Ultrasonographic Evaluation of Long-term Results of Nasal Tip Defatting in Rhinoplasty Cases

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Objectives/Hypothesis: Nasal skin thickness has an important role in aesthetic results of rhinoplasty. The aim of this study was to evaluate the long-term results of tip and supratip skin defatting technique in rhinoplasty subjects using ultrasonography.

Study Design: Prospective, randomized, case-control study.

Methods: Among 111 rhinoplasty cases referred to a university hospital between February 2010 and September 2011, after physical examination and measuring the nasal tip and supratip skin thickness by ultrasonography, a total of 55 patients with thick and moderate skin were randomly allocated for rhinoplasty using one of the following methods: rhinoplasty with (case group) and without (control group) defatting tip and supratip skin. Ultrasonographic evaluation of the skins was repeated 1 and 12 months after surgery, and the data were analyzed by Wilcoxon and repeated measure tests using SPSS 17 software.

Results: Twenty-eight of 55 candidates (10 men, 45 women; mean age, 25.1 ± 7.6 years) underwent skin defatting during rhinoplasty; the other 27 patients did not undergo this procedure. Forty-four patients completed the study. Thickness of tip and supratip skin was not statistically different before surgery and during follow-up evaluations in defatting and non-defatting technique groups (P = .7).

Conclusions: Defatting techniques have no effect on reducing tip and supratip skin thickness after rhinoplasty in moderate to thick skins.

Key Words: Rhinoplasty, skin thickness, defatting, ultrasonography.

Level of Evidence: 1b.

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INTRODUCTION

Rhinoplasty is an aesthetic surgery with high importance because of the central position of the nose in the face. Skin quality is an important and essential parameter determining the preoperative planning and surgical outcomes in rhinoplasty cases. Early traditional nasal anatomic descriptions focused on the bony and cartilaginous nasal skeleton as being the most important parameters in surgical alteration of the nose; currently, however, the critical role of skin thickness and its subcutaneous tissues is more keenly appreciated.

Nasal skin thickness often has been attributed to the increased subcutaneous tissue and glandular quality of this area. The variation in skin thickness along the nasal dorsum is well known to rhinoplasty surgeons. In particular, in the lower third of the nose, the thickest skin may be found in the tip and supratip regions.

Thick skin with more hypodermic fat pad recovers after physical examination and measuring the nasal tip and supratip skin thickness by ultrasonography, a total of 55 patients with thick and moderate skin were randomly allocated for rhinoplasty using one of the following methods: rhinoplasty with (case group) and without (control group) defatting tip and supratip skin. Ultrasonographic evaluation of the skins was repeated 1 and 12 months after surgery, and the data were analyzed by Wilcoxon and repeated measure tests using SPSS 17 software.

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upper and lower lateral cartilages, and an interdomal aponeurosis. Unlike the superficial fatty layer, the deep fat layer lacks fibrous septae and thus allows surgical dissection to be performed in an atraumatic fashion.

During rhinoplasty, optimal profile contouring requires attention to the undersurface of the tip and supratip skin as well as the soft tissue of the tip and supratip. Skin defatting and soft-tissue trimming is one of the surgical maneuvers to address this area, and many authors recommend excision of excessive subcutaneous tissue in the nasal tip, commonly in thick skins; however, this technique is not recommended for thin skins.

In the current study, our aim was to determine the effects of a nasal skin defatting technique on reducing tip and supratip skin thickness in rhinoplasty cases. To our knowledge, this is among the first studies in which the long-term effects of nasal skin defatting have been evaluated by an objective and accurate method (i.e., ultrasonography).

MATERIALS AND METHODS

From 111 rhinoplasty candidates referred to a university hospital between February 2010 and September 2011, we randomly selected 80 subjects, who provided informed consent for participating in a cohort prospective study. Exclusion criteria included smoking, allergic rhinitis, and a history of previous rhinoplasty. The proposal for the research was approved by the Research Office and Ethics Committee of Guilan University of Medical Sciences. After physical examination of the subjects, skin thickness of nasal tip and supratip was measured using ultrasonography with high-frequency surface probes (10 MHz probe, BK medical, Denmark). Skin thickness type in ultrasonography was considered “thin” when it measured about 2.2 to 2.6 mm, “moderate” when it was 2.6 to 3.1 mm, and “thick” when it measured more than 3.1 mm. Subsequently, 55 patients with thick and moderate skins were randomly (using systematic random sampling method) allocated into two groups: rhinoplasty with tip and supratip skin defatting and rhinoplasty without defatting. All rhinoplasty procedures were performed by one surgeon (S.N.) using one method (closed/delivery approach). For defatting the tip skin, before closure of the marginal and intercartilaginous incisions, the inner surface of nasal tip and supratip skin was delivered outside, and then the subcutaneous fibrofatty tissues were dissected and separated evenly and unwarily, until reaching the vascular layer of the skin (Fig. 1). Approximately 1 cm³ of fibrofatty tissue was extracted from the nasal tip skin undersurface of each case. Postoperative orders and care were identical in both groups. In all the cases and controls, noses were taped and casted, but the internal splints were not used. Nose packing was used for 2 days and removed after that, but the nose casts and the tapes were left in place for 6 to 7 days. The casts were then removed, and new tapes were placed from the supratip dorsum to the intercanthal line and from nasal left to the right sidewalls that changed every 3 to 5 days for 1 month.

All the cases and controls were referred to repeat ultrasonography of nasal tip and supratip skin 1 and 12 months after surgery (Fig. 2). All sonography studies were performed by one expert radiologist/sonographer (A.A.) and with a single set during all stages; the sonographer was blind to the technique applied during the surgeries (i.e., defatting or not defatting).

Statistical Methods

Statistical analysis was done using the statistical package SPSS 17 (IBM, Armonk, NY). Normality of the distribution was checked for each variable (one sample Kolmogorov-Smirnov test). To verify changes of quantitative variables measured via sonography before and after surgery, the Wilcoxon test was used, and repeated measures test was applied to verify changes...
RESULTS

From 80 subjects out of 111 rhinoplasty candidates with a mean age of 25.1 ± 7.6 years, 12 (15%) were men and 68 (85%) were women. According to clinical examination, moderate skin was observed in 45 subjects (56.25%), thin skin in 14 (17.5%), and thick skin in 21 (26.25%) patients. Results of ultrasonography revealed that skin was thin in five (6.25%), moderate in 60 (75%), and thick in 15 (18.75%) subjects. These results revealed that skin was thin in five (6.25%), moderate in 60 (75%), and thick in 21 (17.5%) subjects. These results revealed that the least agreement was observed between the two methods of skin thickness evaluation, so there was more than 50% difference between them (κ = 0.19). Table I demonstrates sonographic measurements of different skin types before rhinoplasty.

Twenty-eight cases with moderate and thick skins underwent defatting, and 27 cases had no defatting during rhinoplasty. Fifty-one subjects performed the second session of tip sonography at the end of the first postoperative month, and 44 subjects (22 cases and 22 controls) completed the study and underwent the third session of nasal tip sonography 12 months later. Therefore we had 11 subjects who dropped out; the main causes of not performing postoperation ultrasonography were low compliance with the orders (6 subjects) or wrongly performing the sonographies in other centers (3 subjects) and immigration to other provinces or countries (2 subjects).

According to Figure 3, for example, in the right side of the tip, the mean of measured skin thickness was 3.09 mm, and this measurement reached 2.7 mm and then 3.3 mm at 1 and 12 months after rhinoplasty, respectively. There were no differences considering changes of defatted skin thickness during three different times (preoperative and 1 and 12 months after surgery) (P = .7). Also, according to Figure 4, there was no significant difference in changes of nondefatted skin (P = .3).

As we can see, the thickness of nasal tip and supratip skin increased in 1 month after the surgery, probably because of edema, and then, after 12 months, returned back to the baseline. There were not any postoperative complications, and all of the subjects, including those who dropped out of the study and were followed up by telephone, did not declare significant dissatisfaction with the results of their surgeries after at least 1 year.

DISCUSSION

In our study, less agreement was observed between the two evaluation methods of nasal skin thickness (i.e., clinical examination and sonographic verification). It seems that clinical judgment is not a perfectly accurate method for preoperative evaluation of nasal tip and supratip skin thickness in rhinoplasty candidates.

Copcu et al. conducted a study on the effects of sonography before rhinoplasty and found that the size of the nasal tip fat pad varied among individuals, but it was very large in those patients with fatty skin and onionlike nose. Moreover, Coskun et al. demonstrated a meaningful relationship between thickness of fat pad and surgery results in 23 rhinoplasty patients. Cho et al., in their study of 77 rhinoplasty candidates, verified nasal structure using preoperative computed tomography scan and evaluated patients' results and outcomes; they demonstrated that the thickness of nasal tip skin was about 2.9 mm. Patients with a thin nasal tip and average tip skin thickness of 2.2 to

TABLE I.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Thin Skin (n = 14), mm</th>
<th>Moderate Skin (n = 45), mm</th>
<th>Thick Skin (n = 21), mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right tip</td>
<td>2.6 ± 0.7</td>
<td>3.1 ± 0.6</td>
<td>3.2 ± 0.7</td>
</tr>
<tr>
<td>Left tip</td>
<td>2.6 ± 0.7</td>
<td>3.1 ± 0.6</td>
<td>3.3 ± 0.7</td>
</tr>
<tr>
<td>Right supratip</td>
<td>2.5 ± 0.6</td>
<td>2.7 ± 0.6</td>
<td>2.8 ± 0.6</td>
</tr>
<tr>
<td>Left supratip</td>
<td>2.5 ± 0.6</td>
<td>2.7 ± 0.6</td>
<td>2.8 ± 0.6</td>
</tr>
</tbody>
</table>

Data are presented as mean ± standard deviation.
2.8 mm before rhinoplasty had excellent aesthetic results in the follow-up period, but those with thick nasal tip and higher average tip size of 3.4 mm had poor aesthetic results. In this study, a statistically significant difference was observed among those levels of aesthetics regarding nasal tip skin thickness.12

Preoperative evaluation, one of the essential parts of rhinoplasty, is routinely based on clinical examination and consideration of patient photographs.17 These pictures provide surgeons with information regarding surface anatomy but not information on nasal bony and soft-tissue structures. This information can be useful in satisfying the patients after surgery and also for medicolegal reasons.18 Face sonography can be used for different purposes. According to recent studies, sonography has potential capabilities in determining nasal soft tissues and layers.19,20 Friedrich states that sonography is one of the useful instruments in some specialized fields of medicine because it is safe, noninvasive, inexpensive, available, and can be safely used due to lack of radiation. Its only problem relates to the skill and proficiency of the sonographers, which can affect the reported results.21

Similar to all previous studies, our study revealed that ultrasonography is an excellent method in evaluation of nasal tip soft-tissue thickness.

Tasman and Helbig used sonography to evaluate nasal tip anatomy and stated that the width of the nasal tip was 1.8 to 2.4 centimeters.24 In their study, a meaningful relationship was observed between width of nasal tip before surgery and nasal interdomal distance and width of nasal tip after surgery and skin thickness. They proposed nasal skin thickness as a limited factor in nasal tip correction and reported a significant relationship between nasal tip skin thickness and surgical technique. They declared that transdomal suture could not make an acceptable narrowness for nasal tip when skin was more than 4 mm thick, and this technique might be ideal for skin thicknesses of 3 mm or less.22

Tasman and Helbig introduced cartilage splitting, tip scoring, or defatting as the best techniques for thick skins, and they concluded that nasal tip sonographic study may be helpful in finding the best technique.22 Some other authors have recommended excision of excessive subcutaneous tissue in the nasal tip, especially in thick skins; however, they do not recommend this technique for thin skins.3,14,15 To our knowledge, all of these recommendations are just expert opinions that have the lowest level of evidence, and no structured study of the efficacy of this technique has been reported in the English literature.

Contrary to these suggestions, our study demonstrated no statistically significant difference considering reducing skin thickness in patients with defatted thick skin before surgery and 1 and 12 months after surgery. Although in both groups other confounding factors such as patient age, preoperative thickness of nasal skin, manners of the surgeon, and postoperative orders and care were identical, no one can deny the role of postoperative edema or scarring in the defatted group compared with the control group.

According to our study, the defatting technique in rhinoplasty does not meaningfully affect nasal tip skin thickness, and it seems that the defatting technique is not a useful method in rhinoplasty for normal and thick skins, especially when considering the fact that it can increase the risk of hemorrhage during the surgery, it increases the operation time, and it also has some other risks such as scar formation and skin atrophy. Therefore, it is recommended that skin defatting be avoided during rhinoplasty. Further studies may be needed regarding why the defatting techniques do not work in rhinoplasty cases, but one can consider regrowth of the subcutaneous adipocytes or formation of fibrous tissue at the site of dissection/defatting in these cases. Also, further studies of the aesthetic outcome of the defatting technique may be useful.

CONCLUSION

Similar to previous reports, this study showed ultrasonography as a valuable instrument in assessing nasal tip and supratip skin thickness before rhinoplasty. Defatting techniques had no long-term effects on reducing tip and supratip skin thickness after rhinoplasty in moderate to thick skin types.

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BIBLIOGRAPHY