

Benefits of Turbinectomy vs Turbinoplasty – A Prospective Study

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Revathi Thirugnanamani,¹ Saroj Sahadevan,¹ Anil Kumar Ramabhadraiah,¹ Architha Menon P,¹ Rukmini M Prabhu¹

ABSTRACT

Introduction

Inferior turbinate hypertrophy (ITH) is one of the major causes of nasal airway obstruction. Nasal obstruction due to inferior turbinate hypertrophy is noted in around 20% of the population. Surgical reduction of the hypertrophied inferior turbinate is required when medical treatment fails. This study aimed to compare the Nasal Obstruction Symptom Evaluation (NOSE) scores and complications of inferior turbinate reduction by turbinectomy and turbinoplasty.

Materials and Methods

In this prospective observational randomized controlled study, 30 patients underwent turbinectomy and 30 underwent turbinoplasty. Pre and postoperative NOSE scores and incidence of postoperative bleeding and crusting were compared at first week and six months.

Results

The mean preoperative NOSE score of turbinectomy group was 75.83 and that of turbinoplasty group was 76.83. Both the groups showed statistically significant improvement ($p < 0.05$) in NOSE score post-operatively. Functional outcome is achieved with turbinoplasty by sparing the nasal mucosa and submucosa along with retention of function bearing structures (inferior turbinate). Though not statistically significant, the incidence of post-operative bleeding and crusting were lower after turbinoplasty, in comparison to turbinectomy.

Conclusion

Inferior turbinoplasty provides excellent outcome in a wide variety of patients with minimal morbidity. Turbinoplasty is associated with lesser mucosal injury, post-operative bleeding and crusting, and excellent outcome in terms of symptomatic relief and functionality. Hence, we recommend that it can be done for the treatment of ITH.

Keywords

Turbinate; Hypertrophy; Nasal Obstruction; Turbinectomy; Turbinoplasty

Nasal obstruction due to non-allergic causes is observed in 25% of the global population.¹ The main etiologies are septal deviation, hypertrophy of the inferior and middle turbinates, nasal polyposis and hypertrophy of nasopharyngeal tonsils.² Among these, hypertrophy of inferior turbinate is noted as the major cause of nasal obstruction.³ Allergic rhinitis, vasomotor rhinitis and septal deviation (compensatory hypertrophy) are observed as the main causes of ITH.⁴

Inferior turbinate hypertrophy (ITH) is a common contributor of nasal airway obstruction. Chronic inflammatory conditions including allergy and chronic rhinosinusitis result in the deposition of collagen beneath the basement membrane of the sinonasal mucosa along with mucous gland hyperplasia and resultant

hypersecretion.⁵ Involvement of the mucosa in critical areas such as inferior turbinate, frequently results in nasal airway obstruction. Medical management is the initial modality of treatment and includes antihistamines, sympathomimetics, anticholinergics and steroids. However, failure of medical treatment requires surgical reduction of the hypertrophied turbinate. The goal of surgical reduction of the inferior turbinate is to

1 - Department of Otorhinolaryngology, Bangalore Medical College & Research Institute, Krishna Rajendra Road, Bengaluru, Karnataka

Corresponding author:

Dr Anil Kumar Ramabhadraiah
email: dranil24@yahoo.com

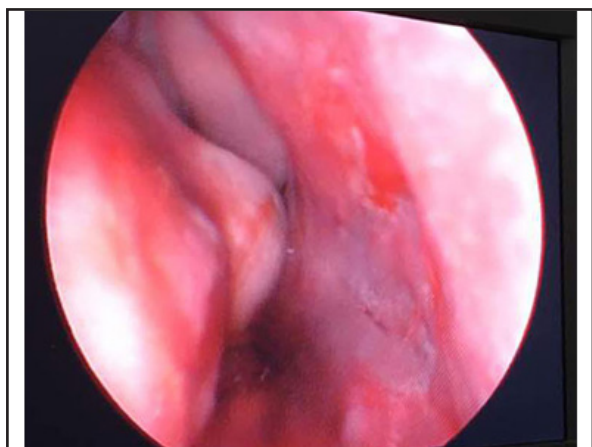


Fig. 1. Preoperative endoscopic image of right hypertrophied inferior turbinate.

achieve relief from obstruction without disrupting the physiological functions of the turbinate. Surgery for inferior turbinate hypertrophy was pioneered by Jones & Holmes.⁶ Cryotherapy, submucosal diathermy, laser turbinoplasty, submucosal turbinectomy, partial and total turbinectomy and endoscopic turbinoplasty are the different methods of surgical management.⁷ Turbinate reduction procedures aim to reduce nasal obstruction while preserving the function of the turbinates.⁸

The NOSE score is the tool used in this study for comparing the pre-operative and post-operative severity of nasal obstruction and to assess the effectiveness of surgery. In this study, we have compared the subjective outcomes and complications of inferior turbinate

reduction by turbinectomy and turbinoplasty.

Materials and Methods

This prospective study was conducted in the Department of Otorhinolaryngology from May 2015 to April 2017. Sixty patients with ITH were included in this study and were divided into 2 groups using simple randomization method, with 30 patients in each arm. After obtaining informed written consent and ethical committee clearance, patients aged from 18 to 45 years with chronic bilateral nasal obstruction due to hypertrophied inferior turbinate, not responding to medical management were included in the study. (Fig.1) Patients with septal and other nasal abnormalities were excluded from the study. Complete clinical history, physical and otorhinolaryngological examination and diagnostic nasal endoscopy with 0° rigid endoscope was done. CT scan of the nose and paranasal sinuses was performed to rule out other pathologies. Preoperative assessment of nasal symptoms was done using NOSE score. (Table I) The American Academy of Otorhinolaryngology validated the questionnaire entitled Nasal Obstruction Syndrome Evaluation, known as NOSE score. The NOSE score is commonly used as a reference in studies for analyzing the influence of nasal obstruction in life quality and for pre and post- surgical comparison.⁹ This score has 5 questions about life quality. Each receives a score from 0 to 4 and these are summed and multiplied by 20. The total NOSE score ranges from 0 to 100.¹⁰

Table I: Nasal Obstruction Symptom Evaluation (NOSE) Score

NOSE	REGULAR	MILD	MODERATE	FAIRLY BAD	SEVERE
Nasal congestion	0	1	2	3	4
Nasal obstruction	0	1	2	3	4
Trouble breathing through nose	0	1	2	3	4
Nasal obstruction during sleep	0	1	2	3	4
Nasal obstruction during exercise	0	1	2	3	4

Patients underwent turbinectomy or turbinoplasty as assigned to each patient by simple random sampling.

Surgical procedure: Nasal cavity was packed with 4% lignocaine and 1:10000 adrenaline. After 15 minutes, the inferior turbinate and the adjacent area were infiltrated with 1% lignocaine and 1:100,000 adrenaline, under endoscopic guidance. Group A patients underwent turbinectomy and those in Group B underwent turbinoplasty.

In turbinectomy group, a portion of the turbinate to be resected was clamped with Rochester forceps, resected after few minutes and hemostasis was ensured.

In turbinoplasty group, under endoscopic guidance, mucosal incision was made with 15 number surgical blade anterior end of inferior turbinate and a submucosal tunnel was created along the length of turbinate. This tunnel was extended along the length of turbinate with help of septal elevator. Knight scissors were used to conservatively resect a portion of the lateral mucosal flap in continuity with excess bone. In cases which did not require removal of mucosa, submucous resection of the conchal bone alone was done. The mucosa was approximated laterally. (Fig. 2)

After ensuring haemostasis, nasal cavity was packed with ribbon gauze soaked in Framycetin ointment in both the groups. Patients were given intravenous antibiotics and analgesics. Nasal pack was removed after 24 hours and patients were discharged.

The surgical outcome of patients was evaluated postoperatively after 1 week and 6 months using the NOSE score. Postoperative bleeding and crusting in both groups were also compared.

Results

The mean age was 33.17 years and 29.70 years in turbinectomy group and turbinoplasty group respectively. Both groups showed male predominance. There were 16 males and 14 females in turbinectomy group and 19 males and 11 females in turbinoplasty group ($p > 0.05$).

The mean preoperative NOSE score of turbinectomy group was 75.83 and that of turbinoplasty group was

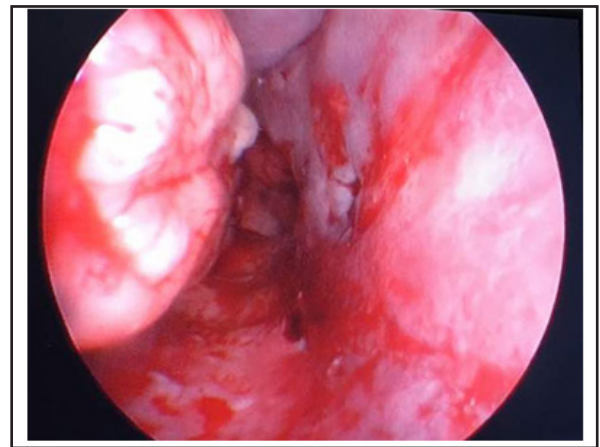


Fig. 2. Post turbinoplasty image of the same patient

76.83. The comparison of preoperative NOSE scores of two groups showed no statistically significant difference. The comparison of pre and post-operative NOSE scores of the turbinectomy group and turbinoplasty group are depicted in Table II. Both the groups showed statistically significant improvement ($p < 0.05$) in NOSE score post-operatively.

The mean operative duration of turbinoplasty group was longer than that of the turbinectomy group, though statistically insignificant ($p > 0.05$). The mean operative time of turbinectomy group was 32.20 ± 2.59 min and that of turbinoplasty group was 37.70 ± 1.62 min. Post-operative bleeding was seen in one patient after turbinoplasty and 3 patients after turbinectomy which were managed conservatively. Though not statistically significant ($p > 0.05$) post-operative crusting was also more common in turbinectomy group (50% and 30% respectively for turbinectomy and turbinoplasty).

Discussion

The primary goal of performing surgery for hypertrophied inferior nasal turbinate is to maximize the nasal airway for as extended a period as possible, while minimizing complications such as excessive nasal drying, crusting, haemorrhage and pain. The advantages, disadvantages, complications and controversies of each form of treatment have been reviewed and discussed by

Table II: Preoperative and postoperative comparison of NOSE score

	PROCEDURE	NOSE SCORE	SD	SEM	P VALUE	INFERENCE
Preoperative	Turbinectomy	75.83	11.751	2.145	0.72	Not significant
	Turbinoplasty	76.83	9.692	1.77		
Postoperative First week	Turbinectomy	35.5	6.991	1.276	0	Significant
	Turbinoplasty	11.17	7.507	1.371		
Postoperative Six months	Turbinectomy	34.5	6.345	1.158	0	Significant
	Turbinoplasty	15.33	8.703	1.589		

(SD- standard deviation , SEM- standard error mean)

many authors.

In our study, mean age was 33.17 years and 29.70 years in turbinectomy group and turbinoplasty group respectively with a slight male preponderance in both groups. These results are similar to the study done by Rodrigues et al¹¹ with mean age of 35.53 years in turbinectomy and 35.56 years in turbinoplasty group.

Mean pre-operative NOSE scores were 75.83 in turbinectomy group and 76.83 in turbinoplasty group which were similar to the study done by Rodrigues et al¹¹ with a mean value of 74 in turbinectomy group and 61.67 in turbinoplasty group. There was improvement in both turbinoplasty and turbinectomy group with a mean post-operative NOSE score of 11.77 and 35.50 respectively which is comparable to the study done by Rodrigues et al¹¹ with mean post-operative NOSE scores of 33.88 in turbinoplasty and 35.50 in turbinectomy group, but the improvement was slightly better in turbinoplasty group in our study. In the study done by Rodrigues et al¹¹ bleeding was slightly more in turbinoplasty group (33.3%) rather than turbinectomy (26.6%) group. But in our study bleeding was much less in the turbinoplasty group (3.3%) when compared to the turbinectomy group (10%). Also, post-operative crusting was more common in turbinectomy group (50%) than in turbinoplasty group (30%).

Hol and Huizing¹² in their review of 13 surgical treatments for ITH, which included electrocautery, chemocautery, cryosurgery, subtotal turbinectomy, laser surgery and radiofrequency, concluded that these

methods may have destructive effects on mucosal and submucosal physiology. Although most procedures are technically easy to perform, there is variable long-term success and significant risks, including necrosis of conchal bone, eschar formation and haemorrhage.⁴ Sapci et al¹³ concluded that although laser ablation of the turbinate was effective in improving nasal obstruction, it significantly disturbed mucociliary function. Berger et al¹⁴ studied histopathological changes after coblation of the inferior turbinates, and found significant fibrosis, glandular and venous sinusoid depletion and partial epithelial shedding.

Turbinoplasty is a technique more laborious and time consuming compared to turbinectomy, but it has the obvious advantage of not exposing the bloody area and less mucosal injury along with preservation of mucosa. There is less bleeding and lower formation of crusts and hence better clinical outcome. Functional outcome is achieved with turbinoplasty by sparing the nasal mucosa and submucosa along with retention of function bearing structures (inferior turbinate). The limitation of the study is that long term follow up should be done for ideal assessment of the outcome of the surgery.

Conclusion

Inferior turbinoplasty provides excellent outcome in a wide variety of patients with minimal morbidity. The technique is an effective alternative to other inferior turbinectomy methods and is a good adjunct

to septoplasty and endoscopic sinus surgery in patients with associated ITH. Turbinoplasty brings excellent outcome in terms of symptomatic relief and is associated with less mucosal injury, better mucosal preservation and less post-operative bleeding and crusting. Hence, we recommend that it can be done for the treatment of inferior turbinate hypertrophy.

References

- Harrill WC, Pillsbury HC, McGuirt WF, Stewart MG. Radiofrequency turbinate reduction: a nose evaluation. *Laryngoscope* 2007; 117:1912-9
- Passali D, Passali FM, Damiani V, Passali GC, Bellussi L. Treatment of inferior turbinate hypertrophy: a randomized clinical trial. *Ann Otol Rhinol Laryngol*. 2003; 112:683-8
- Lai VWS, Corey JP. The objective assessment of nasal patency. *Ear Nose Throat J*. 1993; 72:395-400
- Jackson LE, Koch RJ. Controversies in the management of inferior turbinate hypertrophy: a comprehensive review. *Plast Reconstr Surg*. 1999; 103:300-12
- Cook PR. Sinusitis and allergy. *Curr Opin Otolaryngol Head Neck Surg*. 1997; 5:35-9
- Friedman M, Tanyeri H, Lim J, et al. A safe, alternative technique for inferior turbinate reduction. *Laryngoscope* 1999; 109:1834-7
- Rai S, Sharma V, Koirala K, Sharma AC; Endoscopic versus conventional method for partial inferior turbinectomy in chronic hypertrophic rhinitis. *Nepal J Med Sci*. 2013; 2(2):102-7
- Mathai J. Inferior turbinectomy for nasal obstruction— review of 75 cases. *Indian J Otolaryngol Head Neck Surg*. 2004; 56:23-6
- Stewart MG, Smith TL, Weaver EM, Witsell DL, et al. Outcomes after nasal septoplasty: results from the Nasal Obstruction Septoplasty Effectiveness (NOSE) study. *Otolaryngol Head Neck Surg*. 2004; 130(3):283-90
- Stewart MG, Witsell DL, Smith TL, Weaver EM, et al. Development and validation of the Nasal Obstruction Symptom Evaluation (NOSE) scale. *Otolaryngol Head Neck Surg*. 2004; 130(2):157-63
- Rodrigues M, Dibbern R, Oliveira L, Marques M. Comparação entre turbinoplastia e turbinectomia endoscópicas: eficácia e parâmetros clínicos. *Arquivos Internacionais de Otorrinolaringologia (Impresso)* 2011; 15(4):426-30
- Hol MK, Huizing EH. Treatment of inferior turbinate pathology: a review and critical evaluation of the different techniques. *Rhinology* 2000; 38:157-66
- Sapci T, Sahin B, Karavus A, Akbulut UG. Comparison of the effects of radiofrequency tissue ablation, CO2 laser ablation, and partial turbinectomy applications on nasal mucociliary functions. *Laryngoscope* 2003; 113:514-9
- Berger G, Ophir D, Pitaro K, Landsberg R. Histopathological changes after coblation inferior turbinate reduction. *Arch Otolaryngol Head Neck Surg*. 2008; 134:819-23.