

Original Article

## Efficacy of Radiofrequency Turbinatoplasty for Treatment of Inferior Turbinate Hypertrophy

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### Abstract

#### Introduction:

Nasal inferior turbinate hypertrophy is one of the most common causes of nasal obstruction. Many different surgical methods are currently available. The aim of this study was to review the efficacy and results of radiofrequency turbinatoplasty as a new method in the treatment of the large inferior nasal turbinate.

#### Materials and Methods:

This prospective study was conducted on 50 patients with symptoms and signs of nasal obstruction associated with inferior turbinate hypertrophy refractory to medical therapy. The turbinoplasty was performed using the radiofrequency method. Effectiveness of treatment, signs and symptoms before surgery compared to the first week, first and third month after surgery and possible complications were evaluated. Nasal endoscopy and visual analogue scale (VAS) were used to assess treatment outcomes at the end of week 1 and months 1 and 3 after surgery.

#### Results:

In this study the average age was 24 years old. 27 male (54%) and 23 female (46%) are included in this study. The etiology was vasomotor rhinitis (28 cases) and allergic rhinitis (22 cases). Turbinate edema and secretions decreased significantly ( $P < 0.0001$ ) 1 month after surgery. Concerning the nasal obstruction and related symptoms such as nasal obstruction, snoring, headache, sneezing, itching, nasal turbinate edema, secretions and crust, significant improvement was observed at 1 month after treatment in all patients ( $P < 0.05$ ) and continued up to 3 months after surgery ( $P < 0.0001$ ). No major postoperative complication was observed in patients.

#### Conclusion:

Radio frequency turbinatoplasty technique is recommended as an effective method with no adverse effects such as pain treatment for hypertrophic inferior turbinate.

**Keywords:** Tubrinat Hypertrophy, Tubrinatoplasty, Radiofrequency

Received date: 4 Dec 2010

Accepted date: 24 May 2011

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### **Introduction**

One of the major causes of nasal obstruction is nasal inferior turbinate hypertrophy. Other causes are septal deviation and nasal polyps (1-5).

The etiology of inferior turbinate hypertrophy is allergic rhinitis, vasomotor rhinitis and compensatory hypertrophy secondary to septal deviation (1,3).

Treatment of nasal inferior turbinate hypertrophy varies from conservative treatment, including using corticosteroid sprays, oral antihistamines to invasive procedures such as corticosteroid injection, electrocautery, Yag laser and Co2 laser, cryotherapy, partial resection and turbinatoplasty (4,6).

Due to the resistance of inferior turbinate hypertrophy to medical therapy, new surgical techniques such as radiofrequency, laser and ultrasound have recently been widely used (2-6).

In conventional approaches such as electrocautery diathermy that operate with monopolar and bipolar mechanism and inserted in the three points of inferior turbinate (anterior, medial and posterior) and due to thermal energy and destructive power from high voltage (heat up to 800 °C) the necrosis may occur in the mucosa of turbinate. This problem can create symptoms such as lung edema, infection, long healing period, and mucosal adhesion, atrophic rhinitis and prolonged nasal secretion (7).

Nowadays, radiofrequency methods are widely used in neurosurgery, gynecology, dermatology, ear, nose and throat and plastic surgery, obstructive apnea, and adenotonsillectomy (8).

Radio frequency by creating ion excitation in the target tissue cells, causes temperature rise up to 60-90°C in texture (protein denaturation happens in 49.5 °C). Thermal injury extends 2-4 mm around the probe wand under the mucosal surface. By this technique the surface of the inferior turbinate is intact without any damage and

the depth is contracted, fibrous forms and reduction in volume happens. According to several studies the efficacy and accuracy of this method of treatment have been proved in turbinate hypertrophy treatment (9). The aim of this study is to review the efficacy and results of radiofrequency turbinatoplasty as a new method in the treatment of the large inferior nasal turbinate.

### **Materials and Methods**

In this clinical prospective study 50 patients with symptoms and signs of nasal obstruction associated with inferior turbinate hypertrophy refractory to medical therapy were included. The turbinoplasty was performed using the radiofrequency method. Effectiveness of treatment, signs and symptoms before surgery compared to the first week, first and third month after surgery and possible complications were evaluated. Nasal endoscopy were used to assess treatment outcomes at the end of week 1 and months 1 and 3 after surgery

All the patients operated in the Imam and Apadana Hospital (Iran) between 2009-2010.

Exclusion Criteria was chronic rhinosinusitis, Septal deviation, septum perforation, polyps and previous nasal surgery, previous radiotherapy, hypertension, diabetes, asthma and smokers.

For all patients, nasal endoscopy and CT Scan of Paranasal Sinuses were performed. For better visualization of cavity cotton mesh impregnated with 2% lidocaine+ epinephrine 1/100000 was placed for 5 minutes in the nasal cavity of the patients. The objective measures included swelling and edema of turbinate, exact amount of discharge and crust investigated by the surgeon, and the rating: 0- absence, 1- slight, 2- moderate, 3-severe was used.

Simultaneously subjective symptoms such as obstruction, sneezing, itchy nose,

hyposmia, headaches, snoring at night based on visual analogue scale (from 0 who were asymptomatic to 10 which indicates very severe symptoms) at the same intervals were recorded.

The procedure was done under local or general anesthesia. Before operation, cotton mesh impregnated with 2% lidocaine+ epinephrine 1/200000 was placed in the inferior nasal meatus of patients for 10 minutes.

In this operation, the radiofrequency Celon Lab ENT, Type ip21 (Celon AG, Berlin, Germany) was used. The device power was adjusted on 15 to 20 (the amount of power of this device was between 1 and 25).

The packings within the patients' nose were removed 1 to 3 days after radiofrequency.

All patients after surgery were discharged at the same day and were followed-up three months after the operation.

The data was analyzed by the descriptive statistics and SPSS version 17.

## Results

50 patients aged from 18 to 45 (mean age 24 years) were selected (27 male, 23 female).

28 patients (56%) had vasomotor rhinitis and 22 patients (44%) were suffering from allergic rhinitis. Turbinate edema and secretions decreased significantly ( $P<0.0001$ ) 1 month after surgery. Concerning the nasal obstruction and related symptoms such as nasal obstruction, snoring at night, headache, sneezing, itching, nasal turbinate edema, secretions and crust, significant improvement was observed at 1 month after treatment in all patients ( $P<0.05$ ) and continued up to 3 months after surgery ( $P<0.0001$ ). No major postoperative complication was observed in patients.

Objective nasal symptoms were compared before and after radiofrequency surgery in patients who suffered from nasal inferior turbinate hypertrophy (Table 1).

The Subjective symptoms of patients especially nasal obstruction and snoring at night decreased dramatically. Hyposmia and sneezing have a dramatic reduction and headaches and nasal itching also reduced (Table 2).

**Table 1:** Objective nasal symptoms compared before and after radiofrequency surgery in patients who were suffered from nasal inferior turbinate hypertrophy (Mean+SD).

Clinical signs	Before surgery	A week after surgery	A month after surgery	3 months after surgery	P
Turbinate swelling and edema	2.5±0.5	2.4±5	0.9±0.8	0.6±0.5	<0.0001
Anterior and posterior nasal secretions	1.8±0.8	1.7±7	1.1±0.6	0.6±0.4	<0.0001
Crust	1±0.7	0.9±0.7	1±0.6	1±0.6	<0.0001

**Table 2:** Subjective nasal symptoms compared before and after radiofrequency surgery in patients who were suffered from nasal inferior turbinate hypertrophy (Mean+SD)

Clinical signs	Before surgery	A week after surgery	A month after surgery	3 months after surgery	P
Nasal obstruction	8.1± 1.5	8.00± 1.2	4.1± 1.3	1.5± 1.1	<0.0001
Snoring at night	6.8± 1	6.3± 1.3	3.4± 1	1.2± 1	<0.0001
Hyposmia	5.8± 1	6.1± 1.2	8.2± 1.3	1.2± 0.5	<0.0001
Sneeze	6± 1	5.5± 1.3	3.1± 1.4	1.6± 1	<0.0001
Itchy nose	4±1.5	3.5± 1.2	1.4± 1.3	1.4± 0.6	<0.0001
Headache	4± 1.2	4± 1	2.1± 1.2	1.3± 0.6	<0.0001

Subjective results showed after three month 80% improvements in nasal obstruction and hyposmia, snoring and 67% improvement in sneezing and headache. 61% improvement in nasal itching and discharge. Fortunately none of the patients had complications.

### Discussion

Inferior turbinate manipulation for improving and optimizing the nasal airway has been a popular process in the recent decades. Many different ways ranging from complete destruction to use of full radiofrequency have been described. The turbinate conventional methods can lead to atrophic rhinitis, or, if each of these methods destroyed the mucous, it would lead to nasal obstruction. One of the ways to protect mucosa from destruction is radiofrequency in which heat energy effect in deep layers of turbinate mucosa and causes fibrosis and shrinkage and consequently turbinate volume will decrease (10-14).

The benefits of this method include patients' satisfaction, reduced post-operative complications and pain and lack of direct manipulation of mucosa as well as maintaining physiological function of inferior turbinate. Since this method, is a

minimally invasive technique, in case of in long term recurrence of symptoms, it does not create prohibitive situation for the repeated operations on inferior turbinate. This effect may be compared to other new methods such as microdebrider, which require some time for edema to resolve and fibrosis tissue to form (10,13,15-18). This disease usually affects young people. In our study mean age of patients was 24 years. The most common causes of inferior turbinate hypertrophy in our study are: vasomotor rhinitis (56%) and allergic rhinitis (44%).

In our study, 80%-60% postoperative improvement in objective and subjective symptoms can be seen. In other studies the effectiveness of this method on the obstruction projected up to 80% to 100% improvement in subjective symptoms such as sneezing, itchy nose, snoring at night and hyposmia and objective signs such as reduced size, reduced discharges, crust and edema have been reported (11-15,17). Despite these improvements, Mucociliary health is maintained, confirmed by pathology assessment and functional tests such as saccharin mucosal test (16). Back and his colleagues, using MRI have shown the effect of radiofrequency in reducing anterior - posterior turbinate size

on axial slices (17). In our study no major complications after radiofrequency surgery has been observed, in other studies moderate adverse reactions were low (2.7% to 0.5%) which included more post-operative bleeding and continuing complaints of nasal congestion in the first week after the surgery (10,18).

In a study recently conducted in Spain, this successful method was used in the treatment of hypertrophic inferior turbinate in the children under nine years old without any major side effects (18).

Finally the important point of this study was patients' dissatisfaction with resistant subjective symptoms such as sneezing, itchy nose and hyposmia compared with objective improvements in signs like edema, nasal secretions and forming nasal crust (2,4,15).

### **Conclusion**

Radio frequency turbinoplasty technique is recommended as an effective method with no complications and as a pain treatment for hypertrophic inferior turbinate.

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