

Investigating the Results of Cautery of Inferior Turbinates in Septorhinoplasty on the Quality of Life of Patients with Allergic Rhinitis

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ABSTRACT

Background: Septoplasty and rhinoplasty are the most common nose-related procedures that require surgery with minimal complications and the highest quality.

Aim: To evaluate the results of cautery of inferior turbinates (CIT) in septorhinoplasty on the quality of life (QOL) of patients with allergic rhinitis.

Materials: and **Methods:** This study was performed on 120 patients with septorhinoplasty (60 in the intervention group (CIT) and 60 in the control group (septorhinoplasty without cautery). The patients were randomly divided into two groups, and then before and after the surgery, their QOL and nasal obstruction were recorded. Pair and independent t-tests were used to compare the data.

Results: The results of our study indicated that after the surgery, the mean QOL in the patients of the intervention group was significantly higher than the control group's (106.21 vs. 83.95) ($P < 0.001$) and the mean nasal obstruction in the patients of the intervention group was significantly lower than the control group's (3.08 vs. 8.08) ($P < 0.001$).

Conclusion: Considering the effect of the surgery type on the patients' prognosis and response to the treatment, it is necessary to perform appropriate treatment measures in the patients with deviated nasal septum such as CIT, in order to improve the quality of the treatment and make the patients more satisfied during treatment by further reducing the obstructive symptoms and increasing the QOL.

Keywords: septorhinoplasty, cautery of inferior turbinates, allergic rhinitis

INTRODUCTION

Septorhinoplasty is a combination of rhinoplasty and septoplasty. Rhinoplasty is performed to reshape the nose due to its plastic or functional problems, while septoplasty corrects the deviation of the nasal septum for normal breathing. Septorhinoplasty is performed to reshape the nose and make it fit the other parts of the face, as well as to correct the nasal septum, which is deviated due to trauma, illness, or sometimes previous surgery^{1,2}.

This surgery is one of the most common rhinoplasty surgeries performed worldwide. The Statistics in 2005 indicated that about 201,000 rhinoplasty surgeries were performed in the United States alone³.

Definitely breathing after rhinoplasty is a very serious issue. In the past, however, the goal of rhinoplasty was only to reduce the size of the nose, which is why many patients developed postsurgical acute breathing and olfaction problems. But in recent decades, attention to the evaluation of the consequences of surgery in all specialized branches of surgery science and the interest in examining the functional consequences and QPL as a way to validate the results of surgery has increased⁴. Due to the high prevalence of septoplasty and rhinoplasty surgeries, it is incumbent to perform up-to-date and appropriate surgical techniques in order to minimize the complications along with the highest quality. To this end, surgical techniques have been changed dramatically over the years to minimize the complications of surgery.

Septorhinoplasty is a surgical procedure that changes the size and shape of the nose to beautify the appearance of the nose and at the same time corrects the deviation of

the nasal septum, which helps to improve the patient's respiratory condition⁵. They are the main source of airflow in the nose and play an important role in normal respiratory function⁶. The results of a number of studies suggest that large inferior turbinate leads to narrowing of the internal valve and therefore causes nasal congestion⁷. In this regard, it should be noted that in rhinoplasty surgery, the space of the inferior turbinates is reduced^{8,9}. So far, few studies have dealt with whether or not turbinate repair during rhinoplasty is effective on clinical results, and there is limited information. For example, a prospective study of the people who underwent rhinoplasty five years later showed that the modern rhinoplasty techniques significantly improve a patient's QOL in terms of appearance and nasal function¹⁰. However, unlike the above results, the study which examined the QOL of the people after septorhinoplasty, which is accompanied by changes in the inferior turbinate, indicates that the correction of turbinate through submucosal diameters, does not improve the consequence of QOL in the short term (3 months) generally or specifically¹¹.

Considering the evidence and contradictions of the findings in a few studies, the need for a study in this regard is strengthened. Therefore, the aim of this study is to investigate the results of CIT in septorhinoplasty on the QOL of the patients with allergic rhinitis. Patient's postsurgical QOL plays an important role in any type of surgery and finding effective factors in increasing the postsurgical QOL of the patients is very important nowadays. In this study, by performing a CIT at the same time as the septorhinoplasty surgery, we are trying to find its effect on the postsurgical QOL of the patients.

METHOD

Design: The study was a clinical trial performed on the patients with allergic rhinitis older than 16 years who were candidates for septorhinoplasty surgery and attended Khatam Al-Anbia Hospital in Zahedan (Iran) during 2016-2017. All the stages of this research have been approved by the Institutional Review Board (IRB) of Tehran University of Medical Sciences. In addition, all the steps have been adjusted according to the latest Helsinki Declaration Reviews (12). It should be noted that after a thorough explanation of the steps and purpose of the study, written informed consent was obtained from each of the participants. It should be mentioned that this clinical trial has also been recorded in the Iranian Registry of Clinical Trials (IRCT).

(www.irct.ir; trial identifier with the IRCT 20170619034648N1)

Participants: The participants in this study were selected from the patients with allergic rhinitis older than 16 years who were candidates for septorhinoplasty surgery and attended Khatam Al-Anbia Hospital in Zahedan during 2016-2017. The criteria for entering the study include: Rhinitis allergy, complaints of anatomical deformities such as septal deviation, insufficient support of the tip of the nose or its rotation, collapse of the nasal valves, or crooked nose, which under these disorders the patient has been a candidate for septorhinoplasty surgery, and an age over 16 years. The criteria for the exit and elimination of the participants, including previous nasal surgery; turbinate hypertrophy as the main cause of nasal obstruction; need to perform other surgeries such as functional endoscopic sinus surgery, adenoidectomy; and dissatisfaction with entering the study

Sample size: According to similar studies, 120 patients (60 in the intervention group (CIT) and 60 in the control group (septorhinoplasty without a cautery)) were randomly selected among the patients with allergic rhinitis who had attended Khatam Al-Anbia Hospital in Zahedan in 2017-2016, aged more than 16, and were candidates for septorhinoplasty surgery.

Randomly assigning and homogenizing the participants: The patients were randomly assigned to two treatment groups (intervention and control) using computer codes. Throughout the study, physicians, questioners, and data analysts worked without any knowledge of the participants in each group.

METHOD

In this study, which is a clinical trial, 120 patients with allergic rhinitis candidate for septorhinoplasty surgery at Khatam Al-Anbia Hospital in Zahedan in 2016-2017, by following the entry and exit criteria of the study, attended the project easily and available. The patients were asked before and 3 months after the surgery, to fill in the World Health Organization (WHO) QOL-BREF questionnaire, Nasal Obstruction Symptom Evaluation (NOSE) questionnaire, and the Visual Analog scale and nasal obstruction (VAS-NO). Demographic information of

the patients such as age, gender, and education were also collected.

Data collection: Data collection tools were the WHO QOL-BREF and NOSE questionnaires, and VAS-NO (13-15). The WHOQOL-BREF questionnaire is a 26-item questionnaire that includes four sub-scales including physical health, mental health, social relationships, environmental health, and a total score. The reliability of its sub-scales in Iran is as follows: Physical health 0.77, mental health 0.70, social relations 0.75, and environmental health 0.84.

The NOSE questionnaire is used to evaluate the functional changes and consists of 5 questions related to nasal breathing, each of which is scored on a scale of 0 to 4 by the patient. A score of 0 means no problem and a score of 4 is given to indicate a severe problem. The final results are obtained by multiplying the raw score by 5 to obtain the score from zero to one hundred. The higher the score, the worse the symptoms.

The VAS-NO is utilized to assess the degree of obstruction, and the individuals score the degree of nasal obstruction on a scale of zero (indicating no obstruction or completely open) up to 100 (indicating maximum symptoms or completely blocked).

Moral considerations: All the measures taken are in line with the patients' treatment goals. A written consent was obtained from all the patients to participate in the study after a full explanation.

The patients were also assured that their participation in this study is optional, they could withdraw from the study at any time, and their names would not be mentioned anywhere. Also, no additional costs were imposed on them.

This research was approved by ethical committee of Zahedan University of Medical Sciences with code IR.ZAUMS.REC.1396.13

Statistical analysis: The data were collected by SPSS version 16, analyzed using descriptive statistics (frequency, mean, and standard deviation), and the statistical tests according to the study objectives using paired and independent t-tests. The significance level in all the analyzes was considered to be 0.05. The normality of the variables was assessed by the Kolmogorov-Smirnov test. In the case abnormality of the QOL scores and grades or the degree of obstruction or the score of the symptoms of nasal obstruction, the Wilcoxon parametric test was used.

RESULTS

Initial profile of the patients: The aim of this study was to investigate the results of CIT in septorhinoplasty on the QOL of the patients with allergic rhinitis. The study was performed on 120 people (60 in the intervention group (CIT) and 60 in the control group (septorhinoplasty without cautery), of whom 24 (20%) were male and 96 (80%) were female. The results illustrated that the mean age of the participants was 6.61 ± 31.75 years (50-19 years). The mean and age deviation in the patients of the two groups were not statistically significant ($P > 0.05$) (Table 1).

Also, according to the statistical analysis, the frequency of gender in the patients of the two groups was not statistically significant ($P > 0.05$) (Table 2).

QOL according to the WHOQOL-BREF questionnaire

The mean score of the pre-surgical QOL in the patients of the two groups was not statistically significant ($P > 0.05$). On the other hand, it was found that the mean score of the postsurgical QOL in the patients of the intervention group was significantly higher than the control group (106.21 versus 83.95). In other words, 29.71 number were increased in the intervention group and 7.08 number were increased in the control group (Table 3).

Nasal obstruction based on the NOSE questionnaire and the VAS-NO: The statistical analyzes indicated that the mean score of the pre-surgical nasal obstruction in the patients of the two groups did not have a statistically significant difference ($P > 0.05$). While after the surgery it was discovered that the mean score of the nasal obstruction in the patients of the intervention group was significantly lower ($P < 0.001$) than the controlled group's (3.08 vs. 8.08), or in other words, in the intervention group and in the control group a significant decrease of 8.9 and 3.21 units were seen, respectively ($P < 0.001$) (Table. 4).

QOL and nasal obstruction in the patients based on age: The data analysis indicated that the mean changes in

the QOL score in the intervention group categorized into two age groups (less than 30 years and more than 30 years) had a more significant increase in both age groups than the control group ($P < 0.001$). Also, the mean changes in the nasal obstruction in the age-based groups of the intervention group had a more significant decrease in both age groups than the control group ($P < 0.001$) (Table. 5).

QOL and nasal obstruction in the patients based on gender: The mean changes in the QOL score in the intervention group divided into two gender-based groups increased more in both genders than in the control group, but the mean changes in the nasal obstruction in the gender-based groups of intervention group decreased more in females than in the control group. ($P < 0.001$) (Table. 6).

QOL and nasal obstruction
The QOL increased significantly in both control and intervention groups, and the nasal obstruction decreased significantly in both groups ($P < 0.001$) (Table 7).

Table 1: Mean and age deviation in patients of the two groups

Group	Number	Mean	St. Deviation	P-value
Control	60	31.31	6.24	0.38
Intervention	60	32.28	6.98	

Table 2: Gender frequency in patients of the two groups

Gender		Control	Intervention	Total	P-value
Male	number	12	12	24	1
	percentage	20.0%	20.0%	20.0%	
Female	number	48	48	96	
	percentage	80.0%	80.0%	80.0%	
Total	number	60	60	120	
	percentage	100.0%	100.0%	100.0%	

Table 3: Mean and deviation of pre-surgical and postsurgical QOL in patients of the two groups

Variable	Group	Number	Mean	St. Deviation	P-value
Pre-surgical	control	60	76.86	16.23	0.904
	intervention	60	76.5	15.37	
Postsurgical	control	60	83.95	15.15	<0.001
	intervention	60	106.21	16.51	
Changes in QOL scores	control	60	7.08	11.68	<0.001
	intervention	60	29.71	16.19	

Table 4. Mean and deviation of pre-surgical and postsurgical nasal obstruction in patients of the two groups

Variable	Group	Number	Mean	St. Deviation	P-value
Pre-surgical	control	60	11.3	5.58	0.904
	intervention	60	11.98	5.61	
Postsurgical	control	60	8.08	4.38	<0.001
	intervention	60	3.08	3.81	
Changes in the score of nasal obstruction	control	60	-3.21	5.69	<0.001
	intervention	60	-8.9	4.9	

Table 5: Mean and deviation of changes in QOL score and nasal obstruction in patients of the two groups based on age

Age	Variable	Group	Number	Mean	Deviation	P-value
30 and less	QOL	control	25	8.08	13.11	<0.001
		intervention	21	34.23	17.22	
	Nasal obstruction	control	25	-3.24	5.03	
		intervention	21	-9.14	5.33	
More than 30	QOL	control	35	6.37	10.68	<0.001
		intervention	39	27.28	15.27	
	Nasal obstruction	control	35	-3.2	6.19	
		intervention	39	-8.76	4.72	

Table 6: Mean and deviation of QOL score changes and nasal obstruction in patients of the two groups based on gender

Gender	Variable	Group	Number	Mean	Deviation	P-value
Male	QOL	control	12	2.33	7.47	<0.001
		intervention	12	32.5	17.09	
	Nasal obstruction	control	12	-4.16	7.24	0.052
		intervention	12	-8	4.3	
Female	QOL	control	48	8.27	12.29	<0.001
		intervention	48	29.02	16.06	
	Nasal obstruction	control	48	-2.97	5.3	<0.001
		intervention	48	-9.12	5.05	

Table 7: Mean and deviation of changes in QOL score and nasal obstruction in patients of each group

Group	Variable	Group	Number	Mean	St. Deviation	Mean changes	St. Deviation	P-value
Control	QOL	Pre	60	76.86	16.23	7.08	11.68	<0.001
		post	60	83.95	15.15			
	Nasal obstruction	pre	60	11.3	5.58	3.21-	5.69	<0.001
		post	60	8.08	4.38			
Intervention	QOL	pre	60	76.5	15.37	29.71	16.19	<0.001
		post	60	106.21	16.51			
	Nasal obstruction	pre	60	11.98	5.61	8.9-	4.9	<0.001
		post	60	3.08	3.81			

DISCUSSION

The aim of this study was to investigate the results of CIT in septorhinoplasty on the QOL of the patients with allergic rhinitis. The study was conducted on 120 people, 60 of whom were in the intervention group (CIT) and 60 in the control group (sputinoplasty without cautery). The results of the data analysis show that the mean score of the postsurgical QOL in the patients of the intervention group was significantly higher than the control groups. Also, the mean score of the postsurgical nasal obstruction in the patients of the intervention group was significantly lower than the control group.

In a study in 2012 in the United States, the changes in the QOL after rhinoplasty were examined. In this study, a retrospective graphic comparison with a perspective one was performed. Thus, all patients who underwent rhinoplasty within 5 years were examined. The comparative analysis in this study was based on dorsum reduction, osteotomy, closed vs. open surgery approach, and patient recovery rate. In this study, 113 people completed the questionnaire. The analysis of pre-surgery and postsurgical nasal obstruction evaluation points indicated a median difference of 40 (quartiles, 25 and 60), indicating a significant improvement ($p < 0.01$). The pre-surgical and postsurgical results of rhinoplasty showed a mean difference of 29.2 (quartiles, 12 and 50), indicating an improvement. The difference in improvement in the score was not significant when the groups were divided based on dorsum reduction, osteotomy, and open approaches to closed, or primary, or rhinoplasty correction. In summary, the results of this study indicate that the modern rhinoplasty techniques combined with CIT significantly improve the patients' QOL in terms of the appearance and nasal function (10). The results of the over-mentioned study are in line with our findings. In our study, it was found that rhinoplasty with CIT increases the patients' QOL and reduces the obstructive symptoms. Although in our study, the control group, which had only undergone rhinoplasty, had an increase in the QOL, the CIT method had a much better effect on increasing the QOL and reducing the symptoms, especially in women.

In another study, Naghavi B et al. examined the effect of plastic surgery on the QOL in the people operated in the ENT department of Imam Khomeini Hospital in Tehran. In this study, 72 patients completed a questionnaire, NOSE and VAS, before and 6 months after the surgery. This study concludes that, in general, the QOL after rhinoplasty increases significantly in terms of the appearance of the nose and social relationships. In addition, the QOL in the aspects related to the respiratory status in the patients with obstructive problems, significantly improved, though in the patients without obstructive problems, there is no significant improvement in the QOL¹⁶. The results of this study confirm the findings of our study, because in our study the patients with indications for septorhinoplasty, a significant increase in the QOL and a decrease in the obstructive symptoms were seen.

A study in Brazil examined the effect of cautery of turbinate during rhinoplasty and its implications on the patients QOL. In the study, they included people over the age of 16 with nasal congestion who were candidates for functional and aesthetic rhinoplasty. Eligible participants were randomly assigned to rhinoplasty with or without modification of the inferior turbinate via submucosal diathermy. In this study, 50 patients also had mild / severe allergic rhinitis symptoms. The results of this study were blindly evaluated three months after the surgery. The results of this study show that rhinoplasty, independent of turbinate intervention, significantly improved the QOL scores. In the following, the results of this study indicated that there is no significant difference between the obstructive symptoms of the patients in the two groups with and without correction of the inferior turbinate¹¹. The results of the mentioned study are consistent with the findings of our study. In our study, it was found that the treatment with CIT increased the QOL and improved the condition of the patients and further reduced the clinical symptoms of the patients.

A study in Iran to examine the QOL in the people with a history of rhinoplasty, 150 patients who were candidates for the surgery were investigated. In this study, the people completed the standard of QOL before the surgery, and three to six months after the surgery. The results of this

study illustrated that the patients' QOL three months after rhinoplasty was not significantly better than before. However, their QOL improved significantly six months after rhinoplasty and six months after the surgery compared to three months after the surgery. Improved QOL had been found in all its dimensions six months after the surgery (17). Therefore, according to this study and our study, long-term follow-up care of the patients is required to examine more closely the relationship between the surgery type of CIT and improve the symptoms in the long run.

As stated in the criteria for entering the study, the participants were the patients with rhinitis allergy who were also candidates for septorhinoplasty surgery. The study, which considered the patients' QOL with rhinitis allergy after the septoplasty surgery, found that septoplasty improved the QOL associated with allergy in the patients with septal deviation and allergic rhinitis. Another study examining the effect of rhinitis allergy on the efficacy of open septorhinoplasty, found that the evaluation of open septorhinoplasty performed through the NOSE questionnaire had similar results in the patients with allergic rhinitis and the people with no history of allergy¹⁹. In addition, the retrospective study examined the results of the septoplasty surgery with correction of the turbinates in the patients with allergic rhinitis. The results of this study show that in the patients with rhinitis allergy, the symptoms related to nasal obstruction that have affected the QOL of these people have significantly improved after this surgery²⁰, which is in line with the results of our study.

CONCLUSION

The results of the present study indicated that rhinoplasty along with CIT significantly improved and increased the QOL of the patients and reduced the nasal obstructive symptoms (especially in women). Therefore, due to the effect of the surgery on the patients' prognosis and response to the treatment, it is necessary to perform appropriate treatment measures in the patients with the deviated nasal septum, including CIT, to improve the patient's therapeutic quality by further reducing the obstructive symptoms and increasing the QOL, and further patients' satisfaction during treatment.

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