

Original research article

Comparison of Efficacy of Submucosal Diathermy and Turbinoplasty in Patients with Chronic Nasal Obstruction due to Inferior Turbinate Hypertrophy

¹P. Prashanth Kumar, ²Sajeel Dounde

¹Assistant Professor, Department of ENT, SVS Medical College and Hospital YENUGONDA, Mahbubnagar,

²Consultant ENT Surgeon, Dr. Dounde's ENT Care Centre, Hyderabad, Telangana State

Corresponding Author: Dr. P. Prashanth Kumar

Abstract

Background : Chronic nasal obstruction commonly defined as patient discomfort manifested as a sensation of insufficient airflow through the nose, and also is one of the most common human problems and a very frequent symptom in the otorhinolaryngology field. Chronic nasal obstruction has many adverse sequelae.

Objective : To evaluate the effectiveness of submucosal diathermy of inferior turbinate versus turbinoplasty in patients with inferior turbinate hypertrophy.

Material and Methods : A Prospective Comparative Study conducted at Department of ENT, Narayana Medical College, Nellore for the period of one years, with sample size of 50 (Each Group having 25 Samples). Symptomatic patients with bilateral inferior turbinate hypertrophy and age group 15 to 55 years were included in the study. Prior to surgical intervention patient is asked to fill in the SNOT-22 questionnaire includes patients rated 22 different symptoms related to both nasal and general health on a score of 0 to 5 T-test were used to see the difference between means. Data were presented by mean and proportions, 5% significance were taken to assess the mean difference.

Results : Study had total 50 patients in which 20 were males, and 30 were females. Overall mean age of the patients was 29.28 years with standard deviation of 8.15 years., it was found that Nasal Obstruction improvement in Turbinoplasty was 84% compared to Submucosal Diathermy. Similarly Nasal Symptoms, Non-Nasal Symptoms and also general Health Symptoms proportion of improvement was more in Turbinoplasty as compared to the Submucosal Diathermy, and this improvement between the therapy was statistically significant. (P-value<0.01)

Conclusion : From overall observation and discussion we observed that Turbinoplasty is found to be more effective than submucosal diathermy in reducing the nasal obstruction and other nasal symptoms.

Keyword : Nasal Obstruction, SNOT-22, Turbinoplasty, Submucosal Diathermy

Introduction

Nasal obstruction is one of the most common nasal problems bringing a patient to ENT OPD. Chronic nasal obstruction is one of the most common human problems and a very frequent symptom in the otorhinolaryngology field [1]. It is commonly defined as patient discomfort manifested as a sensation of insufficient airflow through the nose. The etiology of nasal obstruction is generally divided into mucosal and anatomical causes [2]. Chronic nasal

obstruction has many adverse sequelae including mouth breathing, dryness of the oral cavity, nasal speech, disturbed sleep, restlessness, malaise, and adverse effect on quality of life and reduced lung volumes.

Inferior turbinate hypertrophy is one of the common causes of nasal obstruction. The inferior turbinates are bony and soft tissue projections that protrude into the nasal passages and play an important role in normal respiratory function, as the main regulator of nasal airflow in which the mucosa of the turbinates is essential for maintaining normal defense, humidification, warming and filtering of inspired air [3]. Inferior turbinate enlargement due to chronic rhinitis and DNS (compensatory hypertrophy) are the main causes of chronic nasal obstruction. Rhinitis may be allergic, infective, vasomotor, hormonal, or secondary to medication. Turbinate enlargement is usually amenable to medical treatment. Hypertrophy of the inferior turbinate is the most frequent cause of chronic nasal obstruction and may be related to allergy, pseudo allergy, non allergic rhinitis with eosinophilia syndrome and iatrogenic rhinopathy [4]. The first surgical procedure for the treatment of enlarged inferior turbinate was reported by Heider & Crusel in 1845 when they described surface electrocautery using a galvanic current. Latter Hol & Hiuzing evaluated 13 surgical techniques that have been used for inferior turbinectomy in last 130 years. [5]. These include partial or total turbinectomy, turbinoplasty, submucous resection, electrocautery, chemical cautery, coblation, and laser.[6] Traditional turbinectomy is associated with excessive bleeding which may necessitate the use of nasal packs for several days or blood transfusion. Other complications associated with traditional turbinectomy such as excessive crusting, empty nose syndrome, rhinitis sicca, atrophic rhinitis, and ozena have brought the procedure into disrepute.

Submucous Diathermy (SMD) involves passing a probe just below the mucosal surface lining of the turbinate bones and cauterizing using heat energy to shrink the size of these structures, this preserves most of the mucosal lining and allows for preservation of normal function[7].

Turbinoplasty is a procedure that attempts to preserve the mucosa of the turbinate in order to improve the mucociliary clearance and air conditioning function of the inferior turbinate. An incision is made along the inferior border of an in-fractured inferior turbinate and medial and lateral submucosal flaps are elevated. The anterior 2/3 bone of the inferior turbinate is partially resected under the flaps. The flaps are trimmed to re-drape the remaining bone.

So the present study we have undertaken to evaluate the effectiveness of submucosal diathermy of inferior turbinate versus turbinoplasty in patients with inferior turbinate hypertrophy.

Material and Methods

Study Design : A Prospective Comparative Study

Study Place : Department of ENT, Narayana Medical College, Nellore

Study Duration : Duration of one year, 2015

Sample Size : Total of 50 sample taken for study (25 in each group)

Inclusion Criteria:

- Age between 15 to 55 years, both sex.
- Symptomatic patients with bilateral inferior turbinate hypertrophy not relieved with medical management.

Exclusion criteria

- Patients with deviated nasal septum.
- Patients with Nasal polyp.
- Patients with Intra nasal mass.

- Patients with Concho Bullosa.
- Patients with systemic diseases.
- Patients taking anti hypertensive drugs

Methods :

Depending on the clinical features, history, anterior rhinoscopy and Nasal endoscopy is done to identify the turbinate enlargement and to rule out other causes of nasal obstruction like Deviated nasal septum, Nasal polyps, Concho Bullosa and any Nasal mass. All patients are treated by oral antihistamines, local decongestants and topical steroids for three months. Patients who are refractory to medical treatment are alternatively grouped in to A and B Turbinoplasty is done in group A patients and Submucosal diathermy is done in group B patients

Prior to surgical intervention patient is asked to fill in the SNOT-22 questionnaire.

In this questionnaire, patients rated 22 different symptoms related to both nasal and general health on a score of 0 to 5 as below

0 .No problem, 1. Very mild problem, 2. Mild or slight problem, 3. Moderate, 4. Severe
5. Very severe

SNOT-22 questionnaire include 22 symptoms which are divided in to four subsets as nasal obstruction, nasal symptoms and non nasal symptoms and general health symptoms. The various nasal symptoms include Sneezing, Runny nose, Need to blow nose, Postnasal discharge, Thick nasal discharge, loss of sense of smell.

Non nasal symptoms include Facial pain, Ear ache, Ear fullness, Dizziness and cough.

General health symptoms include Difficulty falling asleep, Waking up at night, Lack of a good night sleep, waking up tired, fatigue during the day, reduced productivity, Reduced concentration, Sad, embarrassed and frustration.

Patients were asked to tick the most important symptoms affecting his or her health. Prior informed consent was taken from every patient.

Detailed clinical history based on questionnaire were collected,

Investigations: Nasal endoscopy, Haematological investigations like Haemoglobin percentage, Total leucocyte count, differential count, Absolute eosinophil count, Bleeding time, Clotting time, Blood grouping and typing, Urine examination, Radiological investigation like X ray Para nasal sinuses and Computed tomography scan of sinuses and turinates in coronal and axial views.

Ethical Approval : Study Approved by Ethical Institutional committee.

Statistical Analysis : Collected data were entered in the Microsoft excel 2007 for further analysis, Quantitative data were presented by mean and standard deviation and difference in the means were assessed by t-test, Qualitative data were presented by frequency and percentage. Statistical analysis were performed by using SPSS version 20.

Observation and Results

Table 1 : Age distribution among the patients.

Gender	No.	Mean Age	SD
Male	20	32.25	9.575
Female	30	27.3	6.497
Total	50	29.28	8.157

Study had total 50 patients in which 20 were males, of mean age 32.25 years with standard deviation of 9.57 years and 30 were females of mean age 27.3 years with standard deviation of 6.49 years. Overall mean age of the patients was 29.28 years with standard deviation of 8.15 years.

Table 2 : Mean Pre-op and Post-Op SNOT 22 Score in Submucosal Diathermy and Tuboplasty

		SUBMUCOSAL DIATHERMY	Reduction of SNOT 22 score in %	TURBINOPLASTY	Reduction of SNOT 22 score in %
Nasal obstruction	Pre-Op	4.9 ±0.30	51.9	4.8 ±0.3	77.1
	Post-Op	2.36± 1.01		1.1 ± 0.8	
Nasal symptoms	Pre-Op	10.15 ± 2.30	58.7	10.7 ± 2.2	70.1
	Post-Op	4.2 ± 2.01		3.2 ± 1.3	
Non nasal symptoms	Pre-Op	6.72 ± 2.84	48.9	7.3 ± 2.6	61.7
	Post-Op	3.44 ± 2.08		2.8± 1.4	
General health symptoms	Pre-Op	8.44 ±2.63	54.1	8.4 ± 3.5	59.5
	Post-Op	3.88± 1.67		3.4 ± 1.5	

Table showed the mean SNOT 22 Scoring related to the Nasal and General Health symptoms between the therapies, it was observed that in submucosal Diathermy, Nasal obstruction, Nasal Symptoms, Non- Nasal Symptoms and General Health Symptom SNOT 22 Scoring was reduce to 51.9%, 58.7%, 48.9% and 54.1% respectively after post op, whereas in Tuboplasty for the same parameter it reduced to 77.1%, 70.1%, 61.7% and 59.5% respectively after post op.

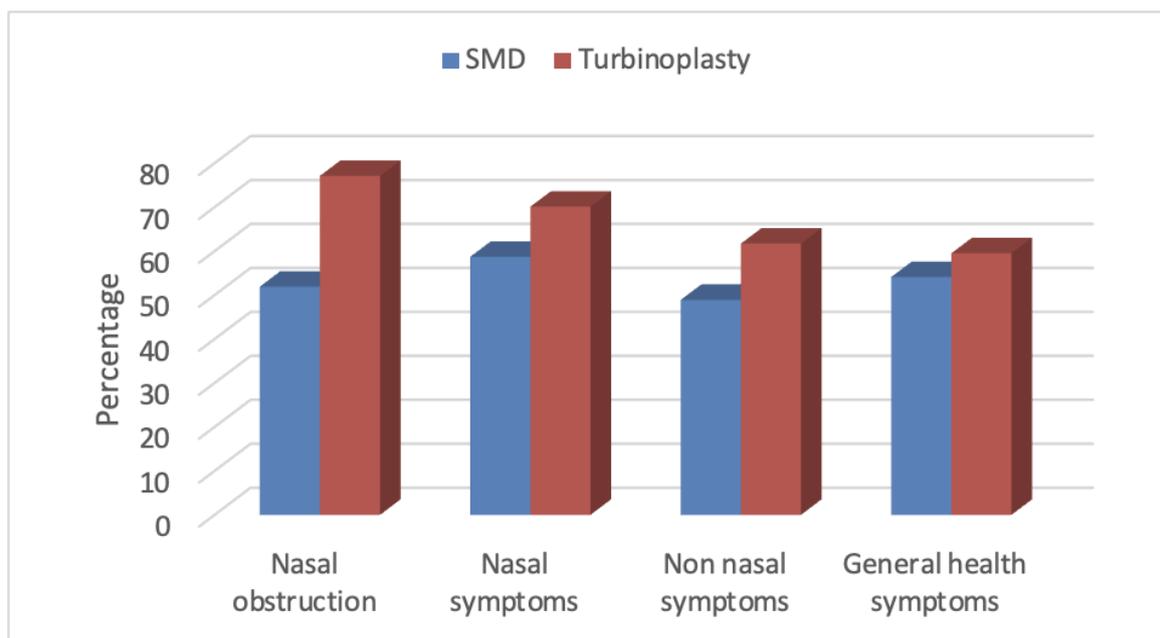


Figure 1 : Distribution of Reduction of SNOT 22 Score after Post OP

Table 3: Comparison of improvement in symptoms following turbinoplasty and submucosal diathermy

	TURBINOPLASTY N=25(%)	SUBMUCOSAL DIATHERMY N=25(%)
NASAL OBSTRUCTION	21(84)	18(72)
NASAL SYMPTOMS	19(76)	17(68)
NON-NASAL SYMPTOMS	18(72)	16(64)
GENERAL HEALTH SYMPTOMS	16(64)	14(56)

From above table we can observed that various symptoms improvement between the therapy, it was found that Nasal Obstruction improvement in Turbinoplasty was 84% compared to Submucosal Diathermy. Similarly Nasal Symptoms, Non-Nasal Symptoms and also general Health Symptoms proportion of improvement was more in Turbinoplasty as compared to the Submucosal Diathermy, and this improvement between the therapy was statistically significant. (P-value<0.01)

Discussion

Nasal obstruction can be caused by a deviated nasal septum, enlarged turbinates, nasal polyps, enlarged adenoids, tumors and nasal congestion [8]. The goal of turbinate reduction surgery is to improve nasal breathing and reduce nasal drainage and post-nasal drip which can improve the patient's quality of life by decreasing headaches, snoring and sleep apnea [9].

This study was carried out in the Dept of ENT, KIMS, Narketpally over a period of 2 years. In the present study we have included 50 patients who have chronic nasal obstruction due to inferior turbinate hypertrophy, among them 20 were males and 30 were females. From this it was observed that females were more commonly affected by nasal obstruction, these results were comparable with the studies conducted by studies done by Matteo Cavliere et.al.[10] In our study we didn't find any statistical significance between the age and sex.

In the pre op we observed no difference in the SNOT score in both the therapies, but in post op we found that SNOT 22 Score was reduced by 77% in Nasal obstruction. SNOT 22 score for Nasal Symptoms like Nasal Discharge, Sneezing, Itchy Nose, loss of smells etc decreased by 70.2% post operatively. SNOT 22 score for Non-Nasal symptoms like headache, facial pain, ear ache etc was decreased by 61.7% and that of for general health symptoms like difficulty falling a sleep, waking up tired etc was decreased by 59.5%. These reduction in these parameters were significantly higher compared to the submucosal diathermy. These reduction in Turbinoplasty in our study supported by study conducted by Matteo Cavaliere et al [10] showed improvement in nasal obstruction among 80% of the cases and Nasal symptoms like sneezing improvement shown in among 69% of the cases, also secretions was improvement among 72% of cases and also in case of smell among 84% of the cases, so these results were analogous to our study. Another study by Mabry R L et al[11] showed improvement in Nasal obstruction is seen in 86% of cases, improvement in nasal symptoms are seen in 80% of cases and improvement in sleep functions like snoring, difficulty falling asleep, lack of good sleep is seen in 70 % of cases post operatively.

Our study found that because of the Turbinoplasty improvement in Nasal obstruction, Nasal Symptoms, Non-Nasal Symptoms and General Health symptoms was more compared to the

Submucosal Diathermy. In support of present study Matteo Cavaliere et al and Mabry R L et al [10, 11] showed maximum improvement in Turbinoplasty compared to the SMD. Khosa et al [12] studied the outcome of SMD and partial inferior turbinectomy in patients with chronic hypertrophic rhinitis in terms of relief of nasal obstruction. They found that both these procedures are simple and easy to perform, SMD leads to a dramatic fall in nasal obstruction but the patient do not have concurrent medical treatment, inferior turbinate re-hypertrophy within 15 months. They concluded that both the procedures are relatively safe and effective and do not need expensive instrumentation.

Anil and Bilkhis [13] studied the comparison between partial inferior turbinectomy and submucosal diathermy in the management of inferior turbinate hypertrophy. They found that partial inferior turbinectomy showed better and early results when compared to submucosal diathermy in terms of subjective improvement of symptoms. In addition, patients who underwent partial inferior turbinectomy showed marked improvement of nasal obstruction at the end of first week itself with 80% of them having total improvement while the remaining 20% said that the nasal obstruction was reduced to being a mild problem. At the end of second month, 49 patients [98%] had no nasal obstruction while only one patient said that it remained as a mild problem. They concluded that early and better results were seen in patients who underwent partial inferior turbinectomy. One more supported to our study by *Smitha* [14] who found that partial inferior turbinectomy was found to be more effective in reducing the nasal obstruction in all 58 patients. At 3rd month 27 patients (46.55%) had complete relief from nasal obstruction & 53.4% of patients had moderate improvement. At 6th month 24 patients (41.34%) had complete relief from nasal obstruction & 43 patients (58.6%) had moderate improvement.

One of the main drawbacks of inferior turbinate surgery is a high rate of recurrence of symptoms with time. Most studies agree that total turbinate resection has long term effectiveness [15,16,17]. Total turbinectomy is not recommended as the method of choice due to potential adverse effects and it is considered carefully. Total turbinectomy is considered if all other treatment attempts do not succeed [18]. According to a study, inferior turbinoplasty is the best method of turbinate reduction with good results and least complications. [19]

Though in our study we found Turbinoplasty was better enough over submucosal diathermy, but there are more than 10 surgical techniques have been used over decades to treat hypertrophy of the inferior turbinate, but there is no single complete therapy. The evidence supporting the efficacy of these procedures remains debatable. None of them are able to produce satisfactory long term results, so more studies required with more sample size to find best technique to treat hypertrophy of the inferior turbinate

Conclusion

From overall observation and discussion we observed that Turbinoplasty is found to be more effective than submucosal diathermy in reducing the nasal obstruction and other nasal symptoms. But considering cost effectiveness SMD is the first choice as it can be done under local anaesthesia and patient is discharged on the same day. If inferior turbinate hypertrophy recurs following SMD, Turbinoplasty should be carried out.

Acknowledgement : None

Conflict of Interest : None

Funding : None

References

1. Deenadayal D S, M Naveen k, P Sudhakshin, Saif H (2014): Radiofrequency Reduction of Inferior Turbinates in Allergic and Non Allergic Rhinitis. *Indian J Otolaryngol Head Neck Surg.*, 66 (1): 231–236.
2. Erickson B, Robert H, Caroline J *et al.* (2016): Acoustic rhinometry and video endoscopic scoring to evaluate postoperative outcomes in endonasal spreader graft surgery with septoplasty and turbinoplasty for nasal valve collapse. *Journal of Otolaryngology - Head & Neck Surgery*, 45:2.
3. Gupta A, Mercurio E, Bielasowicz S (2001) Endoscopic inferior turbinate reduction: an outcomes analysis. *Laryngoscope* 111:1957–1959
4. Scheithauer M O (2010): Surgery of the turbinates and “empty nose” syndrome. *GMS Curr Top Otorhinolaryngol Head Neck Surg.*, 9: Doc03.
5. S. E. J. Farmer, R Eccles. Understanding submucosal electrosurgery for the treatment of nasal turbinate enlargement. *The Journal of Laryngology & Otology*. 2007; 121: 615-622.
6. Passali D, Lauriello M, De Filippi A, Bellussi L. Comparative study of most recent surgical techniques for the treatment of the hypertrophy of inferior turbinates. *Acta Otorhinolaryngol Ital* 1995;15:219-28.
7. Bhandarkar ND, Smith TL (2010): Outcomes of surgery for inferior turbinate hypertrophy. *Curr Opin Otolaryngol Head Neck Surg.*, 18(1):49-53.
8. Nawaz F, Arfat J, Sheraz B (2014): Comparison of nasal patency following submucosal diathermy of inferior turbinate versus inferior turbinectomy. *Pak Armed Forces Med J.*, 64 (4):551-4
9. ENT institute (2015): Surgery Descriptions, Nasal and Sinus. <http://www.entinstitute.com/surgery-descriptions/>.
10. Matteo Cavaliere, MD, Giampiero Mottola, MD, and Maurizio Iemma, MD, Avellino, Comparison of the Effectiveness and Safety of Radiofrequency Turbinoplasty and Traditional Surgical Technique in Treatment of Inferior Turbinate Hypertrophy *Italy Otolaryngology–Head and Neck Surgery* (2005) 133, 972-97
11. Mabry, R. L. (1982), Inferior turbinoplasty. *The Laryngoscope*, 92: 459–461.
oi: 10.1288/00005537-198204000-00019
12. Khosa S H, Ali H S, Muhammad A N (2014): Role of Partial Inferior Turbinectomy in Patients with Chronic Hypertrophic Rhinitis. *J M H S.*, 8: 3.
13. Anil HT, Bilkhis MG (2014): Comparative Study between Partial Inferior Turbinectomy and Submucosal Diathermy in the Management of Inferior Turbinate Hypertrophy. *International J Sci Res.*, 3(7):323-5.
14. Smitha CBC, Kiran B, John S, Kumar C (2015): Comparison of Partial Inferior Turbinectomy and Submucosal Diathermy for Hypertrophied Inferior Turbinate in Allergic Rhinitis Patients. *J of Evolution of Med and Dent Sci.*,4 (54):9457-67.
15. Wright RG, Jones AS, Beckingham E. Trimming of the inferior turbinates: a prospective long – term study. *Clin. Otolaryngol.*1999;15:347-350.
16. Ophir D, Schindel D, Halperin D, Marshak. G. Longterm follow-up of the effectiveness and safety of inferior turbinectomy. *Plast.Reconstr.Surg.* 1992;90(6): 980 – 4.
17. Martinez SA, Nissen AJ, Stock CR, Tesmer T. Nasal turbinate resection for relief of nasal obstruction. 1983; 93:871.
18. Lippert BM, Werner JA. Treatment of the hypertrophied inferior turbinate. *HNO* 2000; 48(3): 170– 81.
19. Rohrich RJ, Krueger JK, Adams WP, Marple BF. Rationale for submucous resection of hypertrophied inferior turbinates in rhinoplasty: an evolution. *Plastic and reconstructive surgery* 2001 ; 108(2): 535-544.