Original Article

Comparative Study Between Submucosal Diathermy And Partial Turbinectomy In Hypertrophied Inferior Turbinate Causing Nasal Obstruction

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Abstract

Objective: The study aims to compare the efficacy of two different surgical techniques to reduce the inferior turbinate.

Methods: A comparative prospective study was conducted in the Otorhinolaryngology and Head and Neck Surgery department of Aziz Fatimah Hospital, Faisalabad, from 13 June 2024 to 13 December 2024, using the non-probability consecutive sampling technique. A total of 74 patients were enrolled in the study, which was divided into two groups, with Group A patients undergoing submucosal diathermy and Group B with partial turbinectomy. Patients from both groups are compared in terms of nasal outflow after 48 hours and one month. The results were then compared for both techniques.

Results: The majority of participants in both groups were female, with 24 (65%) in group A and 21 (52%) in group B. Preoperative assessment was done on both nasal sides, with the majority of participants showing no fogging on the nasal spatula test. The nasal spatula test was done 48 hours and 1 month after the surgery, with participants undergoing submucosal diathermy showing significant improvement with a chi-square value of 0.049 and a p-value < 0.05. Postoperative complications such as crusting were reported the most.

Conclusion: Submucosal diathermy has been reported to be a superior procedure to partial turbinectomy in terms of relieving the symptoms and postoperative complications.

Keywords: submucosal diathermy, partial turbinectomy, hypertrophied turbinate, nasal obstruction.

Contributions:
MR, TM - Conception, Design
MR, KT, AA, MA, SR - Acquisition, Analysis, Interpretation
TM - Drafting
MR, KT, AA, MA, SR - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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Introduction

Turbinate hypertrophy is a widespread otorhinolaryngological problem that affects most of the population at some point. This hypertrophy results from a prolonged history of nasal allergies and nasal difficulties. Initially, the enlargement of the inferior turbinate is temporary, which resolves naturally as the symptoms are relieved.[1] Prolonged and unnoticed symptoms with high morbidity result in permanent hypertrophy of the turbinate. The diagnosis of turbinate hypertrophy is retrospectively based on the treatment given to the patient in the past. Although chronic nasal obstruction is not life-threatening, it significantly impairs patients' quality of life, affecting many aspects of their daily social and working activities.[2]
Hypertrophy of the inferior turbinate can be treated by surgical reduction, which appears to be the most effective approach. Turbinate reduction was found to not only improve nasal patency but also be associated with reduced attacks of headache. The goal of turbinate reduction surgery is to improve nasal breathing and reduce nasal drainage and post-nasal drip, thereby improving the patient's quality of life by decreasing headaches, snoring, and sleep apnea.[3] Diverse surgical procedures have been used to treat inferior turbinate hypertrophy. Various surgical methods have been tried for the inferior turbinate. Of these, the well-known techniques are submucosal diathermy and partial turbinectomy in hypertrophied inferior turbinate.[4] The turbinate mucosa, however, was preserved in both of these surgical procedures. Various other techniques have been used in the past for the treatment of hypertrophic turbinate, such as turbinoplasty, out-fracture, and bipolar cautery. The different procedures are traumatic and can be complicated by various postoperative complications, such as crusting, bleeding, infection, and increased chances of adhesions. Literature evidence suggests a success rate of 88-96% for partial turbinectomy and 76-78% for submucosal diathermy.[5] The success rate measures the non-standardised outcomes more than the patient-reported response related to the disease.
Most of the comparative data available on inferior turbinate surgery compares partial inferior and submucosal diathermy. Comparisons have been done on non-standardised outcomes, rather than the validated patient-reported responses. Our study aims to compare two surgical techniques: submucosal diathermy (SMD) and partial turbinectomy for reducing inferior turbinate hypertrophy.

Materials And Methods

After obtaining ethical approval from the institutional ethics committee board, a comparative prospective study was conducted using the non-probability consecutive sampling technique in the department of otorhinolaryngology of Aziz Fatimah Hospital, Faisalabad, Pakistan, from 13 June 2024 5to 13 December 2024. A total of 74 patients were enrolled in the study. Sample size was calculated using the World Health Organisation (WHO) sample size calculator with a confidence level of 5%, power of 80%, anticipated proportion in submucosal diathermy (SMD) of 38%, and partial inferior turbinectomy (PIT) of 70%. All patients aged between 18 and 55 years diagnosed clinically as having hypertrophied inferior turbinate grades 2 and 3 were included in the study. However, patients with comorbidities, such as uncontrolled diabetes

mellitus, hypertension, and bleeding disorders, and those with a past surgical history of nasal surgeries and nasal polyps were excluded from the study. Patients provided written informed consent, and all possible consequences of the study were explained. Patients were randomised into two groups: Group A patients undergoing submucosal diathermy (SMD) and Group B undergoing Partial turbinectomy (PIT) using the computer system. Preoperative assessment of nasal airflow was performed based on the nasal spatula test and nasal airflow grading as follows: Complete fogging: No obstruction, Partial fogging: partial obstruction, No fogging: Complete obstruction to flow. For SMD, after decongestion, the diathermy needle is inserted in the anterior end of the inferior turbinate, advanced to the submucosa till the posterior end of the inferior turbinate is reached. The needle is then slightly withdrawn, and a current of 50 joules will be applied in a triangular fashion at 3 points (superior, medial, and inferior). In PIT, the inferior turbinate was infiltrated with 2% xylocaine + adrenaline up to the posterior end. Using turbinectomy scissors, the enlarged anterior head and anterior third of the inferior turbinate are excised. The line of resection is first crushed to limit bleeding. Patients will be followed up for one month. The data recorded was entered and analysed in SPSS 25 on the Windows 11 platform. Statistical analysis comprises the Chi-Square test, with a P-value <0.05 considered statistically significant.

Results

A total of 74 patients were enrolled in the study, which was divided into two groups. Group A patients underwent Submucosal diathermy, and Group B underwent Partial Inferior Turbinectomy. The mean age of the participants enrolled in the study for groups A and B was 28 and 29, respectively. Figure 1 indicates the distribution of participants based on gender among both groups. Postoperative complications such as haemorrhage and crusting were also recorded among the individuals. 13 participants out of 37 from group A, undergoing submucosal diathermy, were noted to have crusting post-surgery. In comparison, only 8 participants were identified with the same complication in group B. (Figure 2)

Table 1 indicates the preoperative assessment of the patients of both sides from each group—the majority of participants presented with no fogging in both groups, indicating complete obstruction.

Table 1: Pre-operative assessment of both groups

		Group A (SMD)	Group B (PID)	Total
Pre-operative assessment of the right side	No fogging	27 (73%)	31 (83.8%)	58
	Partial fogging	7 (19%)	5 (13.5%)	12
	Complete fogging	3 (8%)	1 (2.7%)	4
Total		37	37	74
Chi-Square test P value = 0.44				
Pre-operative assessment of the left side	No fogging	26 (70.3%)	29 (78.4%)	55
	Partial fogging	4 (10.8%)	2 (5.4%)	6
	Complete fogging	7 (18.9%)	6 (16.2%)	13
Total		37	37	74
Chi-Square test P value = 0.635				

Table 2: Postoperative assessment of both sides after 48 hours of surgery

		Group A (Smd)	Group B (Pid)	Total
Postoperative Assessment Of The Right Side	No Fogging	6 (16.2%)	8 (21.6%)	14
	Partial Fogging	13 (35.1%)	9 (24.3%)	22
	Complete Fogging	18 (48.7%)	20 (54.1%)	38
Total		37	37	74
Chi-Square Test P-Value: 0.572				
Postoperative Assessment Of The Left Side	No Fogging	4 (10.8%)	7 (18.9%)	11
	Partial Fogging	15 (40.54%)	16 (43.24%)	31
	Complete Fogging	18 (48.65%)	14 (37.84%)	32
Total		37	37	74
Chi-Square Test P Value: 0.509				
Postoperative Assessment After 1 Month Of Surgery				
Postoperative Assessment Of The Right Side	No Fogging	3 (8.11%)	6 (15%)	9
	Partial Fogging	1 (2.7%)	7 (17.50%)	8
	Complete Fogging	33 (88.19%)	27 (67.5%)	60
Total		37	37	74
Chi-Square Test P-Value: 0.049				
Postoperative Assessment Of The Left Side	No Fogging	2 (5.41%)	4 (10.8%)	6
	Partial Fogging	1 (2.70%)	5 (13.5%)	6
	Complete Fogging	34 (91.89%)	28 (75.6%)	62
Total		37	37	74
Chi-Square Test P-Value: 0.156				

**Since the P value is greater than 0.05 for both assessments, the results are statistically non-significant.*

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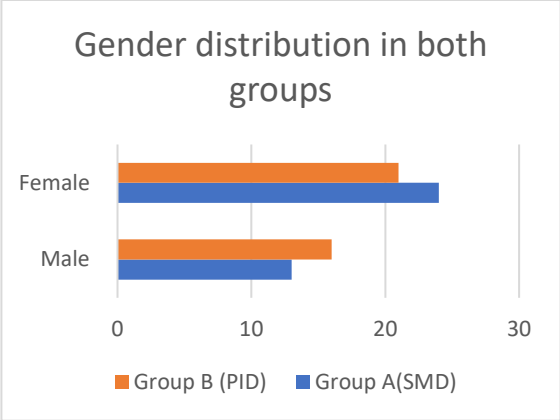

Figure 1: Gender distribution among both groups

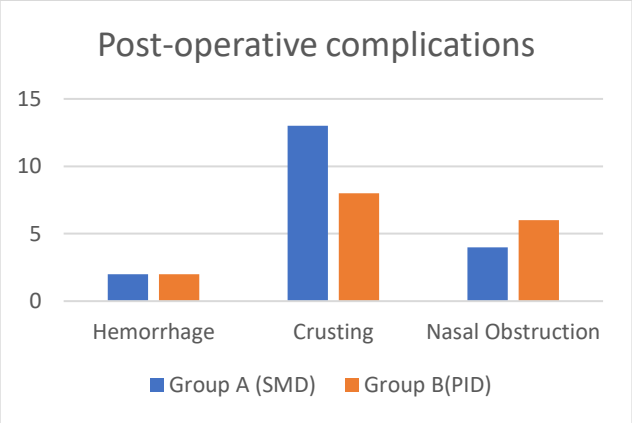

Figure 2: Postoperative complications for both surgical techniques

Discussion

Inferior turbinate hypertrophy is considered one of the most prevalent factors causing nasal obstruction. Unattended symptoms result in complete obstruction, which is relieved after surgical reduction. In our study, two surgical techniques—surgical partial inferior turbinectomy and submucosal diathermy to assist reduction—were used and compared. In our study, most participants were female. Similarly, a prospective randomised controlled trial was conducted involving 40 participants, consisting of 34 (85%) females.

Table 3: Overall improvement crosstabulation

Groups	Improvement		Total
	Yes	No	
Group A (SMD)	35 (94.5)	2 (5.5%)	37
Group B (PID)	29 (78.3)	8 (21.6%)	37
Total	64	10	74

According to the literature, multiple theories have been proposed to explain female predominance, including increased exposure to dust, mites, and hormonal involvement. No statistically significant difference was observed between the two groups regarding age (Group A mean age 26 years, Group B mean age 28 years) (P value > 0.05). Similarly, two of these studies were conducted by Jaber et al. Al,[6] and Gooma et al. Al,[7] also reported female predominance.

In our study, the nasal spatula test was performed to assess nasal airflow 48 hours and 1 month after surgery. After 1 month of surgery, participants who underwent submucosal diathermy showed significant improvement, with a P value of <0.05. Similarly, the results of our study were in line with those of Elshipli et al,[8] who also stated a better outcome of results with patients undergoing SMD. Contrary to that, the study by Ali AR et. al,[9] revealed better outcomes with patients undergoing partial inferior turbinectomy with a significant P value < 0.001. Both techniques were considered equally effective in relieving symptoms, as Aref et al.[10] Contrary to our findings, Ahmad R. Ali et. al,[11] reported that inferior turbinate hypertrophy resection is a procedure with fewer complications and more patient satisfaction.

Postoperative complications such as haemorrhage and crusting were recorded. In our study, most participants had crusting, with 13 out of 37 participants reporting crusting in group A undergoing submucosal diathermy and 8 participants in group B undergoing partial inferior turbinectomy. Similarly, in Madeed et al.,[12] all reported crusting and dryness in the majority of participants as major postoperative complications. Another study was conducted by Al Jabr et al. Al,[6] stated that crusting is a major postoperative complication of SMD. On the other hand, the study expresses key advantages of SMD as a less invasive procedure that requires less operative time than partial inferior turbinectomy.

Conclusions

Based on the results of our study, submucosal diathermy is an effective procedure in relieving the symptoms of nasal obstruction caused by inferior turbinate hypertrophy. However, the majority of participants had crusting postoperatively, which can be controlled by hydrating the nasal mucosa. Our study recommends that submucosal diathermy is a better procedure than the partial inferior turbinectomy. However, a larger sample size and longer follow-up will provide additional treatment options for inferior turbinate hypertrophy. Single-centre study and limited population enrolled in the study are key limitations of this study. Multicenter studies with large populations can yield different results, which could influence the other confounding factors, such as follow-up and findings in the population of other regions as well. Both the surgical procedures yield better results, but the need of the hour is to minimise the postoperative complications related to the procedure. We call for a large multicenter analysis with long follow-up, and also assessing the quality of life of the patient post-procedure would help in understanding the efficacy of both surgical procedures.

Author Information

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