical intervention in the study group does not worsen symptoms of allergic rhinitis.

Given prior reports of poorer outcomes of surgery in patients with concomitant allergic rhinitis [10,12-15], and our finding that surgery benefits may be preserved if the patients are not in their active phase of allergic rhinitis, we suggest that a more cautious attitude must be taken in patient selection for nasal surgeries. For example, this may require applying maximum medical treatment even in purely aesthetic patients, or maybe postponing the surgery (e.g. a later season) until the patient is not in the active phase of the disease.

To our knowledge, this is the first study to examine prospectively the effect of septorhinoplasty on allergic nasal disease. However, it has its shortcomings. To further examine this, a case-control study comparing a case-group of patients with concomitant allergic rhinitis and structural deformity, and a control-group comprising of patients with structural deformity alone would demonstrate whether the outcomes of the group with allergic rhinitis were poorer; but this could not show if the surgery triggers the allergy in those with potential trends. Also, subjective symptoms and patients' history were used in this research to diagnosis allergic rhinitis, which can be superseded with more precise tools in future studies.

Conclusion

Rhinoplasty may not necessarily cause or deteriorate allergic rhinitis in patients who are not in active phase of the disease.

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