Original Article

A comparative study on changes in acne severity before and after Rhinoplasty based on age and sex of patients of Bouali hospital

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ABSTRACT

Background and Aim: Most studies have been conducted on the effects of complications of rhinoplasty in terms of nose shape and its techniques, but a few studies have been conducted of its complications on skin. Thus, the present study was conducted to compare the changes in acne severity before and after rhinoplasty surgery in Bouali Hospital in the second half of 2016. Materials and Methods: In this quasi-experimental observational study, 64 people undergoing rhinoplasty in Tehran Bouali Hospital in the second half of 2016 were examined and their demographic and background information was entered to information collection form and their severity index was also recorded. Then, the subjects were evaluated in terms of acne within a month after rhinoplasty (during follow-up visits) and the frequency of cases with increased severity of acne was determined and compared. Statistical analysis of the data was performed in SPSS version 24 software and with the help of paired t-test and Chi-square at a significant level of 0.05. Results: Before rhinoplasty, 38 patients (59.4%) had no acne, 21 patients (32.8%) had mild acne, 3 patients (4.7%) had moderate acne and 2 patients (3.1%) had severe acne. These figures were 25 (39.1%), 26 (40.6%) 8 (12.5) 5 (7.8%), respectively, after the surgery. 65.8% of people who did not have acne before rhinoplasty also showed no acne after rhinoplasty and 26.3% and 7.9% showed mild to moderate acne. 76.2% of people with mild acne also showed mild acne after the surgery and 23.8% showed moderate acne. All patients with moderate to severe acne remained unchanged after surgery (p-value = 0.000, df = 9, $\lambda^2 = 90.009$). On a quantitative scale, the mean vas score was 0.734 ± 1.515 before rhinoplasty and 1.891 ± 0.910 after the surgery. Paired t-test showed that these differences were significant (P-value = 0.000, df = 63). Discussion and Conclusion: Since aesthetic surgeries such as rhinoplasty are often performed to improve the appearance of people, acne exacerbation after this type of surgery can affect the patient's satisfaction with surgery, so preventive interventions before surgery seem to be necessary.

Keywords: Acne, Rhinoplasty, Influential Factors

Introduction

Rhinoplasty (aesthetic-reconstructive), which is accepted in the world as the most delicate and the most difficult plastic surgery, closes its 100th year of its modern evolution. Although improvements in the surgery technique led to its better acceptance in the first three quarters of the twentieth century, the basis of surgery remained largely as reduction and removal of tissue. There has been a significant revolution in subtle issues and analysis and surgical techniques in the last fifteen years under the guidance of surgeons, including the re-arrangement and strengthening of nasal tissue rather than removing it, using specialized technique for each patient, and on-traumatic nasal tissue dissection in its appropriate plates. Rhinoplasty is one of the relatively difficult and important surgeries, the results of which depend on many physician's skill, the used technique, and the anatomical aspects of the patient's nose and face [1]. This surgery is mainly performed in an open manner, which its main reason in 74% of cases is the difficulty of surgery and the anatomical condition of the patient based on the physician [2]. Thus, predicting the results and conditions during and after surgery, including possible problems in the anesthesia process and the surgery itself will play a major role in improving the results [3].

Iran is ranked first in the world in terms of the number of rhinoplasty surgeries, followed by United States, the United

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Kingdom and France, respectively. Rhinoplasty refers to deformation of nose by reducing or increasing the size, removing a bulge, shrinking the nasal fins, changing the angle between the upper lip and the nose, or changing the shape of tip or bulge of nose. It is the most common type of plastic surgery in Iran, accounting for about 70% of plastic surgeries. Many rhinoplasties in Iran are done for aesthetic purposes rather than respiratory problems. Based on experts, 95% of those seeking rhinoplasty are women and girls in the age group of 14 to 45 years, and the share of males is five percent in this regard [4-6]. Rhinoplasty is a stressful procedure and almost 50% of patients show psychological symptoms such as depression and nervousness in the postoperative period, leading to increased levels of stress hormones. Hormonal responses to surgical stress and critical illness in adults have been well described [7].

Given an increasing trend of aesthetic surgeries such as rhinoplasty in recent years, it has been frequently observed that the patients underwent surgery are seeking rhinoplasty after surgery. Several cases have been observed in which despite proper appearance of the nose, they are still seeking rhinoplasty. It seems that the psychological characteristics of people have a significant relationship with the demand and satisfaction of rhinoplasty.

Bartalena et al reported a significant increase in serum cortisol in 10 adult patients after surgery [8] The effect of cortisol on skin is well known. These changes include acneiform eruption, increased fat secretion, increased overall thickness of skin and striae. Thus, mental and physical stresses such as surgeries can cause skin changes by causing androgen hypercortisolism [9]. The sebaceous glands are also affected by the hypothalamic-pituitary-adrenal axis. Stress stimulates the secretion of cortisol from adrenal glands by acting on this system. Also, it up-regulates the receptors of this hormone on the surface of various tissues, including the sebaceous glands. Corticotropin-releasing hormone or CRH is an autocrine hormone for the human sebaceous glands that controls the homeostasis of the lipogenic system. CRH is involved in the clinical progression of acne, seborrhea, androgenic alopecia and other skin diseases by involving in the production of lipids with sebaceous origin [10].

Many people have demanded for surgeries in recent decades in Iran. This surgery is the most common aesthetic surgery in Iran, which is performed to improve the quality of the nose appearance. Rhinoplasty under general anesthesia lasts 45 minutes to 4 hours on average. A patient's satisfaction with surgery depends on many other factors in addition to maintaining nasal function and improving its appearance. Many plastic surgeons have faced the complains of oily skin on the face and acne after surgery, which can affect the patient's satisfaction with the surgery. Since most of those seeking rhinoplasty are young people, an increase in the severity of postoperative acne can lead to obvious psychological stress in this age group. The effect of stress hormones released during surgery such as CRH can be an effective factor in exacerbating postoperative acne, but manipulating the nasal area may change the microbial flora of the skin surface. Moreover, acne vulgaris is a chronic and inflammatory disease involving the sebaceous glands of the follicles and has a significant prevalence, especially among adolescents and young people. At present time, different therapies are used locally, systemically, or both, which vary in efficacy, complications, and cost. This disease usually begins at puberty. In classification of skin diseases, acne is considered as one of the skin appendages diseases (hair). Acne is diagnosed clinically. It means that the physician examines the patient complaining of a skin complication and observes the type of lesions and while he or she diagnoses the disease and determines its severity to plan the necessary treatment protocol. It is easy for physicians, especially dermatologists, to diagnose the acne. When a physician examines a patient's face, he or she intends to assess the severity of disease more than anything else to diagnose acne.

There is no much valid evidence to show washing skin improves or exacerbates acne. However, repeated washing of the skin due to dryness can stimulate the secretion of fat and worsen the condition. Topical antibacterial solutions are effective in cases of mild acne, and acidic cleansers work better than alkaline soaps in this regard. Spending time to explain the physiopathology of the disease simply and to explain the treatment methods along with a realistic description of the effectiveness of each of them to the patient are useful in achieving the desired treatment goals and increasing the patients' compliance. Despite being aware of the possibility of complications and even mortality of rhinoplasty, many patients undergoing rhinoplasty accept this surgery and consider it as a possible improvement in the condition in the postoperative phase [11]. However, some of them regret performing the surgery, especially due to the psychological problems that occur in the postoperative phase and a reduction in quality of life followed by it [12]. In this regard, acne exacerbation has been reported as one of the possible complications of rhinoplasty in some studies, although there is no consensus about its frequency. Accordingly, the present study was conducted to compare the changes in acne severity before and after rhinoplasty surgery based on age and sex of patients of Bouali Hospital in the second half of 2016. Also, in performing an aesthetic surgery, in addition to paying attention to its techniques, its general outcomes on the patient should also be considered. Any factor that exacerbates the acne will prolong the disease process and require more drugs to control the disease. Thus, this study evaluates the severity of acne in patients undergoing rhinoplasty before and after surgery to provide more satisfaction to patients after surgery [10].

Materials and Methods

The method of the present study is descriptive. The present study is applied / clinical in terms of objective. It is also quasi-experimental in terms of implementation method. The statistical

population of study included patients undergoing rhinoplasty and the sample of the study were some patients undergoing rhinoplasty in Bouali Hospital in Tehran. Using a convenience non-random sampling and Cochran's formula, 64 people were included in the study. Inclusion criteria of the study included performing rhinoplasty, the possibility to follow-up of patient, patient willingness to cooperate and exclusion criterion of the study was non-cooperation and non-follow-up of the patient.

Data collection method

Data were collected using data collection form by using a field method and by examining of the patients.

Data collection tool: checklist was used to collect the data.

Procedure

In this quasi-experimental observational study, 64 people undergoing rhinoplasty in Bouali Hospital of Tehran were examined in the second half of 2016. Their demographic and background data were entered to data collection form. The severity of their acne was also recorded. Then, the subjects were examined in terms of severity of acne within one month after rhinoplasty (during follow-up visits) and the frequency of cases with increased severity of acne was determined and compared.

Data analysis

Data were analyzed using SPSS version 24 software. For quantitative variables, mean and standard deviation, and for qualitative variables, absolute and relative frequency were recorded. Appropriate statistical tests were used to analyze the relationships.

Results

Based on Table 1, the subjects were in the age range of 19 to 48 years with a mean age of 26.54 ± 6.4 years. 13 patients (20.3%) were in the age group of 16-20 years, 20 people (31.3%) were in the age group of 21-30 years, 18 people (28.1%) were in the age group of 31-40 years and 13 people (20.3%) were in the age group of 41-50 years. Out of 64 people in this study, 90.6% were female and the rest were male.

Table 1- Age and sex distribution of patients

		age			
		Frequency	Percent	Valid Percent	Cumulative Percent
age distribution	16-20	13	20.3	20.3	20.3
	21-30	20	31.3	31.3	51.6
	31-40	18	28.1	28.1	79.7
	41-50	13	20.3	20.3	100.0
	Total	64	100.0	100.0	
		sex			
		Frequency	Percent	Valid Percent	Cumulative Percent
	woman	58	90.6	90.6	90.6
	man	6	9.4	9.4	100.0
	Total	64	100.0	100.0	

Changes in the severity of acne before and after rhinoplasty based on age

All subjects aged less than 30 years had no acne before rhinoplasty, 24.2% of them had mild rhinoplasty and 3% had moderate acne.

However, due to non-presence of people with acne before rhinoplasty, it was not possible to statistically assess changes in acne severity. Among people aged over 30 years, the relationship between changes in acne severity and rhinoplasty was confirmed. By changing the age classification from 30 to 40 years, it was found that the level of changes in the severity of acne before and after rhinoplasty was not different based on the age of subjects (p-value <0.05) (Tables 2 and 3).

Table 2 -Evaluation of changes in acne severity before and after rhinoplasty surgery based on age

age groups				acne severity after rhinoplasty				Total
				no acne	mild	moderate	severe	
<30	acne severity before rhinoplasty	no acne	Count	24	8	1	0	33
			%	72.7%	24.2%	3.0%	0.0%	100.0%
		mild	Count	1	2	2	0	5
			%	20.0%	40.0%	40.0%	.0%	100.0%
>=30			Count	0	16	5	0	21
			%	.0%	76.2%	23.8%	.0%	100.0%
		moderate	Count	0	0	0	3	3
			%	.0%	.0%	.0%	100.0%	100.0%
		severe	Count	0	0	0	2	2
			%	.0%	.0%	.0%	100.0%	100.0%

Table 3- Chi-square test of acne severity changes before and after rhinoplasty based on age of subjects

Chi-Square Tests				
AGE_GROUP		Value	df	Asymp. Sig. (2-sided)
=<30	Pearson Chi-Square	.[a]		
	N of Valid Cases	33		
>30	Pearson Chi-Square	37.387[b]	9	.000
	Likelihood Ratio	31.915	9	.000
	Linear-by-Linear Association	13.714	1	.000
	N of Valid Cases	31		

Changes in severity of acne before and after rhinoplasty based on sex of subjects

Changes in severity of acne before and after rhinoplasty were reported based on the sex of subjects. Accordingly, there was a change in the severity of acne before and after rhinoplasty in females (p-value = 0.000), but no such change was found in males (p-value = 0.54) (Tables 5 and 4).

Table 4- Level of changes in the severity of acne before and after rhinoplasty based on sex of subjects

Sex			the severity of acne after rhinoplasty				Total
			no acne	mild	moderate	severe	
before	no acne	Count	25	7	2	0	34

			%	73.5%	20.6%	5.9%	.0%	100.0%
		mild	Count	0	15	4	0	19
			%	.0%	78.9%	21.1%	.0%	100.0%
		moderate	Count	0	0	0	3	3
Woman			%	.0%	.0%	.0%	100.0%	100.0%
		severe	Count	0	0	0	2	2
			%	.0%	.0%	.0%	100.0%	100.0%
		Total	Count	25	22	6	5	58
			%	43.1%	37.9%	10.3%	8.6%	100.0%
	before	no acne	Count	0	3	1	0	4
			%	.0%	75.0%	25.0%	.0%	100.0%
man		mild	Count	0	1	1	0	2
			%	.0%	50.0%	50.0%	.0%	100.0%
		Total	Count	0	4	2	0	6
			%	.0%	66.7%	33.3%	.0%	100.0%

Table 5- Chi-square test of acne severity changes before and after rhinoplasty based on sex of subjects

Chi-Square Tests						
sex		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
woman	Pearson Chi-Square	86.944[a]	9	.000		
	Likelihood Ratio	68.076	9	.000		
	Linear-by-Linear Association	38.144	1	.000		
	N of Valid Cases	58				
man	Pearson Chi-Square	.375[b]	1	.540		
	Continuity Correction[c]	.000	1	1.000		
	Likelihood Ratio	.367	1	.545		
	Fisher's Exact Test				1.000	.600
	Linear-by-Linear Association	.313	1	.576		
	N of Valid Cases	6				

Discussion and Conclusion

Rhinoplasty is one of the most common aesthetic surgeries performed to fit the shape of the nose and improve the function or appearance of nose [13]. This surgery, like other surgeries, is followed by some complications, including complications on skin and surrounding soft tissues. Its acute complications include swelling, hematoma, local infections, and skin necrosis [14]. There have also been reports of increased subcutaneous cysts and granulomas [15]. Skin complications after rhinoplasty always seem to me be less important and transient [16]. Acne vulgaris is one of the most common diseases of pilosebaceous unit, which is manifested in the form of comedones, papules, pustules, cysts or inflammatory nodules [17]. This disease mostly affects the face, neck and trunk [18]. The prevalence of acne is similar in males and females. Increased secretion of sebaceous glands, increased branching of pilosebaceous duct, abnormal microbial flora and inflammation are among the pathogenic factors of acne [19]. Several factors such as stress, diet, changes in hormonal cycles and some drugs are known to be effective in exacerbating or causing acne. Knowing these pathogenic factors is effective in treatment strategies, since each treatment is effective on a specific factor [20].

Since rhinoplasty surgery is the most common aesthetic surgery of the head and face in Iran, patients' satisfaction with rhinoplasty in addition to maintaining the function depends on several factors. Exacerbation of acne after these surgeries influence a patient's satisfaction and cause emotional stress in the patient. Most studies on the complications of rhinoplasty have focused mainly on the shape of nose and its techniques, and a few studies have been conducted on its complications on skin. Hence, the present study addressed this issue and examined the changes in acne severity before and after rhinoplasty surgeries in Bouali Hospital in the second half of 2016. Our results revealed significant changes in the severity of acne before and after rhinoplasty. Before rhinoplasty, 38 patients (59.4%) had no acne, 21 patients (32.8%) had mild acne, 3 patients (4.7%) had moderate acne and 2 patients (3.1%) had severe acne. After the surgery, these figures reached 25 (39.1%), 26 (40.6%), 8 (12.5), and 5(7.8%), respectively. 65.8% of people who did not have acne before rhinoplasty also showed no acne after rhinoplasty. 26.3% and 7.9% had mild to moderate acne. 76.2% of people with mild acne before surgery also showed mild acne after the surgery and 23.8% showed moderate acne after surgery. All patients with moderate to severe acne remained unchanged after surgery. However, changes in the severity of acne after rhinoplasty were not proven in any of sexes. In our study, rhinoplasty was associated with an increase in severity of acne in patients one month after rhinoplasty. This result is in line with the result of studies conducted by Sadeghi et al in 2013, Nemati et al in 2012 and 2013, Adibi et al in 2012 and Rajabian et al in 2004, Cochran et al in 2008, and Noe et al in 1981, but it is inconsistent with the result on a study conducted by Yusuf K. Coban et al in 2007.

In a study conducted by Yusuf K. Coban, an improvement in acne symptoms was reported in patients. Adibi et al attributed the causes of this disease to small sample size or previous treatment of acne as well as racial differences and skin differences. In a study conducted by Sadeghi et al in Iran and its results were published in 2013, 120 people were evaluated in two groups (60 in control and 60 in experimental group) and a total of 12 people in the experimental group (20%) showed acne exacerbation after rhinoplasty, but in the control group, on change in acne severity was reported [21]. In another study conducted by Nemati et al in 2013 in Iran, 110 patients undergoing rhinoplasty were evaluated. In the mentioned study, 27% showed acne exacerbation after surgery, which was significantly higher compared to the control group. These changes did not differ based on age, sex and BMI of the patients [22]. In another cross-sectional study conducted by the mentioned author in 2012, 110 patients undergoing rhinoplasty were examined and it was reported that rhinoplasty exacerbates acne and it was associated with age less than 25 years [23]. In our study, 64 people underwent rhinoplasty, 18 (28.12%) showed acne

exacerbation after rhinoplasty. These changes were not reported based on different ages. However, in males with a BMI of less than 30 kg / m2, acne severity changes after rhinoplasty were not confirmed. One of the reasons for differences between our study with other studies could be lower number of males participated in the study.

In a cohort study conducted by Adibi et al in 2012 in Iran, 32 patients underwent rhinoplasty and found that about 50% of patients had acne before surgery and 75% had after rhinoplasty, which was a significant difference [24]. In our study, 40.6% of people had acne before rhinoplasty, which increased to 60.9% after surgery, and this increase was significant. In a case study conducted by Rajabian et al in Iran in 2004, a case was reported that showed acne in severe dermatitis within one month after surgery [25]. Harris et al reported similar results in a group of 34 adults following abdominal and thoracic surgery, so that cortisol levels in the urinary and serum were high for 4 days [26]. The effect of cortisol on skin has been well known. These changes include acneiform eruption, increased fat secretion, and increased overall thickness of skin and striae. Thus, mental and physical stressors such as surgery can cause skin changes by causing androgen hypercortisolism.

In a review article, Cochran and Landecker referred to a number of skin complications, including nasal cysts, contact dermatitis, and skin necrosis after rhinoplasty [27]. Also, cases of acne rosacea after rhinoplasty surgery were reported and tetracycline was recommended for its treatment for 6 to 8 weeks [28]. In a case-control study conducted by Eltaf et al in 2015, patients underwent septoplasty and 30 patients underwent septorhinoplasty were evaluated to examine their skin condition after surgery. Two groups were homogenous in terms of age and sex. Their results revealed that in the septorhinoplasty group, the skin condition of patients was more unfavorable in terms of acne [29]. In addition to the techniques of aesthetic surgery procedures, its overall outcomes on the patients should be considered. Any factor that exacerbates the acne prolongs the disease treatment process and will require more drugs to control the disease. Exacerbated acne can also exacerbate the psychological effects of it. The present study investigated severity of acne before and after rhinoplasty surgery to increase the patients' satisfaction of patients after rhinoplasty by implementing its interventions. However, most studies conducted on the complications of this surgery have focused on the shape of nose and rhinoplasty techniques, and a few studies have been conducted on its complications on skin.

Thus, it can be stated that paying attention to this issue is one of the strengths of present study given the importance of the mentioned issue. However, in this study, changes in acne severity were measured using the VAS scale. With the help of the formula for determining the severity of acne based on the patients' condition before and after rhinoplasty, it is possible to increase the accuracy of the findings. The effect of rhinoplasty on the acne condition is clear. However, by increasing the intervals examined in the present study, a more accurate understanding of patients' condition in different time periods can be obtained. Rhinoplasty results in a significant increase in the severity of acne in people, so it is necessary to perform therapeutic intervention in this area to increase patients' satisfaction. Finally, it should be stated that most surgeons are seeking to evaluate the aesthetic outcomes of their surgery. Further studies on the factors causing these complications and the factors improving it are needed. It is recommended to increase the patients' satisfaction by taking preventive measures on the factors exacerbating the acne before surgery.

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