



A Comparative Study on Medical Management versus Radiofrequency Volumetric Tissue Reduction of Hypertrophied Inferior Turbinate in Nasal Obstruction Patients having Inferior Turbinate Hypertrophy

Authors

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Abstract

To compare the treatment of hypertrophy of inferior turbinate in patient with nasal obstruction with medical and radiofrequency volumetric tissue reduction technique. Ablation of hypertrophied inferior turbinate with radiofrequency and medical management was given in this study of 60 patients with chronic nasal obstruction at our hospital between January 2020 to December 2020. The results were evaluated subjectively by change in pre and post conservative treatment symptom, size of inferior turbinate. In our study nasal obstruction, nasal discharge, sneezing, hyposmia improved in 75%, 82%, 86%, 72% at the end of 1 month and symptoms further improved to 88%, 89%, 91%, 75.3%, 86% at the end of 3 month after medical management. In our study nasal obstruction, nasal discharge, sneezing, hyposmia improved in 78.4%, 86%, 88%, 78% at the end of 1 month and symptoms further improved to 86%, 92%, 93%, 89% at the end of 3 month after radiofrequency ablation of inferior turbinate. Similarly, 40% patient showed reduction of inferior turbinate at end of 7 days, 80% reduction at the end of 1 month and 88 percent reduction at end of 3 month. These results suggests that radiofrequency volumetric tissue reduction of inferior turbinate is an easily applied, efficient and reliable technique in the treatment of hypertrophied inferior turbinate as compared to medical management.

Keywords: Radiofrequency ablation, inferior turbinate hypertrophy, nasal obstruction.

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1. Introduction

Chronic nasal obstruction is described as a sensation of insufficient airflow through the nose. Anatomic causes of nasal obstruction includes septal deviation, turbinate hypertrophy and internal or external nasal valve collapse etc. Physiological causes of nasal obstruction includes allergic rhinitis or non-allergic rhinitis, inflammatory, infective (viral or bacterial), hormonal, autonomic, drug

induced, occupational or associated with systemic disease.^{1,2}

The inferior turbinate is the largest of the turbinates which plays a major role in the functions of the nose, mainly filtration, warming and humidification of inspired air, directing airflow up into the olfactory area and protecting the host with mucosal IgA antibodies and muco-ciliary clearance. Inferior turbinate hypertrophy causes reduction in nasal airflow. Chronic nasal

obstruction is not life-threatening, but affects patient's quality of life, in a notable way and other aspects of their daily social and working activities.^{2,3}

Initial management of nasal obstruction is often conservative. Medical treatments such as antihistamines, topical decongestants and topical corticosteroids are commonly used, principally to reduce nasal obstruction and restore comfortable nasal breathing. Intranasal antihistamines improve the Total Nasal Symptom Score as well as each Individual Nasal Symptom Score for sneezing, rhinorrhea, nasal congestion and nasal itching with faster onset and similar efficacy when compared with intranasal steroids. Intranasal antihistamines also have a faster onset than oral antihistamines.^{4,5} For turbinate reduction multiple surgical procedures have been developed. The American Academy of Otolaryngology and Head and Neck Surgery, clinical practice guidelines on allergic rhinitis states that "clinicians might prefer inferior turbinate reduction in patients with allergic rhinitis with nasal airway obstruction and enlarged inferior turbinates who are non-responsive to medical management."⁶

Failure of medical treatment will route to various surgical techniques like partial or total turbinectomy, turbinoplasty, sub mucosal electrocautery, radiofrequency ablation (RFA), laser assisted resection / ablation and cryosurgery etc. Submucosal resection techniques include medial mucoperiosteal flaps, turbinate out fracture, and resection of conchal bone. Coblation, cryotherapy and ultrasound-assisted reduction have also been described.⁷⁻¹⁰

Radiofrequency volumetric tissue reduction (RFVTR) of the inferior turbinates is the most common method of reducing the soft tissue volume of the inferior turbinates.¹⁵ This method is commonly utilized thermal technique that has few complications and has the ability to be performed in the office under local anaesthesia. This technique generates a relatively low level of heat in the sub-mucosal layer of the turbinates, and thus preserves overlying mucosal integrity and mucociliary

function of the turbinates. With the transmission of controlled RF energy to submucosal tissue, intracellular and extracellular ions such as sodium, chloride and calcium, gain mobility and then contact surrounding ions, producing heat and subsequent coagulative necrosis. This necrotic tissue heals according to healing principles and scar formation and tissue retraction occur, giving rise to volume reduction and reduced nasal resistance.¹¹

In the study, the medical management versus radiofrequency ablation of hypertrophied inferior turbinates in allergic rhinitis patients, having complain of nasal obstruction, was compared. The present study was conducted to see relief of nasal obstruction in both the categories.

2. Materials and Methods

Study Design

Present study was Prospective and Interventional Randomized Comparative Study. Study was performed on 60 patients of allergic rhinitis presented to the department of ENT, SGMH, with symptoms of nasal obstruction and bilateral inferior turbinates hypertrophy on examination. Study population was divided into 2 groups. GROUP A included patients underwent medical treatment of allergic rhinitis and GROUP B included patients who underwent Radio Frequency Ablation of hypertrophied inferior turbinates.

All patients were subjected to detailed ENT history, local and systemic examination, Diagnostic nasal endoscopy and absolute eosinophil count.

Inferior turbinate hypertrophy was graded on the basis of Friedman Grading system (table-1).¹²

Table 1: Friedman grading system for inferior turbinate hypertrophy

Grade	Definition
Grade I	Mild enlargement of inferior turbinate with no obvious obstruction
Grade II	Between grade I and grade III
Grade III	Complete occlusion of nasal cavity due to hypertrophied inferior turbinate

Inclusion Criteria

(1) Patients aged between 15 and 40 years

(2) All patients of allergic rhinitis with nasal obstruction with inferior turbinate hypertrophy.

Exclusion Criteria

- (1) Previous nasal surgery
- (2) Patients with acute or chronic infection, like sinusitis, Tuberculosis etc.
- (3) Patients with severe nasal deformity like grade III Deviated nasal septum
- (4) Patients with any other local/systemic diseases like diabetes mellitus, coagulation disorders, cardiac pacemaker and uncontrolled hypertension etc.
- (5) Pregnant female

Group A (Medical Management)

In conservative management patient is started on following medications

- Oral antihistamine- T. levocetirizine dihydrochloride- 5mg HS for 3 months
- Nasal decongestant- Nasal drop Xylometazoline - .1% 2 drops TDS for 2 weeks
- Nasal spray Fluticasone Propionate (0.005 w/v) for 3 months.

Group B (Radiofrequency Ablation)

RFA of bilateral inferior turbinate was done under local anaesthesia in operation theatre. Infiltration of 2ml of 2% lidocaine was given in each inferior turbinate along the whole treatment area (To attain anaesthetic effect, increase the size of the inferior turbinate and decrease the damage to mucosa).



Figure 1: Bipolar radiofrequency induced thermotherapy (RFITT) unit and needle electrode

Technique

The RFA (celon pro breath applicator) bipolar probe is inserted in inferior turbinates depending on the site of hypertrophy (lesion). For anterior lesion, the handheld needle electrode is inserted into the anterior portion of the Inferior turbinate. For stacked anterior lesion, the handheld needle electrode is inserted at 2 points in anterior and anterosuperior portion of inferior turbinate. For middle lesion and posterior lesion same technique is followed.

The needle electrode is inserted into inferior turbinate all along the length of treatment area to deliver 15 to 18 watts (mode: fine RFITT or pure RFITT) depending on the size of the turbinate with

an average application time of 4.5- 6 seconds. Higher settings are used to treat smaller turbinate. The lower the power setting, the longer the application time and greater the extent of coagulation. The higher the power setting, the smaller the area of coagulation.

Once the needle electrode is positioned, power supply is activated by pressing the foot switch. Acoustic signal monitors the status of coagulation. Overdose effects were taken care of by automatic reduction of power supply. Now, the needle electrode has to be repositioned by pulling it out slightly but not removing it completely. It is inserted posteriorly, as closely as possible, midway between the bone and mucous membrane.

To coagulate the entire length of turbinate needle is withdrawn repeatedly by 1.5cm and per control unit is reactivated (shaft of applicator has 1cm marking, thus used as positioning gauge; Leaving healthy area between the lesion reduce the risk of crusting and improves healing). Procedure was repeated till the hypertrophied area was fully

treated. Postoperative patients were given saline nasal drops and Tab. Ibuprofen, if required.

Group A and group B patients were followed up on 1st week, 2nd week, 1st month and 3rd month for improvement in nasal obstruction and reduction in size of inferior turbinates. Relief from symptoms like sneezing and rhinorrhea were also checked.

3. Results

Medical Management

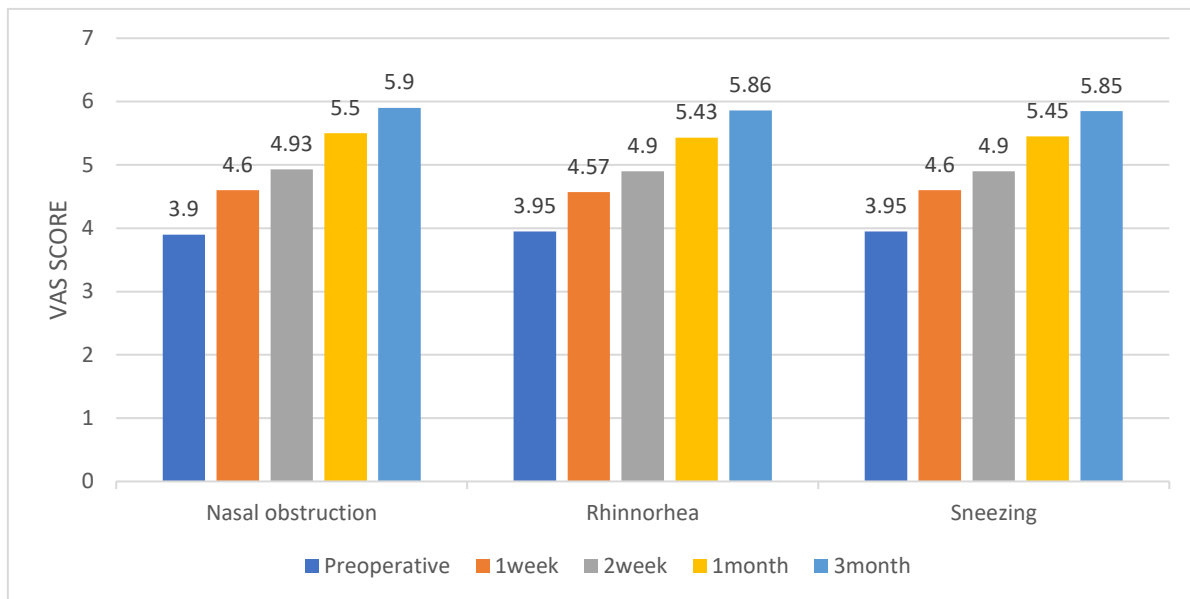


Figure 2: VAS scores at follow-up after medical management

Surgical Management – Radiofrequency Ablation

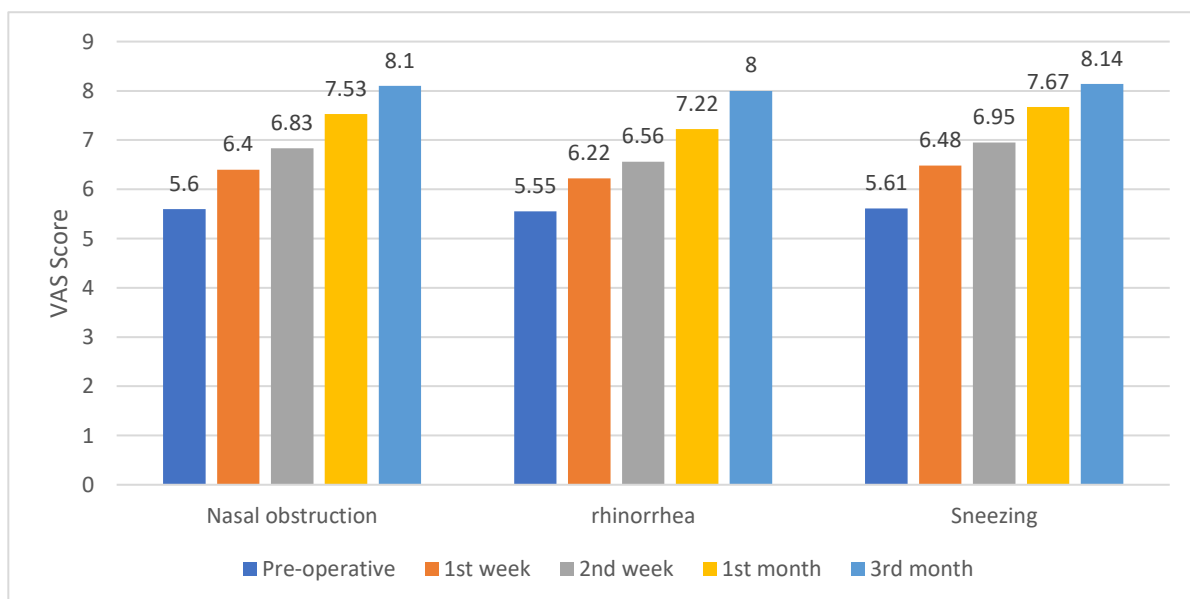


Figure 3: VAS scores at follow-up after radiofrequency ablation

Nasal Obstruction

Compare both type of managements (medical and surgical) in term of relief of nasal obstruction using Visual Analogue Score (VAS).

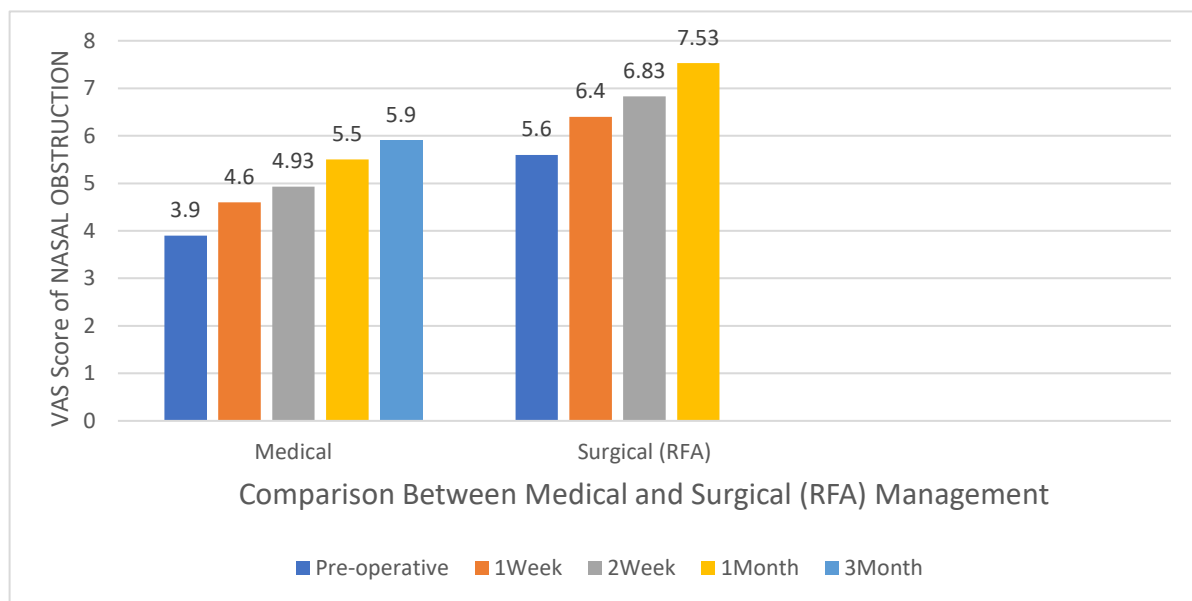


Figure 4: Comparison of VAS score of nasal obstruction – medical vs RFA

Rhinorrhoea

Compare both type of managements (medical and surgical) in term of relief of rhinorrhea using Visual Analogue Score at 1st week, 2nd week, 1st month and 3rd month respectively.

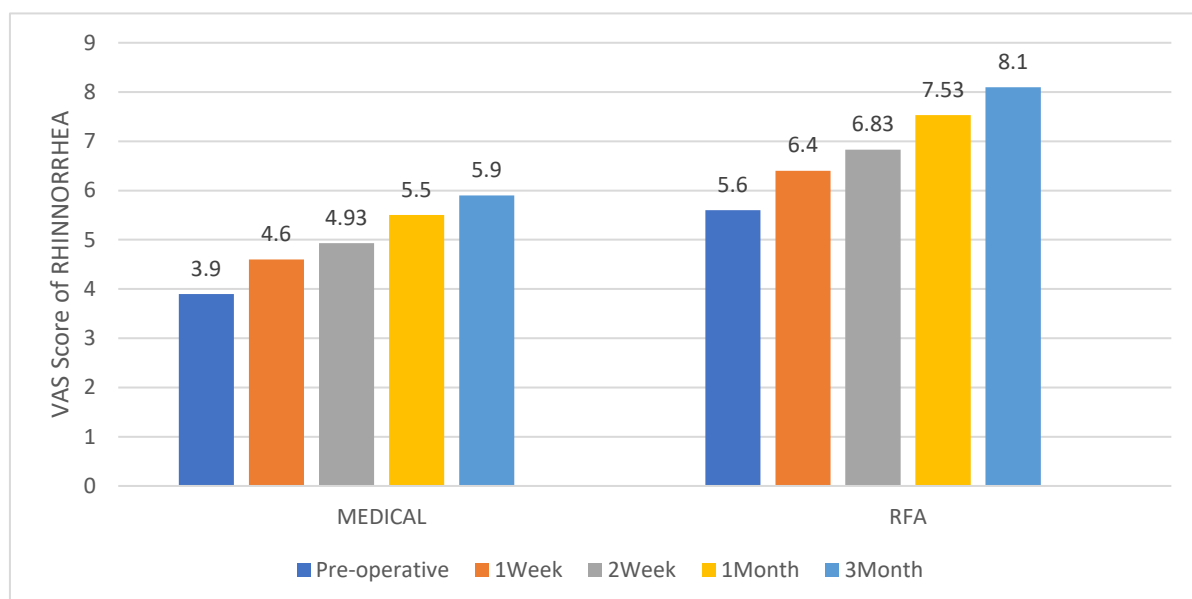


Figure 5: Comparison of VAS score of rhinorrhoea – medical vs RFA

Sneezing

Compare both type of managements (medical and surgical) in term of relief of sneezing using Visual Analogue Score at 1st week, 2nd week, 1st month and 3rd month respectively.

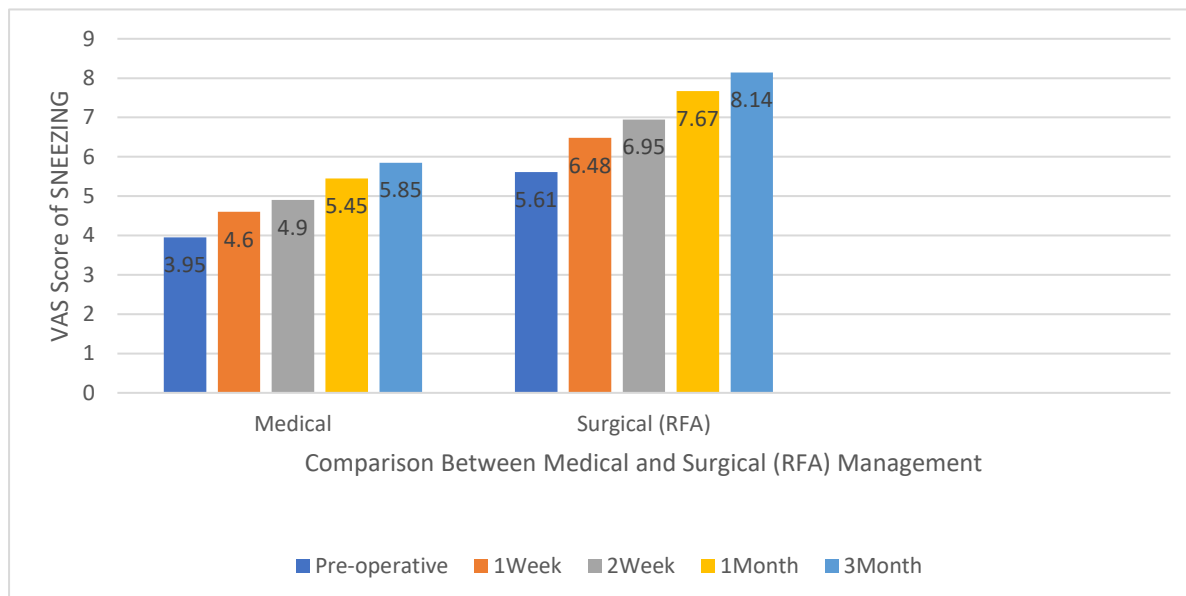


Figure 6: Comparison of VAS score of sneezing – medical vs RFA

Grade of Inferior Turbinate

Preoperative grade of inferior turbinate in all cases was Grade III.

Table 2: Grade of inferior turbinate after medical and surgical management

Frequency	Grade of inferior turbinate	Percent	Cumulative Percent
30 Medical	2	50	50
30 RFA	1	50	50

4. Discussion

Kizilkaya et al. found that statistically notable improvement in the VAS scores of nasal obstructions occurred after RFVTR at 12th week and persisted at 6th month post-operatively.¹³

Batra et al and Special R et al found statistically significant improvement in sneezing. At the end of the 6 month follow up it was found that 97.8% of the patients had got significant relief from sneezing. Relief of sneezing may be due to damage to the branches of posterior nasal nerve.¹⁴

In present study, we found significant improvement in VAS score of relief in sneezing after RFA at 1st month.

Cavaliere et al. and cingi et al. mentioned that significant improvement in nasal obstruction, sneezing and rhinorrhea occurred at one month after treatment which correlates with our present study.¹⁵

In the present study, we observed improvement in VAS score of relief in nasal obstruction after RFA at 4th week which kept increasing till 3rd month. Thus, showing reduction in nasal obstruction.

Parida PK et al., evaluating the long-term outcome of radiofrequency inferior turbinate reduction, demonstrated improvement in nasal obstruction. This clinical improvement persisted 2-5 years after the procedure.¹⁶

In present study, in terms of VAS score, the relief of nasal obstruction after RFA had better outcome than medical management of allergic rhinitis in a follow up period at 1st week, 2nd week, 1st month and 3rd month.

5. Conclusion

The reduction of hypertrophied inferior turbinate volume after RFA had better outcome as compared to medical management in terms of nasal obstruction.

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