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Effect of Submucosal Resection and Submucosal Diathermy on Nasal Airflow in Inferior Turbinate Hypertrophy

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Abstract: Submucosal resection and submucosal diathermy are common procedures in the treatment of inferior turbinate hypertrophy. Nonetheless, there is still a debate on the safety and efficacy between these two surgical techniques. We aimed at comparing the effectiveness and safety of submucosal diathermy and submucosal resection in the treatment of inferior turbinate hypertrophy. Sixty patients with nasal obstruction due to inferior turbinate hypertrophy were randomly divided into two groups; submucosal resection and submucosal diathermy groups. Gertner-Podoshin plate was used for measurement of nasal airflow before operation and 2 months postoperative. Significant resolution of the obstruction reported by the patients was similarly detected in diathermy (93.1%) and resection groups (96%, P>0.05). According to the Gertner-Podoshin measurements, both diathermy and resection techniques similarly resulted in good nasal airflow two month postoperative (86.2% vs. 89.2%, respectively; P>0.05). Postoperative bleeding was more common in the resection group compared with the diathermy group (P=0.002). Moreover, patients in the diathermy group suffered from pain more than the resection group (P=0.01). Both submucosal resection and submucosal diathermy techniques result in similar postoperative outcomes in treatment of inferior turbinate hypertrophy, although postoperative bleeding and pain was more in submucosal resection and submucosal diathermy techniques, respectively.
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1. Introduction

Nasal obstruction due to inferior turbinate hypertrophy is one of the common complaints in otorhinolaryngology. Allergy, pseudoallergy and nonallergic rhinitis with eosinophilia syndrome contribute to the progression of inferior turbinate hypertrophy (Kizilkaya et al., 2008). Inferior turbinate hypertrophy is usually bilateral and is caused by mucosal hypertrophy without accompanying hypertrophic changes in boney structures (Fradis et al., 2002). Medical treatment includes antihistamines, local and systemic steroids, local desensitization and allergen avoidance. It is usually treated with medication but surgery is needed if medical therapy fails (Fradis et al., 2002).

There are different surgical methods in the treatment of inferior turbinate hypertrophy including submucosal sclerosants or steroid, cryoturbinectomy, turbinate resection and submucosal radiofrequency turbinectomy (Kizilkaya et al., 2008; Fradis et al., 2002; Lee et al., 2001; Bhattacharyya and Kepnes, 2003; Sroka et al., 2007; Friedman, 2005; Nease and Krempl, 2004; Sapci et al., 2007). Some of these techniques are expensive and need experienced staff. On the other hand, submucosal resection and submucosal diathermy, common procedures in the treatment of inferior turbinate hypertrophy, do not require expensive instrumentation (Fradis et al., 2000). The technique used in our institute and many other centers is submucosal resection with high success rate but with some accompanying complications such as bleeding (Fradis et al., 2000). Submucosal diathermy also, is highly effective with rapid healing and a relative lack of complications (Fradis et al., 2002). Nonetheless, there is still a debate on the safety and efficacy between these two surgical techniques. Therefore, we aimed at comparing the effectiveness and safety of submucosal diathermy and submucosal resection in the treatment of inferior turbinate hypertrophy.

2. Material and Methods

In a randomized double blind clinical trial, 60 patients with nasal obstruction due to inferior turbinate hypertrophy were randomly divided into two groups. In the first group, submucosal resection was performed and the second group underwent submucosal diathermy. Inclusion criteria were age>16 years old, complaint of nasal obstruction, inferior turbinate hypertrophy, and resistance to medical therapy. Diagnosis was made clinically by an expert otorhinolaryngologist through medical history and examination. Exclusion criteria were nasal polyps and mass, septal deviation and any history of rhinosurgery. The study was approved by local ethics committee at Tabriz University of Medical Sciences. Furthermore, written informed consent was obtained from all of the participants.

Surgery was performed under general anesthesia by an expert surgeon and patients were discharged a day postoperative. Patients were not aware of the surgical technique and results were studied by a blinded researcher. In the submucosal resection group, after placing two epinephrine meshes in middle and inferior turbinates, an incision was made in anterior and medial borders of the inferior turbinate. Thereafter, inferior turbinate bone and mucosal tissue was rersected, and nasal cavity was tamponed for 24 hours after homeostasis. In the second group (submucosal diathermy), diathermy needle was inserted in submucosal layer from anterior to posterior border of inferior turbinate for twenty seconds. Diathermy needle insertion was repeated three times in superior, middle and inferior parts of the inferior turbinate. Gertner-Podoshin plate was used for measurement of nasal airflow (Gertner et al., 1984). Gertner-Podoshin plate is a 10×12 cm steel plate with chromic cover which is placed under nostrils in a right angle then patient breathes slowly with closed mouth. Temperature difference between plate and expiratory air leads to vapor condensation on the plate. Plate is marked with arches 1 cm apart and there are 9 arches in total. The area of condensed vapor has a direct relation with nasal airflow. Score 4 to 9 is considered as good nasal airflow. Nasal airflow measurement by the Gertner-Podoshin plate was performed before operation and 2 months postoperative. A questionnaire assessing subjective improvement of the nasal airflow as well as surgical side effects including bleeding, pain, nasal dryness, nasal fetor and crusting was provided. These side effects were scored from 1 to 5 with a 5-point Lickert scale according to the side effect severity mentioned by the patients in the questionnaire.

Data were presented as frequency (percentage) or mean ± standard deviation (SD). Statistical analysis was performed with SPSS for windows version 16.0 (Chicago, IL) using chi-square test and Independent-Samples t test, whenever appropriate. A P value <0.05 was considered statistically significant.

3. Results

Three of patients failed to follow, one from diathermy and 2 from resection group. In diathermy group 13 patients were female and 16 patients were male, with mean age of 27.5±7.5 years. In resection group 15 patients were female and 13 were male, with mean age of 26.5±5 years. According to the questionnaire on subjective improvement of the nasal airflow, in diathermy group nasal obstruction was significantly resolved in 27 (93.1%) patients and partially in 2 (6%) patients. There were similar results in the resection group; 27 (96%) patients had significant and 1 (4%) patient had partial resolution of the obstruction. There was no significant difference in two groups (P>0.05).

According to the Gertner-Podoshin measurements, nasal airflow was scored in four groups. Score 4 to 9 is considered as good nasal airflow. In the diathermy group, 16 (55.1%) patients had good nasal airflow before operation which increased to 25 (86.2%) patients 2 month later. In the resection group, 16 (57.1%) patients had good airflow before surgery which increased to 25 (89.2%) patients post operation. There was no significant difference in the postoperative nasal flow improvement between the two studied groups (P=0.67).

All the patients in both groups had clinically bloody discharge after removal of nasal tampon the day after surgery with no indication of re-tamponade or cautery. The mean subjective bleeding score was higher in the resection group compared with the diathermy group (1.96 vs. 1.31, P=0.002). Moreover, patients in the diathermy group had higher pain scores than the resection group (1.75 vs. 1.28, P=0.01). There were no significant differences between the two groups in mean scores of fetor (P=0.73), crust (P=0.51) and nasal dryness (P=0.95). Frequency of the subjective surgical side effects in the diathermy and resection groups is provided in Table 1.

4. Discussions

Nasal obstruction is one of common symptoms in inferior turbinate hypertrophy. Submucosal resection and submucosal diathermy are common and effective surgical techniques in the treatment of inferior turbinate hypertrophy (Fradis et al., 2002; Ophir et al., 1992). There are few studies comparing safety and effectiveness of both submucosal resection and submucosal diathermy in

the treatment of inferior turbinate hypertrophy. Fradis et al. (2000) revealed that inferior turbinectomy resulted in greater improvement in nasal breathing both in short-term (2 weeks) and long-term (two months) compared with the submoucosal diathermy. They drew similar conclusion in terms of need for revision surgery (Fradis et al., 2000). In contrast, Imad et al. (2012) found similar postoperative nasal permeability in patients undergoing submucosal diathermy and partial inferior turbinectomy. Although no statistical analysis was performed, Kafle et al. (2007) reported that 40% of patients in diathermy group had recurrence of nasal blockage in a 6-month follow up time, while no patient in partial resection group had recurrence. In the present study, both submucosal resection and submucosal diathermy techniques resulted in similar outcome in terms of nasal breathing according to the Gertner-Podoshin plate scoring. Furthermore, we found no difference in subjective improvement between the two studied surgical techniques. Moreover, no remission of symptoms was seen in the 6-month follow up.

Discrepancy in the postoperative outcome between submucosal turbinectomy and submucosal diathermy techniques has been attributed to the technical failure of the latter. Fradis and colleagues (2000) indicated that a partial failure of the submucosal diathermy technique might be due to the fact that the diathermy needle might not always reach the posterior end of the inferior turbinate. Nevertheless, we believe that such technical failure may be encountered more if surgery is performed under local anesthesia. In the present study, both surgical techniques were performed under general anesthesia; a condition in which surgeon has better control on the surgical site.

Table 1. Frequency of subjective side effects in diathermy and resection group after operation, n (%)

Side effect	Surgical technique	Absent	Mild	Moderate	Severe	Very severe
Nasal fetor	Diathermy	21 (73)	6 (20)	3 (7)	0 (0)	0 (0)
	Resection	24 (86)	0 (0)	4 (14)	0 (0)	0 (0)
Nasal bleeding	Diathermy	22 (76)	5 (17)	2 (7)	0 (0)	0 (0)
	Resection	11 (39)	7 (25)	10 (36)	0 (0)	0 (0)
Pain	Diathermy	15 (52)	6 (20)	8 (28)	0 (0)	0 (0)
	Resection	20 (71)	8 (29)	0 (0)	0 (0)	0 (0)
Nasal dryness	Diathermy	16 (55)	8 (28)	4 (14)	1 (3)	0 (0)
	Resection	14 (50)	10 (36)	4 (14)	0 (0)	0 (0)
Crusting	Diathermy	17 (59)	6 (20)	5 (18)	1 (3)	0 (0)
	Resection	15 (53)	5 (18)	6 (22)	2 (7)	0 (0)

In our study, postoperative bleeding was detected more in the resection group compared with the diathermy group. This finding is in concordance with that of the previous investigations (Fradis et al., 2000; Imad et al., 2012). Bleeding following submucosal resection is reported in the literature, ranging from 4% to 28% (Oluwole and Mills, 1994), but bleeding following submucosal diathermy is much lower (Williams et al., 1991). In addition, pain was more complained by the patients in the diathermy patients. This finding is in contrast to that of the study by Imad et al. (2012) reporting greater complaints of pain in patients undergoing partial turbinectomy. In terms of the side effects, they concluded that diathermy was a better procedure in inferior turbinate hypertrophy due to lower side effects and earlier healing time (Imad et al., 2012). Nasal crusting is considered as another complication of both surgical procedures (Fradis et al., 2000; Imad et al., 2012). However, there was no significant difference in nasal crusting between the two surgical techniques in our study.

In conclusion, both submucosal resection and submucosal diathermy techniques result in similar postoperative outcomes in treatment of inferior turbinate hypertrophy, although postoperative bleeding and pain was more in submucosal resection and submucosal diathermy techniques, respectively.

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References

[1]. Kizilkaya Z, Ceylan K, Emir H, Yavanoglu A, Unlu I, Samim E, Akagün MC. Comparison of radiofrequency tissue volume reduction and submucosal resection

with microdebrider in inferior turbinate hypertrophy. Otolaryngol Head Neck Surg. 2008;138:176-81.
[2]. Fradis M, Malatskey S, Magamsa I, Golz A. Effect of submucosal diathermy in chronic nasal obstruction due to turbinate enlargement. Am J Otolaryngol. 2002;23:332-6.
[3]. Lee KC, Hwang PH, Kingdom TT. Surgical management of inferior turbinate hypertrophy in the office: three mucosal sparing techniques. Oper Tech Otolaryngol Head Neck Surg. 2001;12:107-11.
[4]. Bhattacharyya N, Kepnes LJ. Clinical effectiveness of coblation inferior turbinate reduction. Otolaryngol Head Neck Surg. 2003;129:365-71.
[5]. Sroka R, Janda P, Killian T, Vaz F, Betz CS, Leunig A. Comparison of long term results after Ho:YAG and diode laser treatment of hyperplastic inferior nasal turbinates. Lasers Surg Med. 2007;39:324-31.
[6]. Friedman NR. Inferior turbinate reduction: Anapplication for the microdebrider. Oper Tech Otolaryngol Head Neck Surg. 2005;16:232-4.
[7]. Nease CJ, Krempl GA. Radiofrequency treatment of turbinate hypertrophy: a randomized, blinded, placebo-controlled clinical trial. Otolaryngol Head Neck Surg. 2004;130:291-9.
[8]. Sapci T, Usta C, Evcimik MF, Bozkurt Z, Aygun E, Karavus A, Peker M. Evaluation of radiofrequency thermal ablation results in inferior turbinate hypertrophies by magnetic resonance imaging. Laryngoscope. 2007;117:623-7.
[9]. Fradis M, Golz A, Danino J, Gershinski M, Goldsher M, Gaitini L, Malatskey S, Armush W. Inferior turbinectomy versus submucosal diathermy for inferior turbinate hypertrophy. Ann Otol Rhinol Laryngol. 2000;109:1040-5.
[10]. Gertner R, Podoshin L, Fradis M. A simple method of measuring the nasal airway in clinical work. J Laryngol Otol. 1984;98:351-5.
[11]. Ophir D, Schindel D, Halperin D, Marshak G. Long-term follow-up of the effectiveness and safety of inferior turbinectomy. Plast Reconstr Surg. 1992;90:980-4.
[12]. Imad H, Javad K, Ullah S. Comparison of submucosal diathermy with partial inferior turbinectomy: a fifty case study. J Postgrad Med Inst. 2012;26:91-5.
[13]. Kafle P, Maharjan M, Shrestha S, Toran KC. Comparison of sub mucosal diathermy and partial resection of Inferior turbinate in the treatment of symptomatic nasal valve blockage. Kathmandu Univ Med J (KUMJ). 2007;5:501-3.
[14]. Oluwole M, Mills RP. An audit of the early complications of turbinectomy. Ann R Coll Surg Engl. 1994;76:339-41.
[15]. Williams HO, Fisher EW, Golding-Wood DG. 'Two-stage turbinectomy': sequestration of the inferior turbinate following submucosal diathermy. J Laryngol Otol. 1991;105:14-6.

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