MEDICAL SCIENCES

MODERN SURGICAL TECHNIQUES FOR HYPERTROPHY OF THE INFERIOR NASAL TURBINATES

Daniel Furculița[1]

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Introduction. Chronic nasal obstruction, although it is not a life-threatening pathology, can affect the patient's quality of life and is one of the most common symptoms that bring the patient to the doctor [1, p. 814]. One of the most common causes of chronic obstruction of the nasal passages is the hypertrophy of the inferior nasal turbinate [2, p. 483]. The most common non-infectious causes of hypertrophy of the mucous membrane of the inferior nasal turbinate and decreased air flow in the nasal cavity are allergic rhinitis [3, p. 1086; 4, p. 390] and non-allergic (vasomotor, medicinal) [5, p. 69; 6, p. 685]. Numerous surgical methods have been described in the specialized literature for the treatment of inferior nasal turbinate hypertrophy.

The most important thing to keep in mind in nasal turbinate surgery is that a wider nasal cavity does not necessarily imply better nasal function. The purpose of the surgical intervention is to reduce the patient's complaints, while preserving the function of the organ, and to perform an optimal volumetric reduction while preserving the function [7, p. 172]. In principle, as in any surgical intervention, the effectiveness of the method in reducing respiratory obstruction, hypersecretion, sneezing, headaches and, on the other hand, the short and long-term side effects must be respected [8, p. 485].

We will review some of the non-bleeding and bleeding surgical techniques of inferior turbinate hypertrophy. Bloodless methods include:

1. Cryosurgery is based on necrosis produced by freezing, under local anesthesia, the nasal turbinate. Apart from a transient headache, this surgical technique has no other postoperative sequelae. One month after surgery, there is a marked decrease in glandular acini, scar tissue and normal looking cilia. According to some authors, cryosurgery would be more effective in allergic rhinitis than in non-allergic hypertrophy of the inferior nasal turbinates and has a particularly good effect in controlling rhinorrhea. The disadvantages of this

[1] «Nicolae Testemițanu» State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

technique are the difficult prediction of the volumetric reduction of the inferior nasal turbinate and long-term relapses [7, p. 165; 9, p. 571; 10, p. 148].

2. Volumetric reduction with ultrasound is based on tissue destruction by using very high frequencies (up to 50,000 Hz). It is a minimally invasive, non-bleeding technique that achieves significant intratissue volumetric reduction of the hypertrophied tissue of the nasal turbinate. The disadvantage of the method consists in the inappropriate size and shape of the handpiece [11, p. 369].

3. Laser surgery is one of the methods frequently used in the volumetric reduction of the inferior nasal turbinates. The main advantages of using the laser in surgical practice are: the subsequent lack of bleeding (the hemostatic properties of the laser treatment being so strong that postoperative bleeding is very rare), the advantage of a controlled resection with minimal tissue effect, the possibility of performing it under local anesthesia, in in most cases, and good hemostasis in the operating field and, therefore, the lack of need for nasal tamponade [12, p. 56; 13, p. 35; 14, p. 51]. The formation of fibrin and postoperative crusts occur as a result of thermal damage to the mucosa and suggest the need for proper postoperative care [12, p. 55; 15, p. 250; 16, p. 1037; 17, p. 251]. Currently, the most used types of laser for lower nasal turbinate surgery are: Diode laser, Potassium – Titanium – Phosphate (KTP) laser, CO2 laser [18, p. 910].

4. Radiofrequency consists in the volumetric reduction by this method occurs following fibrosis through coagulation necrosis. The maximum effect occurs 7-14 days after the procedure, it has a number of advantages: it does not require postoperative nasal tamponade, the short duration of the intervention (approximately 10 minutes) can be performed under local anesthesia, in an outpatient setting.

The disadvantages of radiofrequency are given by the persistence of increased rhinorrhea in the first 48 hours and the slight impairment of the quality of life; in the case of untimely use, there is a risk of crust formation, therefore the radiofrequency electrocautery is positioned submucosally (at a distance from the inferior nasal turbinate bone); being simple and easy to accept by the patient, it can be restored in 1-2 years depending on the symptoms and the quality of life.

Among the bleeding methods we can mention:

1. Electrocautery is indicated in soft hypertrophies of the inferior nasal turbinate (vasomotor stage) and consists in reducing the dimensions of the inferior nasal turbinate by cauterization due to the elimination of some portions of the cavernous tissue after cauterization and by retraction of the rest of the tissue due to the following healing process. Galvanocauterization is one of the methods that have been intensively used and consists of drawing two parallel lines of coagulation in the medial wall of the inferior nasal turbinates; this tissue

coagulation will produce necrosis, which is later followed by secondary, superficial fibrosis of the mucosa, the decrease in vascularity and the reduction in size of the medial wall of the inferior nasal turbinates [9, p. 570].

Bipolar electrocautery is especially aimed at patients with chronic hypertrophic rhinitis, having a limited effect in reducing the tail of the degenerated muriform inferior nasal turbinate. The technique can be performed under local or general anesthesia, under direct endoscopic visualization and requires postoperative nasal tamponade. After cauterization, the nasal turbinates will swell and thus the nasal obstruction will increase. The burnt mucosa will be removed in about 7 days, during which the toilet of the nasal passages is performed daily.

2. Turbinoplasty consists in the resection of the bone of the inferior nasal turbinate, with the volumetric reduction of the two flaps (lateral and medial), an intervention that can be performed with endoscopic instruments. It is a pertinent alternative in the surgical treatment of the nasal obstruction syndrome generated by the hypertrophy of the inferior nasal turbinates, addressing hypertrophic chronic rhinitis in the advanced stages in which there are hypertrophic and hyperplastic changes at the turbinate level. It is performed under endoscopic control, preferably under general anesthesia.

3. Mucotomy with the microdebrider (shaver) is performed by trituration and morcellation of the soft tissues by the cutting blades of the shaver, tissues which are then sucked on the suction system of the device. The advantage of using the microdebrider consists in the fact that it reproduces the anatomical landscape, acts strictly at the place where it is applied and has a high degree of safety due to the protection of the cutting blade. The shaver is particularly indicated in endoscopic ablation of nasal polyps and hypertrophy of the inferior turbinate, to remove excess tissue. Mucotomy with the shaver is a beneficial alternative in established chronic hypertrophic rhinitis, having the advantage of reducing the hypertrophied and hyperplastic tissue of the inferior turbinate under direct visualization, without bone damage and without thermal effect in depth. The main inconvenience of the technique consists in the obligation to tamponade the nasal fossa postoperatively.

Conclusions. As can be seen, the surgical techniques in the hypertrophy of the inferior nasal turbinates are very varied, numerous (being described much more widely in the specialized literature), the use of one or another of them depending on each individual pathology. All these techniques have a favorable functional result, therefore we can conclude that none of them can be considered the choice, the technique used being the most indicated for the existing pathology, as well as the one that is most easily accepted by the patient.

References:

1. Larrabee, Y. C., Kacker A. Which inferior turbinate reduction technique best decreases nasal obstruction? The Laryngoscope. 2014; 124: 814–815.

2. Bridger G. P., Proctor D. F. Maximum nasal inspiratory flow and nasal resistance. Ann Otol Rhinol Laryngol. 1970; 79(3): 481 – 488.

3. Heung-Man L., Sook A. P., Seung-Won C., et al. Interleukin-18/-607 gene polymorphism in allergic rhinitis. International journal of pediatric otorhinolaryngology. 2006; 70: 1085–1088.

4. Juniper E. F. Impact of upper respiratory allergic diseases on quality of life. J Allergy Clin Immunol. 1998; 101(2 Pt 2): S386–391.

5. Kimmelman C. P., Gamal H. A. Vasomotor rhinitis. Otolaryngol Clin North Am. 1986; 65: 65–71.

6. Passali D., Passali M. F., Damiani V., Passali G. C., and Bellussi L. Treatment of inferior turbinate hypertrophy: a randomized clinical trial. Ann Otol Rhinol Laryngol. 2003; 112(8): 683–688.

7. Myrthe K. S., Huizing H., Huizing E. Treatment of inferior turbinate pathology: a review and critical evaluation of the different techniques. Rhinology. 2000; 38: 157–166.

8. Mehta U., Huber T. C., Sindwani R. Patient expectations and recovery following endoscopic sinus surgery. Otolaryngol – Head and Neck surg. 2006; 134: 483–487.

9. Passali D., Lauriello M., Anselmi M., et al. Treatment of hypertrophy of the inferior turbinate: long-term results în 382 patients randomly assigned to therapy. Ann Otol Rhinol Laryngol. 1999; 108: 569–575.

10. Tokano H., Maehara H., Nakamura H., et al. Short-term effect of argon plasma coagulation of the inferior turbiante in patients with perennial nasal allergy. Auris Nasus Larinx. 2005; 32: 145–150.

11. Bhattacharyyan N., Kepnes L. J. Clinical effectiveness of coblation inferior turbinate reduction. Head and Neck Surg. 2003; 129: 365–371.

12. Huttenbrink K. B., Lasers in otorhinolaryngology. Current topics in otolaryngology – head and neck surgery. Thieme, New York. 2005. 53–57.

13. Lippert B. M., Werner J. A. CO2 laser surgery of hypertrophied inferior turbinates. Rhinology. 1997; 35: 33–36.

14. Testa B., Mesorella M., Squeglia C., et al. Carbon Dioxide laser turbinate surgery for chronic pbstructive rhinitis. Lasers Surg Med. 2000; 27: 49–54.

15. Englender M. Nasal laser mucotomy (L-mucotomy) of the inferior turbinates. J Laryngol Otol. 1995; 109: 226–299.

16. Lippert B. M., Werner J. A. Comparison of carbon dioxide and neodymium: YAG lasers in surgery of the inferior turbinate. Ann Otol Rhinol Laryngol. 1997; 106: 1036–1042.

17. Werner J. A., Rudert H. Der Einsatz des Nd-YAG-lasers in der Hals-Nasen-Ohrenheilkunde. HNO. 1992; 40: 248–258.

18. Jones A. S., et al. Nasal airflow: resistance and sensation. J Laryngol Otol. 1989; 103:909–911.