Original Article

Evaluation Of The Effect Of Corticosteroid Injection On Supratip Skin Thickness In Rhinoplasty Surgery

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Abstract

Introduction: Thick, sebaceous gland-rich skin and subcutaneous tissue are the most unsuitable types of skin to achieve the desired outcome of a rhinoplasty operation. Corticosteroid injection is a treatment that can prevent this condition. The present study aimed to investigate the effect of intraoperative and first-week post-operative triamcinolone injection on reducing skin thickness in patients with thick skin following a rhinoplasty operation.

Method: A randomized clinical trial with a parallel design was performed on patients referred for rhinoplasty with a supratip thickness of over 3.1 mm. The patients were divided into three groups of 20 individuals. The third group did not undergo triamcinolone injection during the rhinoplasty operation. At the end of the study, supratip skin thickness was measured as the trial outcome in the second, fourth, and sixteenth postoperative weeks using sonography.

Results: 60 patients underwent rhinoplasty (in three groups of 20 individuals). The mean age of the participants was 24.9 ± 7.8 years, of which 42 (70%) were female and 18 (30%) were male. The supratip skin thickness was significantly lower in patients receiving triamcinolone immediately after surgery or one week after surgery than in patients without triamcinolone injection. In addition, there was a significant difference between patients who received triamcinolone intraoperatively and one week after surgery in terms of supratip skin thickness (P =0.027).

Conclusion: The results showed that triamcinolone injection is effective in reducing edema and supratip skin thickness. Also, triamcinolone injection immediately after surgery leads to better thinning of the supratip envelope.

Keywords: Rhinoplasty; Triamcinolone; Supratip; Skin thickness.

INTRODUCTION

Rhinoplasty is one of the most important and common plastic surgeries worldwide and also one of the most numerous cosmetic procedures in Iran (1). In addition to the complexity of rhinoplasty, the surgeon's lack of anatomical knowledge and characteristics of nasal cartilage and the scar tissue under the skin of the nose before opening the nose can also play a major role in the outcome of the operation. Since most measurements and estimates are made from the skin surface of the patient, skin quality is a major indicator of the rhinoplasty outcome, and its accurate evaluation can play a significant role in preoperative rhinoplasty planning. Thick and sebaceous gland-rich skin and subcutaneous tissue are the most unsuitable type of skin to achieve the desired rhinoplasty outcome (2-4).

Prolonged edema and inflammation in the soft tissue of patients undergoing rhinoplasty cause scar tissue in the supratip region, and ultimately patient dissatisfaction with the outcomes of surgery. This complication is seen in secondary rhinoplasty surgeries and patients with thicker skin. One of the important causes of the formation of scar tissue in these patients is the overproduction of collagen from fibroblasts in response to TGF-ß stimulation (4). Scar formation may lead to a range of complications from obscure aesthetic outcomes to a Polly beak deformity (5-6).

Corticosteroid injections are one of the treatments that can prevent this condition. Steroids, through various mechanisms, such as TGF-ß inhibition, reduce edema, inflammation, and scarring in soft nasal tissue. Typically, corticosteroid injection is given to patients one week after rhinoplasty (4). In patients undergoing rhinoplasty, the inflammatory phase reaches its maximum severity within the first three days after surgery, but corticosteroid injection is usually carried out after surgery. On the other hand, the pain and anxiety caused by injections can cause patients to avoid injections. There is a higher risk of edema and hypertrophic scar tissue in patients with thick skin than those with thin skin after rhinoplasty, which will not be satisfactory outcomes for the surgeon and the patient (7).

Current techniques for assessing nasal skin conditions include touching, photography, and radiography. Of course, a new radiologic technique that has recently been considered by surgeons and researchers is nasal ultrasound. Ultrasonography is more cost-effective than other imaging methods and provides the surgeon with quick evidence and analysis of the nasal. Using ultrasonography with high resolution, subcutaneous structures such as cartilages, nasal bone skeleton, and facial muscles can be seen. Therefore, sonography can be effective for analyzing the skin and soft tissue of the face and nose and monitoring the results after cosmetic surgery such as rhinoplasty (8-10). The present study aimed to investigate the effect of intraoperative and first-week post-operative triamcinolone injection on reducing supratip skin thickness in patients with thick skin who were prone to edema following rhinoplasty.

2. Methods and Material

2.1 Study design and data collection

This study was conducted as a randomized, parallel clinical trial in a Taleghani Hospital, in Ahvaz, Iran. Patients in this study were randomly selected from patients admitted for rhinoplasty in the Plastic Surgery Ward of Taleghani Hospital in the time interval from 2020 to 2021. All patients underwent the pre-rhinoplasty ultrasonography examination in terms of supratip skin thickness and patients with skin thickness of over 3.1 mm were enrolled in the study. All the patients who entered the study signed the informed consent form of the study after fully explaining the goals and stages of the study.

60 patients who were candidates for thick nasal-skinned rhinoplasty were divided into three groups of 20 individuals. When the surgical procedure was completed, 10 mg of triamcinolone was injected into the supratip of patients in the experimental group after wound closure and suturing. The second group was, given the first week-post-operation 10 mg of triamcinolone injection after removing the splint. In the third group (control), triamcinolone injection was not performed in the rhinoplasty procedure.

The clinical outcome of this study was that supratip skin thickness was measured in the second, fourth, and sixth weeks (four months) after the operation using ultrasonography with high-frequency surface probes (MHZ10). All ultrasonography imaging procedures were performed by a radiologist using an ultrasonography device and the radiologist was completely unaware of the surgical technique and the time of triamcinolone injection.

The results of this study classified supratip skin thickness: thin, (2.2-2.6 mm), moderate, (2.6-3.1), and thick (more than 3.1 mm) (11). All surgeries were performed by a single surgeon and none of the patients were under defatting technique and removed SMAS. All patients had external tape and splint after the operation, but an internal splint was not used in any of the patients. The nasal packs and splints were removed after two and 6-7 days, respectively. For all patients, the tape was placed between the supratip region and the intercanthal line for two months, which was replaced every 5 to 7 days.

2.2 Statistical Analysis

Data collection and analysis were performed using SPSS. The mean and standard deviation were used to describe quantitative data and qualitative data were described using frequency and percentages. To compare numerical variables analysis of variance (ANOVA) and for repeated factors in follow-up, repeated measure analysis of covariance was used and the Tukey test was employed for post hoc comparison. All the results of the test were considered to be significant at $P<0.05$.

Results

60 patients underwent rhinoplasty (in three groups of 20 individuals). The mean age of the participants was 24.9 ± 7.8 years (range from 18 to 35 years) of which 42 (70%) were female and 18 (30%) were male. The mean supratip skin thickness, based on preoperative ultrasonography, was 3.2 ± 0.7 mm in patients who received

intraoperative triamcinolone injections. The ultrasonography results showed that the supratip skin thickness in these patients was 3.1 ± 0.2, 3.0 ± 0.1, and 3.0 ± 0.2 mm in the two weeks, one month, and sixteen weeks after surgery respectively (Table 1).

According to preoperative ultrasonography, the mean supratip skin thickness was 3.2 ± 0.7 mm in patients who were usually given one week-post operative triamcinolone injection. Ultrasonography results showed that the supratip skin thickness reached 3.4 ± 0.3, 3.3 ± 0.4, and 3.3 ± 0.3 mm within two weeks, one month, and sixteen weeks after the operation, respectively (Table 2).

The results of preoperative ultrasonography revealed that the mean supratip skin thickness was 3.2 ± 0.7 cm in patients who did not have triamcinolone injection. According to ultrasonography, the supratip skin thickness was equal to 3.7±0.6, 3.6±0.6, and 3.6±0.5 mm within two weeks, one month, and sixteen weeks after the operation, respectively.

According to the one-way ANOVA test, there was no significant difference preoperative between the three groups in terms of the supratip skin thickness (P= 0.99). In addition, four weeks after surgery, there was a significant difference between the mean edema rate in the three control groups, intraoperative triamcinolone injection, and injection one week postoperative. So that this difference was observed between the control group and the intraoperative triamcinolone injection group (P < 0.0001), as well as between intraoperative triamcinolone injection and one-week postoperative injection (P =0.027).

According to the repeated measures ANOVA test, in the control and injection groups one week after the operation, a significant increase was observed in the edema rate measured at four different times. However, in the intraoperative injection group, a significant decrease was observed in the edema rate measured at four different times. Also, this significant difference can be seen in Figure 1.

Table 1. Comparing supratip thickness of nasal skin in patients of the first group (intraoperative triamcinolone injection) with the control group

Measurement time	Triamcinolone group	Control group	P-value
Preoperative	3.2 ± 0.7	3.2 ± 0.7	0.98
Postoperative (Two weeks)	3.1 ± 0.2	3.7 ± 0.6	0.001
Postoperative (Four weeks)	3.0 ± 0.1	3.6 ± 0.6	0.007
Postoperative (sixteen weeks)	3.0 ± 0.2	3.6 ± 0.5	0.001

Table 2. Comparing supratip thickness of nasal skin in patients of the second group (triamcinolone injection one-week post-operative) with the control group

Measurement time	Triamcinolone group	Control group	P-value
Preoperative	3.2 ± 0.7	3.2 ± 0.7	0.98
Postoperative (Two weeks)	3.4 ± 0.3	3.7 ± 0.6	0.04
Postoperative (Four weeks)	3.3 ± 0.4	3.6 ± 0.6	0.03
Postoperative (sixteen weeks)	3.3 ± 0.2	3.6 ± 0.5	0.04

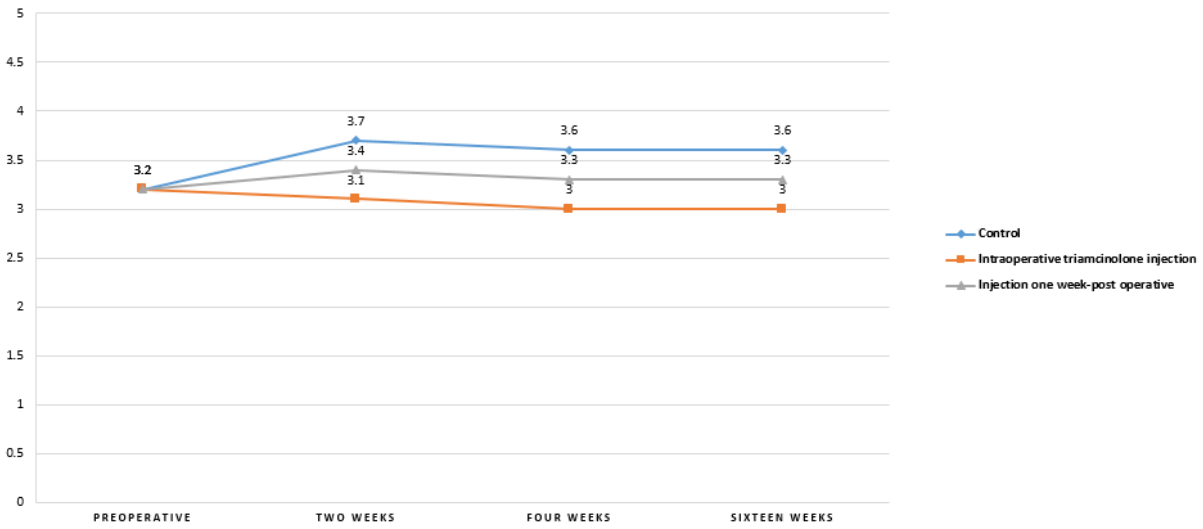

Figure 1. Distribution of skin thickness in three groups Injection immediately post-operative, Injection one week-post operative, and Control

Discussion

The present study aimed to investigate the effect of triamcinolone injection in three states including immediately, one week after rhinoplasty surgery, and without injection. The thickness of the nasal skin is one of the most important factors in the final status of rhinoplasty (2). The present study aimed to compare skin thickness in different groups based on the time of triamcinolone injection.

The results of the current study revealed that the supratip skin thickness was significantly different in patients receiving triamcinolone immediately or one week after surgery than in patients without triamcinolone injection. In Sadeghi et al.'s study, 20.5% thick skin and 3.5% thin skin were reported. The result of this study showed that nasal skin was not desirable for rhinoplasty in 24% of patients. Patients' satisfaction with rhinoplasty was also significantly correlated with the thickness of nasal skin (3).

Various studies have shown that ultrasonography can be used as a safe, non-invasive, and inexpensive evaluation method for preoperative evaluation in many facial surgeries (12-15). In our study, the ultrasound evaluation also made it possible to estimate and judge the skin condition, in addition to clinical examination, so that we can predict the outcomes of rhinoplasty surgery. Ultrasonography can be considered an adjunct to clinical examination for assessing patients before the operation of rhinoplasty.

Various methods have been described for performing rhinoplasty, all of which are used to correct deformities of the nose, especially its tip, based on preoperative evaluations. Tasman stated that the best method for thick skin is the method of cartilage splitting or cutting the cartilage of the tip of the nose or removing fat removing the soft tissue of the subcutaneous area (8). Nemati et al. used defatting techniques to reduce tip and supratip skin thickness (15). Kim et al. resected excessive soft tissue, bone, and cartilage, and used sutures and nasal tip augmentation to remodel supratip cartilages (16). In the study of Hafezi et al. after skin elevation during open rhinoplasty, thinning of the soft tissue layer was performed by defatting and glandular tissue excision until over the skeletal framework in the supratip area (17). In the present study, we prefer triamcinolone injection in patients with thick skin to prevent and treatment of potential complications due to skin thickness.

According to the literature review, this study is one of the first studies conducted in this field in the country so far and ultrasonography has been used for this purpose. Corticosteroid injection is one of the measures suggested to reduce postoperative edema. Nasal skin quality was an essential indicator of rhinoplasty outcomes and must be evaluated before surgery (18). Thick nose skin with sebaceous glands and high subcutaneous tissue can cause undesirable outcomes and prolonged postoperative soft-tissue edema (4, 18). Indeed, the reaction to the thick nasal skin and the subsequent scar can cause a bumpy nose appearance or even deformity in the soft tissue (18). Prolonged soft tissue edema can occur in conditions such as secondary rhinoplasty or patients with thick nasal skin and corticosteroids can prevent excessive scarring and deformity of the supratip region. Typically, corticosterone injections in the supratip region are performed one week after surgery and repeated four or eight weeks later if necessary (4).

Triamcinolone injection immediately after surgery, compared with no triamcinolone injection or routine injections one week after the surgery, leads to better control over the supratip region. Although in other studies, such as Gruber's study, triamcinolone injection (0.1 to 0.2 cc of triamcinolone 10 mg/cc with an equal volume of xylocaine) was performed at intervals of 4 to 6 weeks after surgery (19). In Kridel et al.'s study, triamcinolone injection (0.1 to 0.2 cc of triamcinolone 10 mg/cc) was administered two weeks after surgery and every 4 weeks based on the response of the previous injection (5). Also, in Aydin et al.'s study, a triamcinolone injection (0.1 to 0.2 mL of triamcinolone 10 mg/mL) was performed ten days after surgery (20).

Because the onset of inflammation and formation of scars occur before the seventh day after surgery, therefore, not only the injection of triamcinolone immediately after surgery leads to better control of the supratip area. Patients also get rid of a painful and worrying injection a week after surgery.

Conclusion

The results showed that triamcinolone injection is effective in reducing edema and supratip skin thickness. Also, triamcinolone injection immediately after surgery leads to better thinning of the supratip envelope. However, further studies may be necessary to investigate the effects of triamcinolone injection on rhinoplasty outcomes after the surgery.

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