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TREATMENT OUTCOMES WITH PARTIAL TURBINECTOMY VERSUS MUCOSAL DIATHERMY FOR INFERIOR TURBINATE HYPERTROPHY

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Abstract

Background:
The hypertrophy of the inferior turbinate is one of the frequent causes of chronic nasal obstruction which causes high morbidity and low quality of life. Although the medical treatment is the primary approach to treatment, a large number of patients need surgical intervention because of the persistent symptoms. Surgical techniques that are most frequently used include partial inferior turbinectomy, mucosal diathermy and other surgical procedures, however, the effectiveness of the two is a controversial issue.

Methodology:
The time frame of this randomized controlled trial was 20th December, 2024 up to 20th April, 2025 at the Department of ENT at Khyber Teaching Hospital, Peshawar. One hundred and eighty six patients of the age group 18 to 60 years were recruited and randomized into two groups with the help of blocked randomization. Group A consisted of mucosal diathermy and Group B consisted of partial inferior turbinectomy. Nares obstruction in baseline and 1-month postoperative was measured with the use of visual analog scale (VAS). The criterion of effectiveness was considered VAS less than 4 during the postoperative stage. The IBM SPSS version 25 was used in data analysis, and the $p \leq 0.05$ was deemed to be significant.

Results:
Both groups showed significant improvement in nasal obstruction; however, the reduction in VAS score was greater in the partial inferior turbinectomy group. The mean postoperative VAS was 3.96 ± 1.12 in the mucosal diathermy group and 2.84 ± 0.98 in the turbinectomy group ($p < 0.001$). Effectiveness was achieved in 77.4% of patients in the mucosal diathermy group compared to 92.5% in the turbinectomy group ($p = 0.006$).

Conclusion:
Compared to the mucosal diathermy, partial inferior turbinectomy is more efficient in the reduction of nasal obstructiveness in patients with inferior turbinate hypertrophy, with the two methods showing significant improvements in

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symptomatic response.

INTRODUCTION

The hypertrophy of the inferior turbinate is one of the frequent causes of chronic nasal blockage and one of the main reasons of poor nasal airflow and poor life quality. The structural abnormalities that could cause nasal obstruction include septal deviation or mucosal, and turbinate hypertrophy is one of the most common etiologies. It is also widely linked with allergic rhinitis, vasomotor rhinitis and chronic infectious diseases which result in a sustained inflammation and swelling of the inferior turbinates [1].

Nares obstruction, oral respiration, postnasal drip, headache, and sleep disturbance are the common symptoms of patients with inferior turbinate hypertrophy. The symptoms may significantly affect the everyday life and well-being. First line management typically includes medical treatment, such as antihistamines, topical nasal decongestants, and intranasal corticosteroids, all of which are meant to decrease the mucosal inflammation and enhance nasal patency [2].

Despite the medical treatment as the initial approach to management, a considerable percentage of patients either respond poorly or relapse with the symptoms following the withdrawal of treatment. Surgical intervention may have to be used in such situations to produce a lasting relief of nasal obstruction. The surgical intervention aims at shrinking the size of the hypertrophied turbinate without affecting its physiological functions, in particular the humidification and filtration of inspired air [3].

Different operative procedures have been evolved in the treatment of inferior turbinate hypertrophy. These are partial inferior turbinectomy, submucokinal diathermy (SMD), laser cauterization, cryotherapy, microdebrider-assisted turbinoplasty and radiofrequency ablation. The methods vary in terms of dissimilarity in the mode of action, level of tissue excision, postoperative, and complications involved. Nevertheless, none of the techniques have been universally recognized as the gold standard [4].

Partial inferior turbinectomy is the surgical removal of the part of the turbinate entailing mucosa, submucosal tissue and bone, thus offering instant and enough enlargement of the nasal airway. Although it is a good method of clearing obstruction, it might be correlated with further complications like bleeding, crusting, and, in some instances, excessive cleansing, which results in modified nasal physiology [5].

On the contrary, submucosal diathermy is a comparatively less invasive procedure which entails cauterizing submucosal tissue with the aid of electrical current that leads to fibrosis, which in turn reduces the size of the turbinate. It is regarded as a safe, easy and cheap method that may be conducted in local or general anesthesia. Nevertheless, the extent and the time span of the symptomatic relief provided by SMD may not be as effective as more invasive procedures, and its efficiency is a debatable topic [6].

Prior research studies have tried to compare the results of the two methods with some indicating better symptomatic management with partial inferior turbinectomy and others indicating the safety and ease of submucosal diathermy. As an example, a study found complete relief of nasal obstruction of a greater proportion of patients that received partial turbinectomy than those receiving mucosal diathermy suggesting possible differences in efficacy between the two techniques [7].

Although several surgical choices are available, there exists still scarcity of high quality comparative data to assess the effectiveness of partial inferior turbinectomy and mucosal diathermy. That is why further research is necessary to identify the most appropriate surgery that would bring the most benefits with minimum complications. This paper will compare the outcomes of the treatment of partial inferior turbinectomy and mucosal diathermy in patients with inferior turbinate hypertrophy, thus adding to the evidence-based clinical decision-making and better patient care [8].

OBJECTIVE

To compare the effectiveness of partial inferior turbinectomy and mucosal diathermy in the management of inferior turbinate hypertrophy.

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METHODOLOGY

This randomized controlled trial was carried out in the Department of ENT of Khyber Teaching Hospital, Peshawar, between the two dates 20th of December 2024 and 20th of April 2025 after obtaining the consent of the institutional research review committee and CPSP.

OpenEpi software was used to calculate the sample size due to the expected efficacy of mucosal diathermy (77.9% and partial inferior turbinectomy (92.5%)) with power of 80% and confidence level of 95%. The sample size of 186 patients which included 93 patients in each group was decided. Patient recruitment was done using a non-probability consecutive sampling method.

The study included patients aged 18 to 60 years of both sexes who scored clinically as inferior turbinate hypertrophy (VAS score more than 4 and rhinoscopic confirmation and Friedman grading). Patients who were actively infected at the place of surgery, had undergone a previous surgical intervention on the same area, history of fungal infection of the nasal cavity or sinuses or immunocompromised states were excluded.

Following an informed consent, baseline clinico-demographic information such as age, sex, weight, height, body mass index (BMI), laterality of the turbinate involvement, Friedman grade, residence, schooling, occupation, and socioeconomic position were noted on a pre-designed proforma. Visual analog scale (VAS) was used to measure the severity of nasal obstruction in the baseline one day before the surgery.

Blocked randomization was used to assign patients randomly into two equal groups (Group A and Group B). Mucosal diathermy was applied to Group A patients and partial inferior turbinectomy was done to Group B patients. The two groups were age-matched in order to control confounding. History and clinical examination of all patients were done before surgery.

The surgical team of the same surgical team was used throughout all the surgical procedures under general anesthesia to ensure consistency. All patients were provided with standard post operative care such as antibiotics, analgesics and supportive measures. Patients were discharged when they were clinically stable, and followed up at a period of one week and one month after. After one month, the nasal obstruction assessment was finalized with the help of VAS score. Success of the procedure was considered a VAS of below 4 one month after the operation.

The researcher recorded all the data on specific proforma. IBM SPSS version 25 was used to do data entry and statistical analysis. The statistical values of quantitative variables (age, BMI, baseline VAS, and post-treatment VAS) were given as mean ± standard deviation or median (interquartile range) upon evaluating the normality with the help of the Shapiro-Wilk test. Qualitative variables, such as gender, residence, education, profession, socioeconomic status, laterality of turbinate, Friedman grade, and effectiveness were presented as frequencies and percentages.

The effect or outcome, which is the main one, was compared using the Chi-square test or the Fisher exact test where necessary to the two groups. Stratification controlled effect modifiers in the form of age, gender, BMI, laterality and Friedman grade. Chi-square or Fisher exact test was used to perform a post-stratification analysis. A p-value of 0.05 and below was assumed to be statistically significant.

RESULTS

A total of 186 patients were included in the study and were equally divided into two groups, with 93 patients in Group A (mucosal diathermy) and 93 patients in Group B (partial inferior turbinectomy). All patients completed the study and were included in the final analysis.

The baseline demographic and clinical characteristics of the patients are presented in Table 1. The mean age in Group A was comparable to Group B, with no statistically significant difference ($p > 0.05$). Similarly, both groups were comparable in terms of gender distribution, BMI, residence, education, profession, socioeconomic status, laterality of turbinate hypertrophy, and Friedman grading ($p > 0.05$). This indicates that both groups were well matched at baseline.

The comparison of preoperative and postoperative VAS scores is shown in Table 2. The mean baseline VAS score was similar in both groups ($p > 0.05$), indicating comparable severity of nasal obstruction prior to intervention. At one-month follow-up, both groups demonstrated significant improvement in

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nasal obstruction; however, the reduction in VAS score was more pronounced in the partial inferior turbinectomy group. The mean postoperative VAS score in Group B was significantly lower compared to Group A ($p < 0.001$), indicating better symptomatic relief with partial inferior turbinectomy.

The overall effectiveness of both procedures is presented in Table 3. Effectiveness, defined as postoperative VAS score <4, was achieved in a significantly higher proportion of patients in the partial inferior turbinectomy group compared to the mucosal diathermy group. In Group B, 86 (92.5%) patients achieved effective outcomes, whereas in Group A, 72 (77.4%) patients showed effectiveness. This difference was statistically significant ($p = 0.006$), demonstrating that partial inferior turbinectomy is more effective in relieving nasal obstruction than mucosal diathermy.

Table 1: Baseline Demographic and Clinical Characteristics of Patients (n = 186)

Variable	Group A (Mucosal Diathermy) n=93	Group B (Partial Turbinectomy) n=93	p-value
Age (years)	34.72 ± 10.25	35.18 ± 9.88	0.74
BMI (kg/m²)	24.16 ± 3.42	24.48 ± 3.36	0.52
Gender			0.81
Male	52 (55.9%)	50 (53.8%)	
Female	41 (44.1%)	43 (46.2%)	
Residence			0.68
Rural	56 (60.2%)	59 (63.4%)	
Urban	37 (39.8%)	34 (36.6%)	
Education			0.59
Educated	40 (43.0%)	44 (47.3%)	
Uneducated	53 (57.0%)	49 (52.7%)	
Socioeconomic Status			0.63
Low	51 (54.8%)	48 (51.6%)	
Middle/High	42 (45.2%)	45 (48.4%)	
Laterality			0.77
Right	44 (47.3%)	46 (49.5%)	
Left	49 (52.7%)	47 (50.5%)	
Friedman Grade			0.69
Grade I	18 (19.4%)	16 (17.2%)	
Grade II	42 (45.2%)	44 (47.3%)	
Grade III	33 (35.5%)	33 (35.5%)	

Table 2: Comparison of VAS Scores Before and After Intervention

Variable	Group A (Mucosal Diathermy) n=93	Group B (Partial Turbinectomy) n=93	p-value
Baseline VAS	7.12 ± 1.01	7.18 ± 1.08	0.68
Postoperative VAS (1 month)	3.96 ± 1.12	2.84 ± 0.98	<0.001

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Table 3: Comparison of Effectiveness Between Groups

Outcome	Group A (Mucosal Diathermy) n=93	Group B (Partial Turbinectomy) n=93	p-value
Effective (VAS <4)	72 (77.4%)	86 (92.5%)	0.006
Not Effective (VAS ≥4)	21 (22.6%)	7 (7.5%)	

DISCUSSION

The current research was carried out to compare the efficacy of the partial inferior turbinatectomy and mucosal diathermy in the treatment of inferior turbinate hypertrophy. The results indicated that despite significant overall meaning of nasal obstruction improvement using the two techniques, partial inferior turbinectomy was linked with better results in regards to symptom relief and overall efficacy. The findings are added to the existing controversy of the best way to perform a surgery on the turbinate reduction [9].

In this study, the two groups were similar in the baseline demographic and clinical factors, including age, gender, and BMI, as well as the severity of turbinate hypertrophy. This comparability enhances the internal validity of the study and makes the differences in the postoperative outcomes to be solely due to the surgical interventions and not because of the confounding factors. Close baseline matching has been underlined in the past comparative tests that have been conducted to assess the technique of turbinate reduction methodology [10].

Mucosal diathermy and partial inferior turbinectomy did not significantly differ in terms of nasal obstruction since VAS scores improved significantly at 1 month of post-operative period. This brings out the fact that both processes form good treatment regimes in inferior turbinate hypertrophy. Substantial symptomatic amelioration in the aftermath of both the methods has been reported in previous researches that confirm the existence of the techniques in the operational control of nasal blockage non-sensitive to medical treatment [11].

But, partial inferior turbinectomy group showed a much better improvement in terms of postoperative VAS scores, being lower than mucosal diathermy.

The outcome of this study is that surgical excision offers more definite and long term relief of nasal obstruction presumably because of direct excision of hypertrophied tissue, which includes mucosa, submucosa and bone. Other previous studies have produced similar results with turbinectomy recording better results in restoring patient satisfaction and nasal airflow [12,13].

The fact that the superior effectiveness rate was found in the partial inferior turbinectomy group of the current study is in line with the literature. Comparative studies of these two procedures have stated that turbinectomy produces a higher percentage of total symptom relief, as compared to submucosal diathermy. This could be explained by the fact that the turbinate bulk reduction is more aggressive thus leading to an increased and stable nasal airway [14].

Conversely, mucosal diathermy is not as invasive, and technically more straightforward, but uses submucosal fibrosis as its basis of action in producing turbinate reduction. This treatment is not as predictable and can lead to a partial or interim relief in certain patients. Also, because preservation of turbinate tissue is necessary and advantageous in physiological functioning, it can also be one of the reasons of the relatively lower effectiveness of this technique [15].

Although partial inferior turbinectomy is more efficient, it should be noted that it also has certain disadvantages. The process is more thorough with regard to the removal of tissue and can be linked to more risks of intraoperative bleeding, crusting and postoperative discomfort. Conversely, mucosal diathermy has fewer associated complications, less time to perform, and may even be conducted under local anesthesia and thus is an option in a limited number of patients [16].

The results of this study are consistent with a number of comparative studies which argue in favor of partial inferior turbinectomy regarding the relief of symptoms, as well as reflecting on the safety and ease of mucosal diathermy. Nevertheless, other

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investigations have found similar results of the two methods indicating that the selection of the procedure can also be influenced by the expert of the surgeon, patient choice, and availability [17].

Analysis of stratifications in the current study revealed that the benefits of partial inferior turbinectomy were similar in various subgroups comprising of, but not limited to, age, gender, BMI, laterality and Friedman grade. This implies that the obtained benefit is generalizable rather than confined to specific categories of patients, which improves the overall generalizability of the findings [18].

Comprehensively, the findings of the current research verify the application of partial inferior turbinectomy as a better surgical procedure to inferior turbinate hypertrophy, especially in individuals with severe nasal obstruction. Nonetheless, mucosal diathermy is also a useful alternative and is indicated particularly in instances where one wishes to have a less invasive procedure or where resources are limited. Long-term studies that involve long-term follow-up are required to assess long-term outcomes sustainability and complication profiles [19,20].

Limitations:

There are some limitations of this study. It was carried out in one center and hence the generalizability of the findings might be limited. The follow-up duration was also not very long and the measure of the outcomes was after only one month and the long term outcomes including recurrence rates and long term symptom relief were not measured. Also, objective assessment of airflow through the nose was not taken like rhinomanometry, and subjective evaluation through VAS scoring can be biased. It is suggested that future multicenter trials involving longer follow-up and objective measurement instruments be used in such an evaluation.

CONCLUSION

Compared to mucosal diathermy, partial inferior turbinectomy proved to be more efficient in patients with inferior turbinate hypertrophy as it provides more significant decrease of the VAS scores and more significant rates of effectiveness. Although both of the techniques offer a considerable amount of symptomatic relief, partial inferior turbinectomy is more conclusive, so it is a better choice in those patients with a moderate to severe disease. Nonetheless, mucosal diathermy is still safe and a less invasive option especially in specific situations and in situations with limited resources.

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