Original Research Article

A comparative study of partial inferior turbinectomy versus radio frequency ablation in the patients with DNS with hypertrophied turbinate

Shilpa Shrivastava[1], Abdul Azeez[2*]

[1,2]Assistant Professor, Department of ENT, Dr VRK Women's Medical College, Opposite Deer Park, Aziz Nagar,Hyderabad, Telanagana. 500075, INDIA.
Email: docazeez77@gmail.com

Abstract

Background: The inferior turbinate is an important nasal structure carrying filtration, warming, and humidification of inspired air and regulation of nasal airflow. Inferior turbinate hypertrophy lead to decreased nasal airflow and nasal obstruction. Chronic nasal obstruction can affect quality of life of a person. **Aim and objective:** To compare the partial inferior turbinectomy and radio frequency ablation in patients of DNS with hypertrophied turbinates. **Methodology:** Present study was a prospective, interventional study carried out on patients visiting OPD of otorhinolaryngology department diagnosed with Deviated Nasal Septum and hypertrophied turbinates. The patients were divided into two groups. First group was treated with partial inferior turbinectomy and group 2 was treated with radio frequency ablation of the turbinates. Each group contains 40 patients. Both the groups were compared for relief of nasal obstruction, duration of surgery and complications. **Results:** At follow up of 7 day, 3 month and 1 year VAS score improved significantly in group 2 (radiofrequency ablation) than Group 1 (partial inferior turbinectomy). ($p<0.05$) DNE score significantly improved in both groups from pre operative to 1 year follow up ($p<0.05$) but when compared both the groups it was less in Group 1 than Group2. This difference is statistically not significant. Mean operative time for partial inferior turbinectomy was 8.45±1.5 mins in group 1 and 3.64 ± 1.1 mins.

***Address for Correspondence:**
Dr Abdul Azeez, Assistant Professor, Department of ENT, Dr VRK Women's Medical College, Opposite Deer Park, Aziz Nagar, Hyderabad, Telanagana. 500075, INDIA.
Email: docazeez77@gmail.com
Received Date: 02/08/2020 Revised Date: 12/09/2020 Accepted Date: 21/10/2020
DOI: https://doi.org/10.26611/10161631

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 04 December 2020

INTRODUCTION

The Inferior Turbinates are independent bony structures situated in the lateral wall of nose. These are anatomically and functionally very important. Their size and position is important for adequate nasal breathing which is one of the primary and vital functions of the nose. Inferior turbinate facilitates eddy current flow of the air and contribute to normal nasal cycle.[1] The turbinate has immense submucous cavernous plexus with large sinusoids. They are controlled by the autonomic nervous system. The turbinate is covered by respiratory epithelium, with a high number of goblet cells (approximately 8/mm2) which decrease in density towards the posterior end. [2] Inferior turbinate hypertrophy is observed in physiological changes and pathological conditions like Deviated Nasal septum, allergic rhinitis, vasomotor rhinitis etc. Unilateral turbinate hypertrophy secondary to DNS is due to bone expansion mainly. Nearly a two fold increase in osseous layer of the IT was observed. Histopathological studies shown dilated,

How to cite this article: Shilpa Shrivastava, Abdul Azeez. A comparative study of partial inferior turbinectomy versus radio frequency ablation in the patients with DNS with hypertrophied turbinate. *MedPulse International Journal of ENT.* December 2020; 16(3): 24-28. https://www.medpulse.in/ENT/

thin walled venous sinuses; lamina propria fibrosis; lymphocyte, plasma cells and eosinophil infiltration of subepithelial layer; increased secretory glandular ducts.[3] Various surgical methods are used for treating these inferior turbinate hypertrophy. These methods are Radical Turbinectomy, Partial Turbinectomy, Conventional Turbinoplasty, Submucosal Resection, Lateralization/ Out fracture of the inferior turbinate, Laser Vaporization, Radiofrequency Ablation, Microdebrider assisted turbinoplasty, Coblation turbinoplasty, Injection of corticosteroids, Injection of sclerosing agents, Vidian neurectomy, Cryosurgery, Turbinoplasty and Argon plasma surgery. [4-8] The aim for any surgical procedure involving the inferior turbinates include reduction of the turbinate size resulting in adequate airway space, decreasing the symptom of nasal obstruction. Complications after inferior turbinate surgery include bleeding, nasal dryness, crusting, scarring and atrophic rhinitis. Techniques that sacrifice the nasal mucosa are found to cause a greater disruption of nasal physiology. Radiofrequency ablation (RFA) utilizes a probe that is inserted directly into the inferior turbinate and is used to deliver a low-frequency ionic energy. [9]This thermal effect results in postoperative wound contracture and fibrosis, while preserving the surface epithelium and ciliary function. [10] Partial inferior turbinectomy involves submucous resection of the bony component along with the lateral mucosa of the inferior turbinate. Intraoperative manipulation of the posterior part of the inferior turbinate can lead to bleeding which should be controlled. Adequate nasal airway space is produced at the end of the procedure. Present study was conducted to compare partial inferior turbinectomy and radiofrequency ablation in patients of DNS with hypertrophied turbinates.

Aim and objective: To compare the partial inferior turbinectomy and radio frequency ablation in patients of DNS with hypertrophied turbinates.

MATERIAL AND METHODS

Present study was a prospective, interventional study carried out at Otorhinolaryngology department of a tertiary health care centre. Study population was patients visiting OPD of otorhinolaryngology department diagnosed with Deviated Nasal Septum and hypertrophied turbinates.

Inclusion criteria: 1. All patients diagnosed with deviated nasal septum and hypertrophied turbinates 2. Patients willing to participate in the study

Exclusion criteria:

1. Patients with allergic rhinitis, acute rhinosinusitis, Patients getting relieved with antihistamines/topical steroids/local decongestants
2. Patient with nasal polyp, tumours of nasal and paranasal sinuses
3. Patients with history of previous nose surgery

Study was approved by ethical committee of the institute. A valid written consent was taken from the patients after explaining study to them. After considering inclusion and exclusion criteria, total 80 cases were studied. These patients were divided into two groups. Patients were randomly allotted to groups by a statistician. First group was treated with partial inferior turbinectomy and group 2 was treated with radio frequency ablation of the turbinates. Each group contains 40 patients. Data was collected with pre tested questionnaire. Data included demographic data like age, sex. Present complaints were noted. Through clinical examination was done. Preoperative evaluation was done by clinical examination, CT scan of paranasal sinuses, Nasal Obstruction Symptom Evaluation (NOSE) and diagnostic nasal endoscopy. Clinical examination included anterior and posterior nasal examination. The NOSE survey consists of 5 items each scored using a 5-point Likert scale. The total score is multiplied by 5 to make a total score range of 0 through 100. Higher scores indicate worse obstruction. [11] Diagnostic nasal endoscopy was done and hypertrophy of turbinates was graded according to airway space as Grade 1 (0% –25%) of airway space, Grade 2 (26% –50%), Grade 3 (51% –75%) and Grade 4 (76% –100%). [12]

All patients underwent routine blood investigations, Chest X ray and other preoperative anaesthetic assessment. Group 1 patients underwent partial inferior turbinectomy and group 2 patients underwent radio frequency ablation of the turbinates.

In group 1 Surgery was done under general anaesthesia. Angled scissors were used, one blade was inserted beneath the inferior turbinate and the other on top of it,so that the resection included the turbinate mucosa and bone. The extent of the resection depended upon the degree of the hypertrophy. In group 2 patients turbinate is infiltrated with local anaesthetic. This will expand submucous tissue and operative field. The wand tip was coated with saline gel and activated at the head of turbinate for producing devascularized zone. Wand is again through this devascularized zone and submucosally advanced toward the tail of turbinate. It is activated for 10 seconds, partially withdrawn and activated again. No of passes depends on surgeon and turbinate hypertrophy. Nasal packing was done in group 1 patients. As very less bleeding was seen in patients of group 2, nasal packing was not required. Duration of surgery was individually calculated from incision to nasal packing. Post operative follow up assessment was done at post operative day 1, day 7, 3 months and 1 year. Patients pain score and better symptomatic relief were noted down. Score for Nasal

Obstruction was obtained using Visual Analog Scale (VAS). It consists of a 10 cm long line (0-10). The ends are labeled as the extremes ('no obstruction and nasal obstruction before surgery). At one year follow up CT (PNS) was done and compared with the pre-operative CT. Difference in medial mucosal thickness and mean airway space were compared. Complaints like crusting, epistaxis and nasal obstruction were noted.

Data was entered in excel sheet. Data was analysed with SPSS version 22.

RESULTS

Table 1 shows comparison of two groups with respect to demographic variables. Mean age of patient in group 1 is 39.3± 3.8 years and in group 2 is 40.1± 3.1 years. In group 1 there were 21 males and 19 females. In group 2 22 were male and 18 were females. Male preponderance was seen in both the groups. Both the groups were comparable with respect to age and sex ($p>0.05$). VAS score on day 1 was 6.42± 1.5 in group 1 and 6.1± 1.2 in group 2. It reduced to 5.24± 1.3 and 3.38± 1 on day 7 postoperatively in group 1 and 2 respectively. At 3 month follow up, VAS score was 4.56± 1.1 and 2.21± 0.8 in group 1 and 2. At the end of 1 year, group 1 patients show VAS score of 2.91± 0.9 and group 2 patients show VAS score of 1.36± 0.7. on analysis of data we observed that VAS score improved statistically in both the groups ($p<0.05$). on comparison of Group 1 and Group 2, VAS score on day 1 was more in Group 1 than group 2 but statistically not significant. At follow up of 7 day , 3 month and 1 year VAS score improved significantly in group 2 than Group 1. ($p<0.05$)

Table 3 shows comparison of Group 1 and Group 2 according to Diagnostic Nasal Endoscopy (DNE). DNE score pre operatively in Group 1 and Group 2 were 87.34 ± 15.4 and 88.6± 17.6. At follow up of day 7, 3 months and 1 year score in Group 1 was 32.61± 9.5, 35.42± 7.2 and 30.24± 5.4 and in Group 2 was 39.32± 10.2, 32.67± 8.1 and 30.68± 4.9. DNE score significantly improved in both groups from pre operative to 1 year follow up ($p<0.05$) but when compared both the groups it was less in Group 1 than Group2. This difference is statistically not significant. Mean operative time for partial inferior turbinectomy was 8.45 ± 1.5 mins in group 1 and 3.64 ± 1.1 mins. This difference was statistically significant. Patients in group 1 were complainting of bleeding after procedure so nasal pack was kept. In Group 2 minimal bleeding was observed so majority patients did not require nasal pack. Crusting was observed in both the groups. Out of 40 patients in group 1, 19 patients experienced crusting and in Group 2, 17 patients experienced crusting. This difference was statistically not significant.($p>0.05$)

Table 1: comparison of Group 1 and Group 2 according to demographic variables

Sr no	Variables	Group 1 (n=40)	Group 2(n= 40)	P value
1	Age (years)	39.3± 3.8	40.1± 3.1	>0.05
2	Male:female ratio	21: 19	22:18	>0.05

Table 2: comparison of Group 1 and Group 2 according to VAS score for nasal obstructions

Sr no	VAS score	Group 1 (n=40)	Group 2(n= 40)	P value
1	Day 1	6.42± 1.5	6.1± 1.2	>0.05
2	Day 7	5.24± 1.3	3.38± 1	<0.05
3	3 Months	4.56± 1.1	2.21± 0.8	<0.05
4	1 year	2.91± 0.9	1.36± 0.7	<0.05

Table 3: comparison of Group 1 and Group 2 according to DNE score

Sr no	DNE score	Group 1 (n=40)	Group 2(n= 40)	P value
1	Pre operative	87.34± 15.4	88.6± 17.6	>0.05
2	Day 1	32.61± 9.5	39.32± 10.2	>0.05
3	3 Months	35.42± 7.2	32.67± 8.1	>0.05
4	1 year	30.24± 5.4	30.68± 4.9	>0.05

DISCUSSION

The management of chronic nasal obstruction caused by inferior turbinate hypertrophy is challenging. [13] Surgical modalities for inferior turbinate reduction aim at alleviating nasal obstruction and improve compliance of nasal passage. Many different surgical techniques have been described for the treatment of inferior turbinate hypertrophy. This is brought about by inducing fibrosis and scar tissue in the submucosal layer while destroying vascular and glandular structures. Although during last two centuries there are many new techniques that may had been proved with better outcomes of this surgery but still it may become very difficult to decide which technique is most suitable variety for certain particular patient. In our study, VAS score improved statistically in both the groups ($p<0.05$) over the follow up upto 1 year. At follow up of 7 day , 3 month and 1 year VAS score improved significantly in group 2 (radiofrequency ablation)than Group 1 (partial inferior turbinectomy). ($p<0.05$) DNE score significantly improved in both groups from pre operative to 1 year follow up ($p<0.05$) but when compared both the groups it was less in Group 1 than Group2. This difference is statistically not significant. Mean operative time for partial inferior turbinectomy was 8.45 ± 1.5 mins in group 1 and 3.64 ± 1.1 mins. This difference was statistically significant. Out of 40 patients in group 1, 19 patients experienced crusting and in Group 2, 17 patients experienced crusting. This difference was statistically not significant.($p>0.05$) Li *et al.*. first reported the effect of radiofrequency ablation effect on turbinate hypertrophy,

the safety and efficacy of this procedure were well demonstrated. [14] Sapci *et al.* Compared the techniques of CO2 laser ablation, radiofrequency ablation and partial turbinectomy. He found the greatest increase in mucociliary transport time in patients undergoing laser ablation. [15]Excessive turbinate resection is associated with paradoxical complaints of nasal obstruction and atrophic rhinitis despite having a wide and patent nasal cavity. In reviewing a large group of patients with atrophic rhinitis, Moore and Kern found that many had subjective complaints of nasal obstruction despite widely patent nasal airways and normal or low nasal resistance. [16] Passali *et al.*. reported on a series of 382 patients treated with a variety of turbinate reduction methods. [17] patients were randomized to undergo reduction by one of six methods: turbinectomy, electrocautery, cryotherapy, laser cautery, submucosal resection and submucosal resection with lateralization. The authors found the greatest improvement in symptom scores in patients undergoing a submucosal resection with or without outfracture. Crusting was seen much less frequently in patients treated with the submucosal resection methods than in those treated with the other methods. Mehmet Akdag in the retrospective study carried out on 98 patients with nasal obstruction treated by RFVTR. Visual analogue scales (VAS) and nasal endoscopic view score (NES) were used for nasal obstruction to evaluate the efficacy of the treatment. Turbinate edema and nasal obstruction in the treated patients were recovered after one month of treatment ($p < 0.01$). Maximum improvement were determined at the end of third month ($p < 0.01$). [18] Radiofrequency Coblation is a relatively easy and faster technique to perform providing a near bloodless field and minimal damage to surrounding tissues. When comparing the methods with each other, coblation has an upper hand in terms of improvement of patient symptoms and reduction in turbinate size. RF is considered to be more accurate, with minimal injury to collateral tissue in previous studies. [19-21]

CONCLUSION

Radiofrequency ablation is easy to perform, OPD based technique with improved nasal obstructionand decreased bleeding than partial inferior turbinectomy.

REFERENCES

1. Gindros G, Kantas I, Balatsouras DG, Kandiloros D, Manthos AK, Kaidoglou A. Mucosal changes in chronic hypertrophic rhinitis after surgical turbinate reduction. Eur Arch Otorhinolaryngol 2009;266(09):1409–1416.
2. Tos M, Morgensen C. Mucus production in the nasal sinuses. ActaOtolaryngologica. Supplementum. 1979 ;360: 131 -4.
3. Berger G, Hammel I, Berger R, Avraham S, Ophir D. Histopathology of the inferior turbinate with compensatory hypertrophy in patients with deviated nasal septum. Laryngoscope. 2000;110: 2100-2105.
4. 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(3):514–519.
5. Cavaliere M, Mottola G, Iemma M. Comparison of the effectiveness and safety of radiofrequency turbinoplasty and traditional surgical technique in treatment of inferior turbinate hypertrophy Otolaryngol Head Neck Surg. 2005;133(6):972–978.
6. Di Rienzo Businco L, Di Rienzo Businco A, Lauriello M. Comparative study on the effectiveness of Coblation-assisted turbinoplasty in allergic rhinitis. Rhinology. 2010;48(2):174–178.
7. Gindros G, Kantas I, Balatsouras DG, Kaidoglou A, Dimitris K. Comparison of ultrasound turbinate reduction, radiofrequency tissue ablation and submucosal cauterization in inferior turbinate hypertrophy. Eur Arch Otorhinolaryngol. 2010;267(11):1727–1733.
8. Salzano FA, Mora R, Dellepiane M, Zannis I, Salzano G, Moran E, Salami A. Radiofrequency, highfrequency, and electrocautery treatments vs partial inferior turbinotomy: microscopic and macroscopic effects on nasal mucosa. Arch Otolaryngol Head Neck Surg. 2009;135(8):752–758.
9. Chang CW, Ries WR. Surgical treatment of the inferior turbinate: new techniques. CurrOpinOtolaryngol Head Neck Surg 2004; 12:53–57
10. Hyto¨ nen ML, Ba¨ck LJ, Malmivaara AV, *et al.*. Radiofrequency thermal ablation for patients with nasal symptoms: a systematic review of effectiveness and complications. Eur Arch Otorhinolaryngol 2009; 266:1257–1266
11. Michael J. Lipan, MD; Sam P. Most, MD, Development of a Severity Classification System for Subjective Nasal Obstruction, JAMA Facial Plastic Surgery September – October 2013 Volume 15, Number 5, 358- 361.
12. Macario Camacho, MD *et al.*, Inferior Turbinate Classification System, Grades 1 to 4: Development and Validation Study, Laryngoscope, 125:296–302, 2015.
13. Leong SC, Kubba H, White PS (2010) A review of outcomes following inferior turbinate reduction surgery in children for chronic nasal obstruction. Int J Pediatr Otorhinolaryngol 74:1–6
14. Li KK, Powell NB, Riley RW, Troell RJ, Guilleminault C. Radiofrequency volumetric tissue reduction for treatment of turbinate hypertrophy: a pilot study. Otolaryngol Head Neck Surg. 1998;119(6):569– 573.
15. Sapçi 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(3):514–519
16. Moore EJ, Kern EB. Atrophic rhinitis: a review of 242 cases. Am J Rhinol 2001;15(6):355–361)
17. Passàli D, Passàli FM, Damiani V, Passàli GC, Bellussi L. Treatment of inferior turbinate hypertrophy: a randomized clinical trial Ann OtolRhinolLaryngol 2003;112(8):683–688.

18. Mehmet Akdag, Suleyman Dasdag,, Fazil Emre Ozkurt. Long-term effect of radiofrequency turbinoplasty in nasal obstruction. Biotechnol Biotechnol Equip. 2014 Mar 4; 28(2): 285–294
19. Lee JY, Lee JD Comparative study on the long-term effectiveness between coblation and microdebrider assisted partial turbinoplasty. Laryngoscope. 2006; 116:729–734
20. Gouveris H, Nousia C, Giatromanolaki A, Riga M, Katotomichelakis M, Ypsilantis P *et al.* Inferior nasal turbinate wound healing after submucosal radiofrequency tissue ablation and monopolar electrocautery: histologic study in a sheep model. Laryngoscope 2010; 120:1453–1458
21. Reina CC, Garcia-Iriarte MT, Angel DG, Morente JC, RodriguezDiaz A Radiofrequency volumetric tissue reduction for treatment of turbinate hypertrophy in children. Int J Pediatr Otorhinolaryngol. 2007; 71:597–601.

Source of Support: None Declared
Conflict of Interest: None Declared