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Observational Study on the Effects of Submucosal Diathermy on Chronic Nasal Obstruction in Allergic Rhinitis

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ABSTRACT

Background: Nasal blockage in adults can lead to protracted respiratory infections, subsequent sinus involvement, decreased sense of smell, and sleep difficulties. Submucosal diathermy (SMD) is used for hypertrophic thickening of the inferior turbinate-related mucosa in diseases like allergic rhinitis and nasal obstruction, which are variants of vasomotor rhinitis. The objective was to evaluate the role of SMD in patients with chronic nasal obstruction in allergic rhinitis and to find the effect of SMD in patients with chronic nasal obstruction due to enlarged turbinates in allergic rhinitis.

Methods: This prospective observational study was conducted in the Department of ENT, a tertiary care facility in Pipariya, Vadodara, Gujarat. The study was conducted from October 2022 to October 2023. Patients with allergic rhinitis were subjected to SMD and observed for relief of nasal symptoms. SMD done via bipolar cautery. Current passed at 20 watts for 1-2 mins till significant decrease in size of inferior turbinate achieved.

Results: A total of 33 patients with Allergic Rhinitis were part of the study. About 57% of the participating patients were females and 43% were males. The maximum number of patients was found to be in the age group ranging from 20 to 29 years. In our current study, the maximum number of participants (25) have been involved in the inferior turbinate. 75.8% of patients get relief in symptoms of nasal obstruction and 63.6% of patients get relief in sneezing post-operatively.

Conclusion: Our findings show that SMD is an efficient and safe treatment for relieving refractory nasal obstruction caused by inferior turbinate hypertrophy in individuals with allergic rhinitis.

Key-words: Allergic rhinitis, Inferior turbinate hypertrophy, Nasal blockage, Submucosal diathermy

INTRODUCTION

Nasal blockage is frequent in adults and can impact their health. Chronic nasal blockage owing to hypertrophy inferior turbinates is frequently caused by allergic or vasomotor rhinitis.[1] Nasal blockage is prevalent in adults and can lead to respiratory infections, secondary sinus involvement, diminished sense of smell, and sleep difficulties. Chronic nasal blockage from hypertrophy inferior turbinates are often caused by allergic and vasomotor rhinitis. Turbinate enlargement in these individuals is often bilateral, resulting from mucosal thickening rather than bone hypertrophy.[2] It is used in hypertrophic thickening of the inferior turbinate-associated mucosa, such as allergic rhinitis & the nasal obstruction variant of vasomotor rhinitis.

Medical therapies, including antihistamines, steroids, desensitisation & allergen avoidance, are initially employed. However, if they do not work, surgery is recommended. Surgical options for treating inferior turbinate hypertrophy include submucosal injections of sclerosants or corticosteroids, cryo-turbinectomy, resection of the entire turbinate, submucosal resection of the inferior turbinate, laser turbinectomy, and radiofrequency coblation techniques.[3-9] SMD for inferior

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turbinates gained popularity in 1989, but its practice dates back to 1907. The coagulative current produces tissue necrosis and fibrosis, shrinking the soft tissues in the turbinates. The SMD approach often leads to quick healing and restoration of normal mucosal function. Surgeons choose SMD over other treatments due to its lower risk of complications.[2]

Various reduction procedures have been used to improve nasal airway flow, including turbinectomy, turbinoplasty, radiofrequency coblation, cryosurgery, and laser therapy. Reducing turbinate tissue volume by surgical procedures improves nasal congestion and shrinks the turbinate. Despite considerable comparative research on the subject, the ideal surgical approach remains a topic of debate.[10,11] In theory, this operation lowers the size of the inferior turbinate by cauterising blood vessels and the glandular activity of the rhinitis nose by causing autonomic nerve damage. As a day-case surgery, it appears to be the optimum therapy for nasal blockage.

Therefore, this study aimed to assess the efficacy of SMD in individuals with chronic nasal obstruction in allergic rhinitis.

MATERIALS AND METHODS

The current study was conducted in the Department of ENT, Dhiraj Hospital, Piparia, Vadodara. This observation study included 33 participants with allergic rhinitis and the sample size was determined using computerised random allocation and the data was obtained using a predesigned proforma. The ethical approval was provided by the Institutional Ethical Committee of Sumandeep University, Vadodara, after which the study was conducted.

The sample size was derived using:

$$n = \frac{4pq}{L_2}$$

A total of 20 patients were selected for the study + 10% for the permissible risks i.e. 3 patients. To increase the efficiency of my research, 30 patients will be studied during the study period. Due to the random allocation, the sample size was set at 33.

Patients were later provided with their informed written consent after the brief details of the study were explained to them. Patients who met the criteria received SMD and they were as follows:

Inclusion criteria

- All patients with Chronic nasal obstruction.
- All patients with inferior turbinate hypertrophy.
- All patients with allergic rhinitis.
- Patients giving consent.
- Patients aged 18 years and above

Exclusion criteria

- Congenital anomaly of nose.
- Patients with nasal or sinus infection.
- Patients having severe deviated nasal septum.
- Patients having nasal polyps, nasopharyngeal swelling and malignancy.
- Patients who did not give informed consent.

Methodology- During the study, a detailed clinical history was taken & the nasal examination was done. Patients were taken under local anesthesia for SMD. Bipolar cautery was used. All the data was noted in the predesigned proforma for the study. After the surgery, two follow-ups were taken after SMD, the first follow-up after 1st week and 2nd follow-up after 1 month. During every follow, a Visual Analogue Scale (VAS) was used to check the improvement in nasal obstruction & allergic rhinitis.

Materials used- 4% lignocaine, Otrivin, Adrenaline, Bipolar Cautery, 20-watt current.

Procedures- In our study, patients were prepped using the solution of 4% lignocaine (15 ml) + otrivin (4 drops) + adrenaline (1 amp): nasal packing was done with it. Nasal endoscopy was done via 0-degree nasal endoscope. Lignocaine 2%+adrenaline (1:200000) was injected in 6 ml locally for local anesthesia and vasoconstriction.

SMD was done via bipolar cautery. The current was passed at 20 watts for 1-2 minutes till a significant decrease in the size of the inferior turbinate was achieved.

In the post-operative period, all the patients were enquired about decreased nasal obstruction and sneezing. A visual analogue scale was used for post-operative pain evaluation among the operated patients.

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Statistical Analysis- Being the observation study, the data was analyzed based on primary frequency distribution as the statistical method using SPSS software 11.

Consent- The author(s) have gathered and maintained the patients' written permission by international or university standards.

Ethical Approval- The author(s) has gathered and maintained documented ethical clearance by institution or international standards.

RESULTS

The current study involved 33 patients with allergic rhinitis who had undergone SMD over one year. In this study, the maximum number of patients were within the age group of 30-39 years (15 patients), followed by 20-29 years (13 patients) & 40-49 years (3 patients) and lastly, in the age group 50 years and above (2 patients). There were no patients in the <20 years of age group (Table 1).

Table 1: Distribution of patients according to age

Age	Number	Percentage (%)
<20	0	0
20-29	13	39.5
30-39	15	45.5
40-49	3	9
>=50	2	6

Nineteen females were part of the study, while 14 were males. For the Turbinate involvement, 25 patients had inferior involvement, and the remaining 8 had combined inferior and middle involvement (Table 2).

Table 2: Distribution of patients according to gender

Genders	Number	Percentage (%)
Female	19	57.5
Male	14	42.5

For the distribution of the patients according to the level of pain post-operatively, it was found that five patients reported having no pain (0). In contrast, the maximum number of patients reported mild pain (1-3), 19. For moderate pain (4-6), 9 patients fall under this category; lastly, 0 patients reported having severe pain (7-10) in this study (Table 3).

Table 3: Distribution of patients according to level of pain scale post-operatively

Pain scales	Findings	Percentage (%)
None (0)	5	15.2
Mild (1-3)	19	57.5
Moderate (4-6)	9	27.3
Severe (7-10)	0	0.0

For another parameter, which was about the distribution of patients according to a decrease in nasal obstruction post-operatively, it was observed that a decrease was observed in 25 patients. In comparison, 8 patients reported no reduction in nasal obstruction post-operatively. It was seen that 21 patients reported having a decrease in sneezing post-operatively while 12 reported no changes in the sneezing episodes post-SMD (Table 4).

Table 4: Distribution of patients according to decrease in nasal obstruction & sneezing post-operatively

	Number of patients	Percentage (%)
Decrease in nasal obstruction		
Yes	25	75.8
No	8	24.2
Decrease in sneezing post-operatively		
Yes	21	63.6
No	12	36.4

DISCUSSION

Nasal obstruction is a common complaint of patients presenting to ENT OPD. Inferior turbinate hypertrophy is a common finding. The etiology of the hypertrophied inferior turbinate is multifactorial. It can be secondary to allergic rhinitis, vasomotor rhinitis, deviated nasal septum or due to enlargement of the bone itself.[12] The cases selected in this study were between the ages of 20-54 years and the majority were between the age group of 30-39 years. This is similar to a survey conducted by Okhakhu and Ogisi [13], which found the most significant number of patients between 18 and 40 years old. In a study performed by Lukka *et al.* [14] 29 patients were aged between 18–45 years, with a mean age of 26.8 years. The age group of patients in our study was similar to the study done by Lukka *et al.* [14], while the survey done by Okhakhu and Ogisi [13] had an 18-40

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maximum number of study participants in our study that age group had no patients.

It was seen that there were more females in this current study, with a total 19 female patients and 14 male patients. In a similar setup, a survey conducted by Okhakhu and Ogisi [13] had the majority of male patients 7 and female patients 5. In a different survey conducted by Lukka *et al.* [14], it was seen that their study had 22 male and 7 female patients. In a separate study performed by Tokano *et al.* [11], there were 25 men and 7 women. Our study's results were similar to Okhakhu and Ogisi's [13].

In our study, there was a maximum number of patients involved in the inferior turbinate, a total of 25, and a coincidental finding of involvement in the middle turbinate was seen in 8 patients. In a similar study by Fradis *et al.* [15], inferior turbinate was found in all the patients. In a different survey conducted by Lukka *et al.* [16], it was seen that in the ESMD group, surgery was performed on the right inferior turbinate in 13 instances and the left inferior turbinate in 12 study subjects. While in 14 of the 30 ESMR patients, surgery was performed on the right inferior turbinate and 16 on the left inferior turbinate.

In the current study, 25 patients were relieved of nasal obstruction & 21 patients had a decrease in sneezing after the SMD, which was recorded during the follow-up time. In a study conducted by Fradis *et al.* [15], it was found that 39 patients had relief from nasal obstruction and sneezing after SMD. In a study by Lukka *et al.* [16], all 24 patients who received endoscopic SMD saw a statistically significant improvement in nasal symptoms (nasal obstruction & sneezing) in the immediate and late post-operative follow-up periods.

In this study, 19 patients experienced mild pain following the SMD and 9 patients with moderate. A study conducted by Smitha *et al.* [17] observed that the majority of patients, 20, experienced no pain, while 4 patients had mild pain. In a study by Lavinsky-Wolff *et al*. [18], pain was significantly lower after three months during the post-operative evaluation.

The present study was a short-term follow-up observational study. The study's disadvantages were the shorter duration and a smaller sample size from a single tertiary care centre. Therefore, the result of the study cannot generalized. Long-term follow-up ranging from 12 to 24 months may reveal more consistent improvement in subjective ratings. Other contemporary and technical ways to SMD should be considered. However, no gold standard strategy or consensus on the best technique exists. We chose the SMD approach because of its popularity, speed, and cost-effectiveness.

CONCLUSIONS

Submucosal diathermy is an effective and safe technique to relieve refractory nasal obstruction secondary to inferior turbinate hypertrophy in allergic rhinitis patients. Endoscopic submucous diathermy has proved to be a successful surgical option for inferior turbinate hypertrophy caused by allergic rhinitis that has not responded well to pharmacological treatment. We have found that SMD demonstrated good results post-operatively. Patients have alleviated the symptoms of sneezing and nasal obstruction, which also does not require expensive instruments or effective procedures for improving nasal breathing. Submucous diathermy provides the most minor advantages, yet it remains the most often used procedure because of its simplicity, conventionality, and low-cost component.

CONTRIBUTION OF AUTHORS

Research concept- Shreya Vaghasia, Tosha Shah
Research design- Shreya Vaghasia, Lopamudra Ghosh
Supervision- Nirali Chauhan
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Critical review- Nirali Chauhan
Article editing- Tosha Shah, Lopamudra Ghosh
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