

## A comparative study between turbinoplasty and submucosal cautery for surgical management of inferior turbinate hypertrophy and correlation with improvement in nasal obstruction

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**Abstract:** *Background:* Nasal Obstruction (NO) is a common problem which affects the life of the patient and one of the causes is inferior turbinate hypertrophy. Surgery is needed for treatment of inferior turbinate hypertrophy which is not responding to medical treatment. The cases were divided into turbinoplasty group and cautery group. *Method:* In this cross-sectional prospective study, 50 patients were admitted to our otorhinolaryngology department with nasal blockage and had inferior turbinate hypertrophy. This study included people with chronic nasal obstruction -3 months duration. Turbinoplasty and submucosal cautery had been used as surgery. Pre operatively and post operatively nose scale was used. For bleeding and crusting 4 point scale is used postoperatively, all the preoperative symptoms were improved in 1 month. *Result:* The data were expressed as Mean SD, and frequency is expressed as a number or percentage. Maximum incidence of Inferior turbinate hypertrophy was seen from 20-29 years. Lower turbinate volumes were reduced. At 1 month, turbinoplasty caused significant improvement in postoperative nasal obstruction. Bleeding as shown to be more common in the turbinoplasty group, while crusting was found to be less. *Conclusion:* Inferior turbinate hypertrophy failing medical treatment can be improved by endoscopic surgical turbinoplasty technique and it caused earlier improvement in nasal obstruction.

**Keywords:** Inferior turbinate hypertrophy, Turbinoplasty, Submucosal cautery, NOSE score.

### Introduction

The most frequent complaint among patients seeking otorhinologists is nasal blockage for along time [1]. Nasal or septal anomalies, as well as mucosal disease connected to turbinate hypertrophy, cause nasal obstruction. Turbinate hypertrophy has been reported in a variety of illnesses, including allergic rhinitis, vasomotor rhinitis, and infectious rhinitis [2]. Topical antihistamines, decongestants, and antihistamines are popular medical therapies for treatment, with the goal of reducing nasal obstruction and restoring comfortable nasal breathing. Primary treatment for inferior turbinate hypertrophy is almost conservative.

However, use of medications may not be effective for all patients. Although there may be a

modest improvement, in some situations there is no response, and patients may experience persistent nasal blockage [3].

The hypertrophied inferior turbinates produce nasal obstruction, which can be relieved by surgical reduction of the inferior turbinates. The mucosa and turbinate bone are all removed during surgery to reduce the inferior turbinate [4].

In the current study patients with chronic nasal blockage caused by inferior turbinate hypertrophy who did not respond to medical treatment were treated with surgery, i.e, Turbinoplasty or Submucosal cautery. A comparative analysis between the two surgical techniques was made.

**Material and Methods**

In this cross-sectional prospective study, between 2020 and 2022, 50 patients were admitted to our otorhinolaryngology clinic with nasal blockage and had inferior turbinate hypertrophy were included in the study. This study included people with chronic nasal obstruction caused by inferior turbinate hypertrophy in patients with minimum of 3 months duration, chronic rhinosinusitis, seasonal allergies, and who had not responded to medical treatment such as Antihistamines, topical steroids, and local decongestants have failed to relieve their symptoms.

This study covered both unilateral and bilateral inferior turbinate hypertrophy; however, when bilateral inferior turbinate hypertrophy was found, each hypertrophied inferior turbinate was taken separately. Patients who had any type of

nose surgery or who had a systemic condition were also excluded from the research.

A nasal endoscopy was used to perform a diagnostic nasal endoscopy. To rule out any additional paranasal illnesses, a CT scan of the nose and PNS was performed in coronal and axial cuts. Patients with morbid obesity, individuals younger than 20 years, patients with craniofacial abnormalities and/or congenital malformation, septal perforation, bleeding disorders, nasal tumors of any kind, patients who do not agree to participate in research and sign the consent form are excluded. All of the patients in the study had allergic rhinitis, and they were given oral antihistamines for 30 days and topical nasal corticosteroids for three months. After confirming that clinical treatment had failed, surgery was advised.

**Chart-1:** NOSE scale was used in the preoperative and postoperative period [5].

	<b>Not a problem</b>	<b>Mild problem</b>	<b>Moderate problem</b>	<b>Fairly bad problem</b>	<b>Severe problem</b>
Nasal congestion	0	1	2	3	4
Nasal blockage	0	1	2	3	4
Trouble breathing through nose	0	1	2	3	4
Trouble sleep	0	1	2	3	4
Obstruction during exertion	0	1	2	3	4
<b>Severity Classification</b>		<b>Percentage</b>			
Mild		5-25			
Moderate		26-50			
Severe		51-75			
Extreme		76-100			

Patients were assigned to one of two study groups at random. In group A, just submucosal cautery was used, but in group B, turbinoplasty was used. The surgeries were carried out under general anesthesia [6].

*Procedure:* Decongestion of the nasal mucosa was done by packing with xylometazoline soaked ribbon gauze. Turbinate was infiltrated with 2% lignocaine with adrenaline (1:100000).

*Group A:* Cautery was done in group A patients.

*Group B:* Turbinoplasty was performed utilizing the medial flap technique in group B.

On the second postoperative day, both groups had their nasal packs removed. Follow up was done on 2<sup>nd</sup> day, after one week, and after four weeks.

The NOSE score was used to evaluate nasal obstruction relief. The preoperative and postoperative NOSE scores were compared and analysed in both study groups [7].

The Free and Enlightened Consent Term was signed by all of the participants.

*Followup:* The surgical outcomes of both surgical treatments were examined immediately after surgery, one week later, and four weeks afterwards [8]. In this study also surgical outcomes were studied after, one week later, four weeks later. The difference in the NOSE scale before and after surgery was the key variable studied. A conventional four-point scale was employed to measure bleeding and crusting. 0 indicates no bleeding or crusting, 1 indicates light bleeding, 2 indicates moderate bleeding, and 3 indicates severe bleeding or crusting [9].

### **Surgical technique:**

**Microdebrider turbinoplasty [10]:** Using the microdebrider blade, the lateral side of the inferior turbinate mucosa and soft erectile component were removed in an anterior to posterior direction. The turbinate bone was separated from the soft tissue with a Cottles dissector, and it was removed with a Blakesley forceps. The medial flap was curled inferolaterally to cover the lateral inferior turbinate's remaining exposed region.

**Conventional turbinoplasty [11]:** Under endoscopy visualization, a superior-to-inferior incision was made on the anterior surface of the lower turbinate with a 15 blade, and this incision was extended posteriorly along the inferior surface. The turbinate mucosa and turbinate were removed while the medial flap was preserved. The flap was replaced, packing was done in both nasal cavities. After 48 hours, the nasal packing was removed.

**Monopolar cautery [12]:** The inert electrode was placed under the right thigh. To avoid charring, the cautery was controlled with a foot switch until the anterior end of the turbinate blanched. A similar procedure was repeated on the medial and superior surface then the posterior part of the turbinate with precaution not to injure the septum and ala.

*Followup:* The surgical outcomes of both surgical treatments were examined immediately after surgery, one week later, and four weeks afterwards. Nasal blockage, sneezing, itching in the nose, rhinorrhea, bleeding during surgery,

post-surgical bleeding, post-operative pain, crusting, etc. are to be considered before, during, and after surgery. The difference in the NOSE scale before and after surgery was the key variable studied [13]. A conventional four-point scale was employed to measure bleeding and crusting. 0 indicates no bleeding or crusting, 1 indicates light bleeding, 2 indicates moderate bleeding, and 3 indicates severe bleeding or crusting.

*Statistical Analysis:* All characteristics were summarized descriptively. For continuous variables, the summary statistics of mean  $\pm$  standard deviation (SD) were used. For categorical data, the number and percentage were used in the data summaries and diagrammatic presentation. Chi-square ( $\chi^2$ ) test was used for association between two categorical variables. If the p-value was  $<0.05$ , then the results were considered to be statistically significant other wise it was considered as not statistically significant. Data were analyzed using SPSS software v.23(IBM Statistics, Chicago, USA) and Microsoft office 2007

### **Results**

However, the turbinoplasty technique has the favor of long-term improvement of obstructive symptoms with minimal risk of side effects, and earlier improvement in nasal obstruction than the surface bipolar cauterization technique. The reason attribute was removal of both the lateral nasal mucosa along with controlled reduction of medial mucosa, which reduced there expansion of turbinate with passage of time when compared to submucosal cautery.

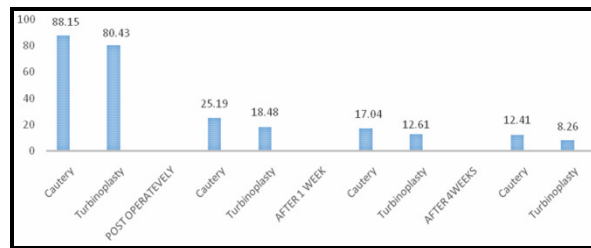
Lower turbinate volumes were significantly reduced in both groups. At one month, turbinoplasty was statistically superior to submucosal cauterization in terms of postoperative nasal obstruction. Bleeding and crusting are comparatively lesser in turbinoplasty group. Comparison in between groups showed both surgeries are good with significant p value but the turbinoplasty group had lower nose score and allergy symptoms are better relieved in turbinoplasty group when compared to cautery.

<b>Table-1: Comparison of Nose scale (Right side) between Cautery (n=27) and Turbinoplasty (n=23)</b>						
Nose scale (Right side)	Mean	±SD	Mean difference	In %	Mann Whitney U test	P value
<b>Pre Operatively</b>						
Cautery	88.15	19.765	7.72	9%	241.500	0.175
Turbinoplasty	80.43	24.022				
<b>Post Operatively</b>						
Cautery	25.19	6.121	6.71	27%	128.000	0.0001*
Turbinoplasty	18.48	4.378				
<b>After 1 Week</b>						
Cautery	17.04	6.394	4.3	26%	166.000	0.003*
Turbinoplasty	12.61	4.229				
<b>After 4 Weeks</b>						
Cautery	12.41	6.559	4.15	33%	192.500	0.004*
Turbinoplasty	8.26	4.158				

\*:Statistically significant

Table-1 and Figure-1 shows comparison between the Right side (treated by cautery) and the left side (Turbinoplasty) with regard to postoperative data at 1 month.

**Fig-1:** Comparison of Nose Scale (Right Side) between cautery and turbinoplasty



(Turbinoplasty) with regard to postoperative data at 1 month.

**Fig-2:** Comparison of NOSE scale (Left Side) between cautery and turbinoplasty

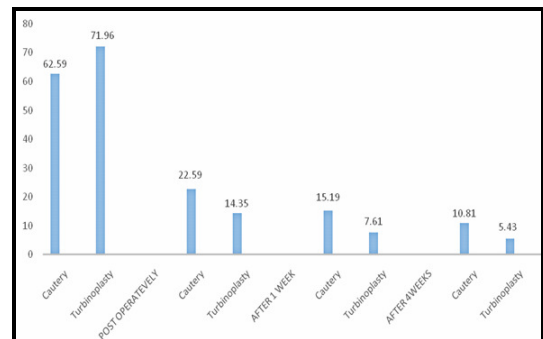


Table-2 and Figure-2 shows comparison between the Left side (treated by cautery) and the left side

<b>Table-2: Comparison of Nose scale (Left side) between Cautery (n=27) and Turbinoplasty (n=23)</b>						
Nose scale (Left side)	Mean	±SD	Mean difference	In %	Mann Whitney U test	P value
<b>Pre Operatively</b>						
Cautery	62.59	17.00	6.0	6.0	200.00	0.100
Turbinoplasty	71.96	16.00				
<b>Post Operatively</b>						
Cautery	22.59	5.30	5.0	5.0	100.00	0.0001*
Turbinoplasty	14.35	3.00				
<b>After 1 Week</b>						
Cautery	15.19	5.00	4.0	3.0	150.00	0.004*
Turbinoplasty	7.61	3.00				
<b>After 4 Weeks</b>						
Cautery	10.81	5.00	3.0	3.00	80.00	0.003*
Turbinoplasty	5.43	4.00				

\*:Statistically significant

## Discussion

The optimum turbinate reduction treatment eliminates the obstructive and hypertrophied sections of the turbinate while keeping the medial physiological portion of the turbinate, which is responsible for air warming and humidification [14]. Surgery is indicated only when there is failure of medical treatment. The goal of this study was to compare the results of Submucosal cautery with Turbinoplasty in alleviating nasal blockage based on the NOSE Score. Patients who received Turbinoplasty (Group B) had a lower NOSE score than those who got Cautery alone, according to our findings (Group A). As a result, patient's quality of life in the form of breathing and sleep were improved in turbinoplasty group.

Many studies have evaluated the effectiveness of turbinoplasty in relieving nasal obstruction. Sander et al reported that turbinoplasty technique causes more reduction of post-operative nasal crusting and nasal scores, hence improvement of nasal obstruction when compared to sub mucous cautery [15]. Ahmed et al stated that microdebrider-assisted turbinoplasty is more effective and satisfactory than submucosal cauterization in relieving nasal blockage both subjectively and objectively [16].

In our study reduction of the inferior turbinate hypertrophy was done using turbinoplasty technique, there was sustained benefit at 1 month after surgery, with a good surgical score. It was associated with low rates of crusting and problematic initial bleeding. In contrast, submucosal cautery causes reduction of nasal blockage, while it is initially effective, did not last for long. Initial results with submucosal cautery were good, but after 1 month postoperative, there was a need for medical treatment to sustain subjective improvement of patient's symptoms. Various studies have proved the efficacy of turbinoplasty in reducing facial pressure, snoring, itching, and sneezing. Chen YL

et al reported that Microdebrider-assisted inferior turbinoplasty with lateralization appears to be as effective as submucosal resection at relieving nasal symptoms and decreasing total nasal resistance [17].

Our study has proved that turbinoplasty is more effective one month after the surgery regarding no obstructive symptoms like snoring, facial pressure, sneezing and itching. The results shown by preserving the nasal mucosa, resection of the turbinate bone, and controlled volume reduction will contribute to a better surgical outcome. Dropouts were similar between the groups but still post-operative patients maintained a 90% follow up [18].

Although lower turbinate out fracture and bipolar cauterization are less invasive than turbinoplasty, they have a higher risk of perioperative haemorrhage [19]. In our study also the patients who underwent turbinoplasty had more bleeding when compared to cautery. Another factor that should be borne in mind is that Sub mucous cautery decreases the size of the inferior turbinate, facilitating fibrosis, which may have a certain latency period [20]. One of the limitations of the study is that, sample size is less and long term follow-up is required to know quality of life impairment due to obstruction and duration of relief of symptoms.

## Conclusion

Inferior turbinate hypertrophy failing to medical treatment can be improved by submucosal cauterization or endoscopic surgical turbinoplasty technique. Both techniques had advantages and disadvantages. This study has proved that turbinoplasty is better one month after the surgery regarding non-obstructive symptoms like snoring, facial pressure, sneezing and itching.

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