



Outcomes of Submucosal Diathermy Versus Surface Cauterisation For Inferior Turbinate Hypertrophy Reduction

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Abstract

Background: One of the most common complaints that otolaryngologists have to deal during their regular practice is chronic nasal obstruction. Nasal obstruction, despite not being life threatening can very well interfere with the quality of life. It is caused by either nasal or septal deformities or by mucosal disease associated with turbinate hypertrophy.

Materials & Methods: About 40 cases were selected who presented with symptoms of nasal obstruction and inferior turbinate hypertrophy not responding to medical treatment taken for at least 6 weeks. The data for the purpose of the study was collected in a redesigned and pretested proforma including pre and post-operative nasal endoscopy. Patients were subjected to the surgical techniques randomly with GROUP-1 undergoing

submucosal diathermy & GROUP-2 undergoing surface cauterisation, with 20 patients in each group.

Results: About 11 patients reached inferior turbinate size of grade I and 9 grade II following submucosal diathermy and 7 patients reached grade I, 10 reached grade II and 3 reached grade III turbinate size following surface cauterisation as assessed on nasal endoscopy post operatively at 6 weeks. Post-operative crusting and synechiae formation were seen in cases following surface cauterisation.

Conclusion: Surface cautery and submucosal diathermy are equally effective in volumetric tissue reduction of inferior turbinate hypertrophy though post-operative complications were more common with surface cauterisation technique.

Keywords: Inferior Turbinate Hypertrophy (ITH), Submucosal diathermy (SMD), Surface cauterisation (SC)

Introduction

Inferior turbinate hypertrophy is one of the most common encountered cause for nasal obstruction [1]. Inferior turbinates are soft tissue and bony projections that protrude into nasal cavities from the lateral wall on each side. It consists of three layers: thin medial mucosa, bone and thick lateral mucosa. The mucosa of the inferior turbinate is lined by pseudostratified columnar ciliated epithelium containing complex arrangement of arteries, veins, goblet cells and venous sinusoids. They provide warmth, humidification and filtration of inspired air and are necessary for airflow resistance through a complex network of autonomic nerves that innervate its sinusoids. Some patients with turbinate hypertrophy may have co-existing abnormalities like deviated nasal septum on the opposite side for which they might be symptomatic. The usual treatment advised for inferior turbinate hypertrophy due to various reasons are topical decongestants, oral decongestants and anti-histamines which are aimed to decrease the dimensions of the inferior turbinate with particular aim of restoring the nasal function. Though certain patients do not respond well to medical therapy. For such patients, the hypertrophied inferior turbinate should be managed surgically. The basic principle behind this is to reduce nasal obstruction and restore comfortable nasal breathing[2]. There are various surgical techniques which aim at either reduction, resection or non-resection of inferior turbinate for its size reduction. Optimal surgical treatment techniques for reduction of inferior turbinate hypertrophy are categorised into turbinate resection techniques and non-resection techniques.

These include

Resection Techniques	Non Resection Techniques
Partial Turbinectomy	Out Fracturing Of Inferior Turbinate
Inferior Turbinoplasty	Steroid Injection
Subtotal Turbinectomy	Chemical Cautery
Submucosa Resection	Cryotherapy
Powered Turbinectomy	Electrocautery: Surface Electro-Cautery & Submucosal Electro-Cautery
Posterior End Turbinectomy	Submucosal Diathermy
	Radiofrequency Coblation
	Laser Treatment

Material & Method

This prospective hospital based study was conducted in the Department of Otorhinolaryngology, ASCOMS Jammu after ethical clearance by the Institutional ethics committee. About 40 cases were selected on the basis of their presenting symptoms & status of inferior turbinate at nasal endoscopic examination. Informed consent was taken from all the subjects after explaining to them the nature and purpose of the study. Pre op turbinate sizes and post op turbinate size reduction at 6 weeks were noted by nasal endoscopic examination and graded according to:

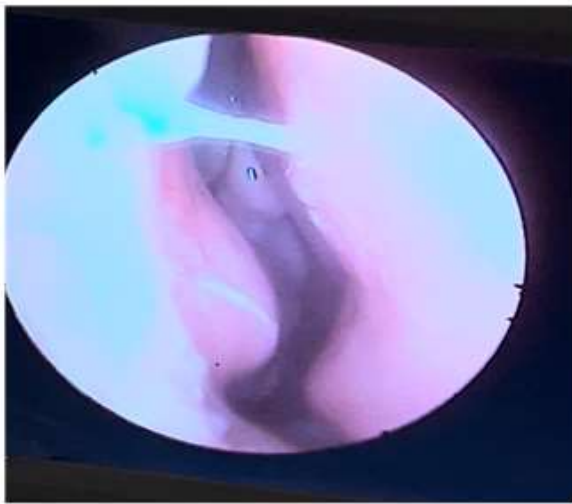
Inferior turbinate hypertrophy as assessed on nasal endoscopy is graded on the basis of Camacho Grading System of Inferior Turbinate Hypertrophy. [3,4]

Grade 1: Turbinate covers 0-25% of the total airway space.

Grade 2: Turbinate covers 26-50% of the total airway space.

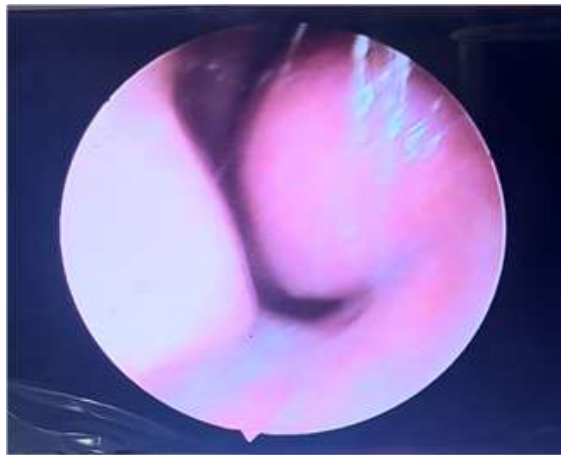
Grade 3: Turbinate covers 51-75% of the total airway space.

Grade 4: Turbinate covers 76-100% of the total airway space.



GRADE 1

Figure 1



GRADE 4

Figure 4

Inclusion Criteria

- Age: 12 - 45 years (both males & females)
- Patients with symptoms of nasal obstruction and inferior turbinate hypertrophy not responding to prescribed medical treatment.

Exclusion Criteria

Nasal obstruction with inferior turbinate hypertrophy with:

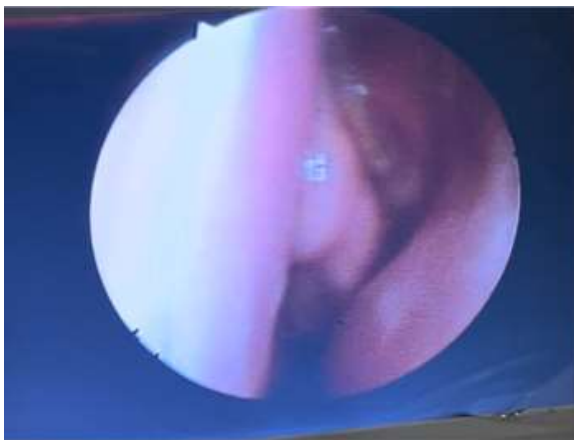
- Allergic rhinitis
- Chronic sinusitis
- Sinonasal polyposis
- Fungal sinusitis
- Neoplasms

Patients medically unfit for the procedure.

Patients were subjected to the surgical techniques randomly with GROUP-1: submucosal diathermy technique & GROUP-2: surface cauterisation technique.

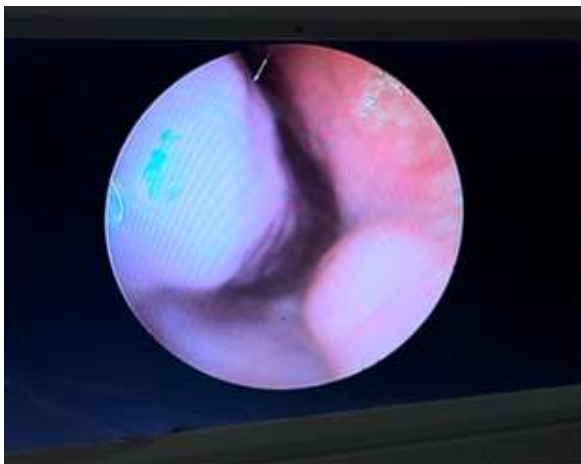
Results

Our study included 40 patients, out of whom there were 24 males (60%) and 16 females (40%) patients. The male to female ratio was 3:2. Most of the patients were the age group of 20 - 45 years. Majority of the patients presented with primary complaints of unilateral nasal



GRADE 2

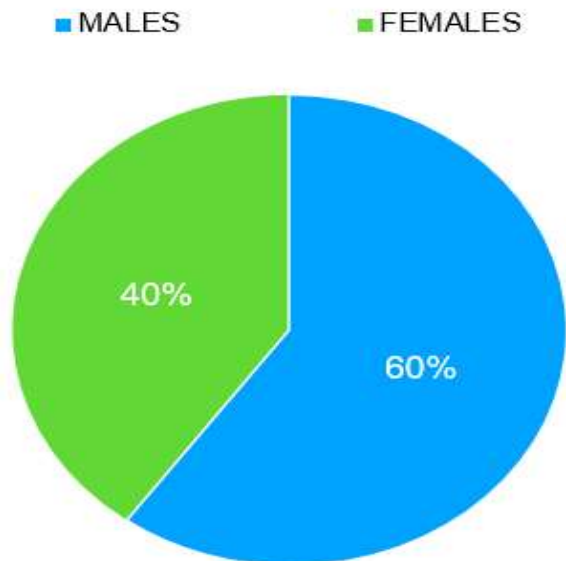
Figure 2



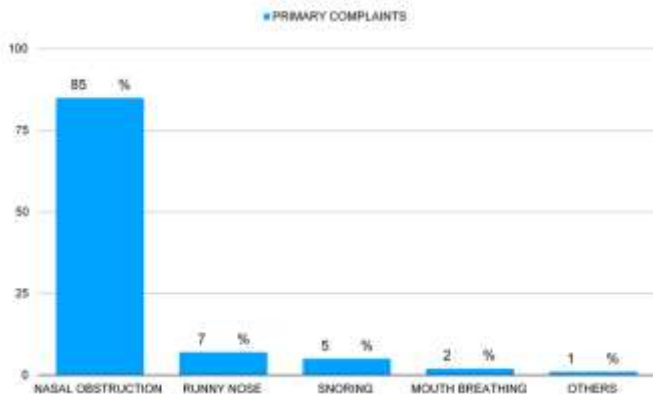
GRADE 3

Figure 3

obstruction (85%), runny nose (7%), snoring (5%) and mouth breathing (2%). Patients were assessed on nasal endoscopy for determining the size of inferior turbinate post operatively.



Graph 1: Pie Chart Showing Sex Distribution



Graph 2: Graph Showing Primary Complaints at Presentation

Table 1: Comparison of Pre And Post Turbinate Grade Size In Patients In SMD (Group-1)

Nasal Obstruction	SMD	
	Pre Turbinate Grade Size	Post Turbinate Grade Size
GRADE I	0	11
GRADE II	5	9
GRADE III	9	0
GRADE IV	6	0
P-VALUE	0.0001**	

Out of 20 patients in Group -1, pre-operative nasal endoscopy results showed 5 patients had turbinate size of grade II, 9 patients had size of grade III and 6 had size of grade IV. After the reduction of inferior turbinate by submucosal diathermy technique, there was a significant reduction in size of inferior turbinates with post-operative grades of, 11 patients having size reduced to grade 1 and 9 patients with ITH reduced to grade II. The results were statistically significant (p-value=0.0001).

Table 2: Comparison of Pre And Post Turbinate Grade Size In Patients In Surface Cautery (Group-2)

Nasal Obstruction	Surface Cautery			
	Pre Turbinate Grade Size		Post Turbinate Grade Size	
	N	%	N	%
GRADE I	0	0	7	35
GRADE II	6	30	10	50
GRADE III	8	40	3	15
GRADE IV	6	30	0	0
P-Value	0.0001**			

Out of 20 patients in Group -2, pre-operative nasal endoscopy results showed 6 patients had turbinate size of grade II, 8 patients had size of grade III and 6 had size of grade IV. After the reduction of inferior turbinate by using surface cauterisation of ITH, there was a not much reduction in size of inferior turbinates with post-operative grades of, 7 patients having size reduced to grade I, 10 patients with ITH reduced to grade II and 3 patients had turbinate size of grade III post operatively.



Figure 5: Surface Cauterisation



Figure 6: Submucosal Diathermy

In majority of patients, size was significantly reduced post operatively when seen at 6 weeks with majority of them falling in Group-1 (submucosal diathermy technique). This technique showed less intra operative bleeding and post op complications like discomfort to the patient, crusting, recurrence and synechiae formation were negligible. On the other hand, majority of Group-2 (surface cauterisation technique) patients returned to OPD with similar complaints of nasal obstruction though milder this time. This technique also showed crusting as

a post-operative complication in 13 (65%) patients and 2 patients showed post-operative synachiae formation between surface of inferior turbinate and septum medially and 1 patient showed recurrence of inferior turbinate hypertrophy.

Discussion

Inferior turbinate hypertrophy is one of the most common encountered cause for nasal obstruction. Historically, there has been uncertainty in the treatment of inferior turbinate hypertrophy (ITH). Although management always begins with medical therapy, the decision to offer surgery in resistant cases is becoming more widely practiced. There have been a variety of surgical techniques described and performed over the years. Since the last quarter of the 19th century, at least 13 different techniques have been introduced.

In the present study of 40 patients, the mean age of subjects in Group-1 was 28.30 ± 8.99 and in Group-2 was 29.90 ± 9.70 in the range of 12-45 years. **Okhakhu A et al., 2015** conducted a study where the most common age group was second decade. **Manimaran V et al., 2023** reported majority of its patients were in the age group of 20-40 years. In our study, submucosal diathermy showed better post operative reduction in size of inferior turbinate to grade I in 11 patients and grade II in 9 patients. These results were consistent with study conducted by **Fradis M et al., 2022** where patients undergone SMD diathermy for ITH reduction and 2 months postoperatively 64 of 91 patients (70.3%) experienced subjective improvement in nasal breathing, where as 73 patients (80.2%) had good nasal breathing post operatively. Another study conducted by **Aboulwafa WH et al., 2012** showed better post operative results after submucosal diathermy and less post operative complications as also seen in our study.

Joniau S et al., 2006 conducted a study which showed a significant postoperative crusting, less changes in endoscopic grading of turbinate size, no change at mean area at the level of the nasal valve after submucosal cauterization of inferior turbinate. It also showed recurrence of turbinate hypertrophy.

Conclusion

Surface cautery and submucosal diathermy are somewhat equally effective in volumetric tissue reduction. Though, submucosal diathermy is considered to be more accurate as it showed better post operative reduction in grade of inferior turbinate hypertrophy with less post operative crusting and better results to the patients.

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