

Case Report

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Protocol of Conservative Treatment of Persistent Edema after Rhinoplasty

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Abstract

Due to the great popularity and relative availability of surgical methods for correcting appearance, rhinoplasty steadily occupies a leading position among all types of plastic surgeries, while remaining difficult both in technical terms and in terms of the rehabilitation period. Often, edema after even sparing closed rhinoplasty using modern surgical methods, including piezotome, persists for a year or more, provoking the formation of fibrous tissue, which prompts the patient and the surgeon to revision surgery. With the increase in the number of repeated interventions on the tissues of the nose, the question arose of how to avoid certain complications, which, perhaps, will provide a predictable final result of the operation. Based on 3 years of experience with such patients, we have developed a protocol for the treatment of postoperative edema, which we actively use in our work both with patients after primary rhinoplasty and after repeated surgeries. Keywords: rehabilitation after rhinoplasty, rhinoplasty, treatment of surgical complications, postoperative edema, soft tissue edema, LLLT, neodymium laser.

Introduction

Rhinoplasty is one of the most popular operations in the world of plastic surgery. But along with this, rhinoplasty is one of the most difficult operations, both in technical terms and in terms of predicting long-term results. This is due, on the one hand, to the peculiarities of the anatomy of the nose, in which tissues completely different in their physiological characteristics (bone, cartilage, mucous membrane, muscles, subcutaneous adipose tissue and the dermis proper) are closely intertwined, on the other hand, the technical component of surgery (method operations, technique and tools) [1]. Modern trends in nasal surgery call for us to adhere to preservation techniques with the choice of the correct levels of tissue dissection, minimal aggression in resection of the anatomical structures of the nose, and maximum preservation of natural anatomic structures [2,3]. But despite this, no matter how carefully we try to operate, the physiological response in the form of soft tissue edema to injury always remains part of the obligatory and, unfortunately, not always predictable effect, which, ultimately, can significantly affect our final result. Understanding the processes of soft tissue healing and studying the possibility of influencing them with various non-surgical methods in the postoperative period is extremely important and will allow achieving more acceptable results.

In the classical sense, the rehabilitation period after rhinoplasty lasts for a year. It is believed that during this period all the processes of healing and tissue formation finally take place and the nose acquires its finished appearance. It is during this period that we see the regressive development of soft tissue edema and structuring of the nose. But in some patients, swelling of the soft tissues of the nose can persist for more than a year, for example, for several years. Sometimes in such cases, patients are in search of repeated interventions on the nose in order to obtain a more elegant result. But here a completely different problem arises. It should not be forgotten that repeated operations on the nose are technically more complex, often requiring the use of cartilage autografts, and at the same time even more traumatic due to the abundant amount of scarred soft tissues, which cannot guarantee an improvement in the result in terms of nasal volume. The most common type of postoperative condition that interferes with the normal course of rehabilitation is persistent swelling in the area of the terminal part of the nose. Edema can last up to a year and a half, and in some cases (loose, voluminous skin) and more. And even if the patient is not concerned about this situation, it worries the surgeon who performed the rhinoplasty, since prolonged stagnation of fluid in the soft tissues of the nose leads to fibrosis and irreversible productive changes, which are often an indication to secondary open rhinoplasty.

Summing up all of the above, we are actively studying the issues of reducing and stopping postoperative swelling of the soft tissues of the nose using various hardware techniques to improve the final result. In this article, we present clinical cases of postoperative edema, which are successfully stopped using the protocols we have developed.

Own treatment protocol

In order to rehabilitate patients prone to edema, a treatment protocol has been developed that includes the following methods.

1. Deep heating with a short-pulse neodymium laser, the active medium of which is a neodymium-doped yttrium aluminum garnet, with a wavelength of 1064 nm, with a pulse frequency of 650 μ s "Aerolase Neo Light Pod 1064 nm" from the outside and, in case of nasal congestion, from the mucous membrane side of the nasal cavity. The purpose of this effect is to drain the deep vessels of the dermis and hypodermis, the mucous membrane of the septum and nasal cavity, to thicken the mucous membrane due to the collagen-inducing action of neodymium laser for tissue heating. At the same time, a short pulse duration (650 ms) is safe from the point of view of vascular coagulation, since it is less than the thermal relaxation time of the vessels of the nasal microvasculature, which prevents overheating of the vessel walls and burns. The parameters used in this protocol are: pulse duration 650 μ s, frequency 1.5 Hz, wavelength 1064 nm, energy density 15-20 J/cm², laser spot diameter 5 mm. The presence of a richly vascularized nasal mucosa with periodically bleeding capillaries is an indication for the additional use of high energy density (160-170 J/cm²) with a laser spot diameter of 2 mm in order to coagulate the vessels and reduce the volume of the mucous membrane.
2. Infiltration of the edematous cavity located between the lateral and / or septal cartilages and the mucous membrane of the nasal cavity with a solution of low-concentrated GCS – Celestone Soluspan and Hyalase 1500 IU, diluted with a 0.9% saline in a ratio of 1:2:2. Such a proportion of active substances allows stopping edema in a short time, realizing a stable result, and, what is extremely important, does not have a destructive effect on cartilage tissue. Injections are performed strictly subcutaneously with an infiltrative technique using a needle or a 30G blunt cannula. For optimal diffusion of the solution in the tissues after injection, neodymium heating is performed at the parameters described above.
3. If necessary, this procedure is repeated several times, but not earlier than after 1 month. Physiotherapeutic microcurrent treatment of the nose and middle zone of the face is recommended for patients as home preventive care.

Rationale for the protocol: The use of a short-pulse neodymium laser with a wavelength of 1064 nm at a low energy flux density is based on the principle of low-level laser therapy (LLLT). A number of studies in wound healing have demonstrated the high efficiency of LLLT in stimulating repair, faster relief of postoperative edema and pain (4,5). There are also experimental data on the greater effectiveness of the combination of LLLT and GCS introduced into the inflammation focus, compared with these methods in monoform [6]. The use of a neodymium laser for

acute and recurrent chronic nose bleeds is an effective, safe and painless method of vascular coagulation [7,8]. The combined use of hyaluronidase and corticosteroid is explained by their synergy in the relief of edematous syndrome. According to the description of Hyalase, it causes the breakdown of hyaluronic acid to glucosamine and glucuric acid and thereby reduces its viscosity, increases tissue and vascular permeability, facilitates the diffusion of fluids in the interstitial space, reduces tissue swelling, softens and flattens scars, and is used to improve the diffusion of other drugs [9]. A special role is acquired by the solution, "Hyalase" and the synthetic glucocorticosteroid "Celestone Soluspan", which consists from two salts of betamethasone: sodium phosphate (with high solubility, providing rapid relief of edema) and betamethasone acetate, characterized by poor solubility, slow hydrolysis and absorption [10]. The combination of these substances provides, on the one hand, a fast, on the other hand, a very long-term effect of the drug (up to a month), and the total duration of the effect can reach 1.5 months. In order to prevent adverse events and complications from the intralesional administration of Celestone Soluspan, the concentration of the latter in a solution with Hyalase is reduced by a factor of three, but due to its properties described above, the diffusion of the drug in the injection zone makes it possible to achieve anti-edematous, anti-inflammatory and antifibrotic effects.

Photos (in a separate file)

Clinical case 1 (L., 27 years old): the patient applied 3 weeks after rhinoplasty. Complaints: increasing swelling of the terminal and lateral sections of the nose, the area of the nose, nasal congestion and the presence of copious secretions of mucous character. Treatment: according to the protocol, a course of 3 procedures with an interval of 1 month, and additional exposure to a low-energy neodymium laser (20-30 J/cm²) was carried out every week during the first month of treatment in order to stop inflammation of the nasal mucosa.



Case 1.

Clinical case 2 (D., 26 years old). Condition after rhinoplasty 3 weeks ago. Complaints about swelling of the back, side and end of the nose. Treatment: according to the protocol, a course of three procedures with an interval of 1 month.



Case 2.

Clinical case 3 (A., 23 years old). Condition after rhinoplasty 1.5 years ago. Complaints about persistent dense swelling of the terminal section of the nose. Local status: the skin in the area of the wings and the tip of the nose has enlarged pores, hyperkeratosis, dense, rigid, with increased turgor. Palpation is painless. Treatment: according to the protocol, a course of 5 procedures with an interval of 3 months.



Case 3

Clinical case 4 (D., 28 years old). Condition after primary rhinoplasty 3 months. Complaints about persistent edema all parts of the nose. Treatment: 1 procedure, according to the protocol.



Case 4

Conclusions

1. Based on the results of the application of the protocols developed by us for the management of patients with edema after rhinoplasty, it can be argued that these methods are pathogenetically substantiated, relatively safe and less traumatic, which is extremely important when working with the delicate soft tissues of the operated nose.
2. These protocols allow not only stopping edema, but also preventing fibrotic changes, which in some cases develop in patients due to their individual characteristics, which allows avoiding repeated surgical interventions and increasing patient satisfaction with the result of the operation.
3. These protocols can be implemented in the practice of dermatologists and plastic surgeons involved in nose surgery.

No conflict of interest.

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