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EFFECT OF SILVER VITELLINATE, HYALURONIC ACID AND SODIUM BENZOATE NASAL SPRAY AFTER SEPTOPLASTY

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The aim of the study was to evaluate the postoperative endoscopic score and the quality of life (QoL) in two groups of adults undergoing septoplasty with turbinoplasty and who were treated after surgery with a nasal spray containing silver vitellinate, hyaluronic acid and sodium benzoate, or saline solution alone. This single-blind randomized study was carried out on 54 patients (30 males, and 24 females, mean age 33.5±2.7 years) undergoing septoplasty and volumetric tissue reduction of inferior turbinates for nasal obstruction. All subjects underwent the Visual Analogue Scale (VAS) questionnaire and the nasal endoscopy score by Lund and Kennedy (LK) at baseline before surgery (T0), 15 days (T15) and 21 days (T21) after treatment. All subjects were randomized into 2 groups, the experimental arm, group I (GI), and the control arm, group II (GII). Patients were given the treatment, a nasal spray containing silver vitellinate, hyaluronic acid and sodium benzoate for group I and a saline solution alone (sodium chloride 0.9%) for group II. After therapy, better VAS and LK scores were found ($p < 0.05$) in the GI in GII. No patients reported adverse reactions or complications. Our findings suggest that silver vitellinate, hyaluronic acid and sodium benzoate nasal spray improved not only the endoscopic score, but also the quality of life (QoL) in the early postoperative period after septoplasty. In addition, the absence of adverse reactions or complications pointed out the tolerability and safety of the treatment.

To the Editor,

Septoplasty with concomitant turbinoplasty, is one of the most frequent surgical procedures performed on adults by otolaryngologists (1) to correct a deviated septum and to restore nasal patency. To date, surgeons have developed a variety of surgical techniques (2) that have changed over time, from the concept of a wide resection to that of preservation and regularization of the deviated septum (3, 4). However, regardless of the surgical technique used and despite the consolidated use

of different postoperative treatments, the early postoperative period after nasal surgery is often compromised by edema, crust formation, mucosal alterations, and excessive secretions (5).

Furthermore, despite accurate postoperative medications and the use of available treatments as nasal irrigation, inhalations, sprays, and ointments, postoperative discomfort often persists and no established gold standard treatment exists (5). To this end, otolaryngologists are continually searching for devices able to promote wound healing and

Key words: septoplasty; turbinate surgery; QoL; postoperative outcomes; nasal spray

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postoperative regeneration of nasal mucosa (5).

Intriguingly, previous studies reported that silver-based medical preparations exert not only an antimicrobial effect in the airway of a murine model of asthma, but also a role in decreasing the inflammation (6). Moreover, silver-based preparations as well as quartz seem to modulate the proliferation rate of fibroblast cells, the main characters of wound healing process (7). For instance, silver vitellinate (silver proteinate) is a powerful germicidal and decongestant, that has been used for a long time to treat infection of nasal mucosa (8) of viral or bacterial origin, in children. In addition, hyaluronic acid, the main component of the extracellular matrix, is a glycosaminoglycan, that may exert reparative, anti-inflammatory and immune-modulating activities (5, 9-12).

Hence, an alternative local postoperative therapy after nasal surgery could be the application of nasal spray containing silver vitellinate and hyaluronic acid (Rinostil plus, DECA, Milan, Italy). For this purpose, we evaluated the postoperative quality of life (QoL) in non-allergic adults undergoing septoplasty with turbinoplasty, treated after surgery with a nasal spray containing silver vitellinate, hyaluronic acid and sodium benzoate.

MATERIALS AND METHODS

This randomized study was carried out at the ENT Department of Cardarelli Hospital in Naples on 54 non-allergic patients (30 males, 24 females, mean age 33.5 ± 2.7 years) undergoing septoplasty and volumetric tissue reduction of inferior turbinates by Vesalius Quantum (Quantum Molecular Resonance Cautery) for nasal obstruction due to septal deviation and inferior turbinate hypertrophy.

The enrolled subjects gave their informed consent to the study, which was approved by the local Board of Medical Ethics. The study was carried out according to the Declaration of Helsinki.

All subjects underwent:

- Skin prick test (SPT) using a standard allergen extract panel [(Stallergenes Company, Anthony, France). Positive (histamine) and negative (distilled water) controls were also performed. Aeroallergens

included house dust mite, pollens, alternaria, aspergillus, cladosporium, grasses, weeds, wheat, cockroach] (13).

- Nasal endoscopy by a 4-mm 30-degree rigid endoscope (Storz, Tuttlingen, Germany) at baseline before surgery (T0), 15 days (T15) and 21 days (T21) after treatment. The nasal endoscopy was performed, without decongestant or local anesthesia and scored as previously described by Lund and Kennedy (LK) (14).
- the Visual Analogue Scale (VAS) at baseline before surgery (T0), 15 days (T15) and 21 days (T21) after treatment. The VAS included questions about nasal obstruction (VASo), and rhinorrhea (VASr). The disease was divided into mild, moderate, and severe based on total severity VAS scores (mild, VAS = 0-3; moderate, VAS = 4-7; and severe, VAS = 8-10). A VAS > 5 affected patient QoL (15).

Patients suffering from systemic diseases, allergy, acetylsalicylic acid (ASA) sensitivity, cystic fibrosis, primitive ciliary dyskinesia, or with a history of previous nasal surgery were excluded from the study. Subjects who were being treated with antibiotics, steroids, antihistamines, and local vasoconstrictive decongestants during the previous month were also excluded.

The enrolled subjects underwent the septoplasty as described by Sulisenti under general anesthesia by the same experienced consultants (16). The maxilla-premaxilla approach combining mobilization and/or removal of any deranged portion of the bony and/or cartilaginous septum, followed by reconstruction of the septum support (16) was performed. The septum was fixed through trans-septal sutures and the septal caudal incision was closed.

In addition, turbinoplasty was performed by using the Vesalius Quantum (Quantum Molecular Resonance Cautery), which aims to create a decongested submucosa. The nose was packed, and the packing was removed 48 h after surgery, after which subjects were randomized into 2 groups and assigned the treatments. The investigational arm, group I (GI), included 28 subjects, and the control arm, group II (GII), also included 26 subjects.

GI subjects received topical therapy with a nasal spray (2 puffs for each naris 5 times a day for 21 days) containing silver vitellinate, hyaluronic acid and sodium benzoate (Rinostil plus, DECA, Milano, Italia).

GII subjects received topical therapy with a nasal spray (2 puffs for each naris 5 times a day for 21 days)

containing saline solution (sodium chloride 0.9%) alone.

Continuous baseline characteristics were described as mean and standard deviation, whereas differences between groups were tested with the Student's *t*-test. $P < 0.05$ was considered statistically significant.

RESULTS

At baseline, no statistically significant differences were observed between groups (Table I).

After treatment at T15 and T21, we observed a statistically significant ($p < 0.05$) improvement of both VASo, VASr and LK scores in GI (Table II), whereas we did not find improvement ($p > 0.05$) in either the VAS scores or in the LK scores in the GII at T15 (Table II). Conversely, in GII we observed improvement ($p < 0.05$) in the VASo, VASr and LK only at T21. After therapy at T21, the VASo, VASr and LK scores were better ($p < 0.05$) in the GI than in the GII (Table II). No patients reported adverse reactions or complications.

DISCUSSION

Comfortable nasal breathing is a condition directly related to the QoL, and the nasal obstruction is one of the most common symptoms observed in ear, nose and throat (ENT) practice. Consequently, septoplasty is of the utmost importance in the field of otorhinolaryngology (2,18).

Since the QoL is a subjective evaluation of the effect of a disease or of treatment on a patient's health, it represents an important assessment in clinical interventions. Interestingly, several patients with the same objective conditions may have different QoL (19).

Currently, there is evidence that the patient's perspective on treatment outcomes is a crucial element for improving high-quality care and patient-rated therapeutic outcomes in terms of symptoms, and that it can provide a much more realistic feedback of the effectiveness of a treatment than those of objective outcomes (5). For these reasons, our study aims at evaluating postoperative treatment outcome in terms of QoL.

Despite the consolidated use of different topical

treatments after septoplasty, the early postoperative period is often painful and uncomfortable, seriously affecting the patient's QoL. Indeed, crusting, mucosal changes, ventilation disorders due to excessive secretion and edema, hemorrhaging, or the development of synechia with possible re-obstruction are critical factors that can lead to postoperative complications (20). In addition, the final postoperative result depends on a rapid wound healing of the nasal mucosa, which considerably reduces the risk of infections.

Our study evaluated the effect of a nasal spray containing silver vitellinate, hyaluronic acid and sodium benzoate on adults undergoing septoplasty with turbinoplasty for nasal obstruction. We investigated whether the local treatment influenced the postoperative status of the nasal mucosa upon endoscopic evaluation and the QoL.

Silver vitellinate, which has been used for a long time to treat upper airways phlogosis is a powerful antimicrobial and decongestant (6-8). In particular, this molecule blocks the metabolism of bacteria, reducing their replication, implementing the lysis of the microbial cell wall, damaging bacterial DNA and bacterial proteins, and inducing the blockage of the respiratory enzyme system. It also has mucolytic and decongestant properties (6, 7).

Recently, mounting evidence suggests that hyaluronic acid - the major component of extracellular matrices of the respiratory mucosa - serves important biological roles beside its function as a structural component of interstitial and connective tissues. Furthermore, it seems to promote wound healing, repairing mucosal surfaces, and cell motility. Previous studies showed that topical application of hyaluronic acid may promote the healing process of the nasal mucosa, preventing extensive crusting, and leading to the recovery of smell function and cooling sensation (5, 9-12). Furthermore, sodium benzoate has bacteriostatic and antimycotic properties (21).

In our study, the impact of the postoperative treatment was assessed with the endoscopic score and QoL questionnaire, VAS at T15 and T21. At T0 we did not find differences between groups (Table I).

After treatment, we observed a statistically significant ($p < 0.05$) improvement in all parameters

Table I. Differences in both groups at baseline.

GROUP T0	LK	VASo	VASr
I	5.8±2.2	7.3±2.0	7.5±1.3
II	6.2±1.2	6.8±1.0	7.0±1.3
p	>0.05	>0.05	>0.05

No statistically significant differences were found in the two groups at baseline.
 LK: endoscopic score; VASo: obstruction; VASr: rhinorrhea.

Table II. Differences in both groups after treatment at T15 and T21.

	GI			GII			
	LK	VASo	VASr	LK	VASo	VASr	
T0	5.8±2.2	7.3±2.0	7.5±1.3	6.2±1.2	6.8±1.0	7.0±1.3	
T15	3.4±1.3	1.1±1.2	0.8±1.0	5.5±1.8	6.2±1.3	6.5±1.0	P:GIvsGII<0.05
P	<0.05	<0.05	<0.05	>0.05	>0.05	>0.05	
T21	0.7±1.3	0.7±0.8	0.45±1.0	5.0±1.2	5.2±1.0	5.6±1.0	P:GIvsGII<0.05
P	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	

After treatment at T15 and T21, a statistically significant ($p<0.05$) improvement was observed of both VAS and LK scores in GI, whereas at T21 we did not find improvement either in the VAS scores or in the LK scores in GII. In GII we observed improvement in the VAS and LK parameters only at T21. After therapy only at T21, the VAS and LK scores were better ($p<0.05$) in GI than in GII. LK: endoscopic score; VASo: obstruction; VASr: rhinorrhea.

studied in GI (Table II). Conversely, in GII at T15 we did not observe improvement in the VAS and LK scores, but at T21 we observed improvements in all considered scores (Table II).

These observations suggest that the nasal spray containing silver vitellinate, hyaluronic acid and sodium benzoate improved not only clinical/endoscopic parameters reducing the formation of crusts and edema, but also the QoL.

Furthermore, in GI, the improvement of VAS and LK scores after 15 days already demonstrated that the effect of the nasal spray containing silver

vitellinate, hyaluronic acid and sodium benzoate might reduce the healing time after nasal surgery. Indeed, in GII, we observed an improvement of endoscopic and QoL parameters only 21 days after surgery. However, this could be the result of the physiological post-operative healing process *per se*.

In addition, although the results were statistically significant in both groups, they were better in GI than in GII. Eventually, the absence of adverse reactions or complications confirmed the tolerability and safety of the treatment.

In conclusion, our findings suggested that a

nasal spray containing silver vitellinate, hyaluronic acid and sodium benzoate improves not only the clinical parameters, but also the QoL in the early postoperative period.

Moreover, given the large number of septoplasties performed by otolaryngologists, the use of the spray containing silver vitellinate, hyaluronic acid and sodium benzoate could represent an economic advantage, particularly in terms of reduction of indirect costs (disability, reduced school performance and absence from school) related to the duration of the convalescence .

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