COMPARISON OF OUTCOMES OF PARTIAL TURBINECTOMY VERSUS MUCOSAL DIATHERMY IN PATIENTS WITH INFERIOR TURBINATE HYPERTROPHY

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ABSTRACT

OBJECTIVES

To compare the outcomes of partial turbinectomy versus mucosal diathermy in patients with inferior turbinate hypertrophy.

METHODOLOGY

The ENT Department at Sheik Zayed Hospital, Lahore, conducted this single-center, non-randomized, controlled study. Sixty adults aged 18-60 years with clinically and radiologically confirmed inferior turbinate hypertrophy were selected and sequentially assigned to two equal groups upon screening and informed consent. Group A had partial inferior turbinectomy (PIT), whereas Group B had submucosal diathermy (SMD). Comparison of the groups with the baselines was conducted. Variability in operators was minimized using a standardized operative protocol. The pain after the operation was measured using a 10-point Visual Analog Scale (VAS), nasal obstruction was measured on a 0-3 scale, nasal crusting was graded using the Lund and Kennedy system, and endoscopic assessment assessed tissue healing. The three-month follow-up was made.

RESULTS

There was similarity between groups in baseline demographic and clinical variables. Mean postoperative pain was significantly lower in the SMD group than in the PIT group on day 1 (mean difference 2.67; 95% CI 2.14-3.20; Cohen's d=2.61; p=0.0001) and at one month (mean difference 1.83; 95% CI 1.43-2.23; Cohen's d=2.36; p=0.0001). Nasal obstruction, crusting, and bleeding outcomes in the nasal passages were numerically predisposed to SMD, although a majority of between-group comparisons were non-significant. The SMD group exhibited a statistically significantly higher (0.003) good tissue healing at three months (76.67%) compared with the PIT group (33.33%).

CONCLUSION

SMD, in this non-randomized study, was associated with less postoperative pain and faster tissue healing at 3 months compared to PIT. Other clinical outcomes showed positive trends in SMD but should be used with caution due to small sample sizes, non-random subject allocation, and limited follow-up..

KEYWORDS: *Submucosal Diathermy, Partial Turbinectomy, Nasal Obstruction*

INTRODUCTION

The hypertrophy of the inferior turbinate is a major cause of nasal airflow obstruction, leading to persistent nasal congestion and reduced quality of life. It usually results from chronic inflammatory disorders, such as allergic rhinitis and vasomotor rhinitis, or secondary compensatory hypertrophy due to septal deviation, and is regularly seen in otolaryngology clinical practice.[1] Mucosal thickening and submucosal fibrosis are common symptoms of chronic inflammatory alterations, which eventually result in persistent nasal blockage that is resistant to medical intervention. Examples of conservative treatment options include intranasal corticosteroids, antihistamines, decongestants, and immunotherapy; however, their effectiveness often diminishes with long-term use. Surgery aims to reduce the bulk of the inferior turbinates, enhance nasal patency, and preserve physiological nasal function.[2] To achieve significant patient outcomes, surgical treatment options have been devised to address the symptoms of turbinate hypertrophy. Examples of traditional methods of surgery include partial inferior turbinectomy (PIT), submucosal diathermy (SMD), electrocautery, laser cautery, cryosurgery, and radiofrequency ablation. Turbinectomy offers instant relief by removing hypertrophic tissue, but its mainstream acceptability is restricted by the hazards involved, including bleeding, crust development, synechiae, and postoperative pain.[4,5] As a result, minimally invasive methods like submucosal diathermy have drawn interest since they can successfully lower turbinate volume while causing the least amount of tissue damage. High-frequency electrical currents are used in submucosal diathermy to produce controlled submucosal thermal injury and consequent fibrosis, resulting in a long-term decrease in turbinate size. Notwithstanding its widespread use, submucosal diathermy has been linked to postoperative side effects, including crusting, nasal dryness, adhesion formation, and sporadic hypertrophy recurrence. As a result, physicians are looking into alternative surgical methods that may yield better results.[6,7,8] There is still a conspicuous lack of clear evidence to guide clinicians over the best surgical method between submucosal diathermy and partial inferior turbinectomy, despite the abundance of research. The conflicting findings of previous studies on both the immediate safety and long-term effectiveness of the treatment make it critically important to conduct more comparative studies. The current study aims to bridge this gap by systematically assessing clinical outcomes, complication rates, and the sustainability of symptom relief following these two common surgical procedures. This research should lead to better patient outcomes in the treatment of inferior turbinate hypertrophy, provide valuable clinical guidance, and support evidence-based therapeutic decision-making.

METHODOLOGY

This is a single-center, non-randomized controlled study conducted in the ENT Department at Sheik Zayed Hospital, Lahore, between September 2025 and December 2025, with the consent of the institutional ethical review committee. The research was structured as a pragmatic comparison since the practice of both interventions was common in the department. Randomization and allocation concealment were not performed. Eligible patients were sequentially assigned to two equal treatment groups after eligibility screening and written informed consent, based on the intended surgical procedure in routine departmental practice; this pragmatic allocation approach was used because both procedures were already routinely performed in the unit. It has been recognized that this allocation method could introduce selection bias and, therefore, limit internal validity. Given a confidence level of 95 and a power of 80, assuming that the percentage of excellent healing would be 60 percent with PIT and 84 percent with SMD, with 30 patients in each group, patients aged 18-60 years old with inferior turbinate hypertrophy (enlargement of the inferior turbinate to produce a clinically significant nasal obstruction) were the participants. Clinical evaluation and diagnostic nasal endoscopy, performed by a consultant ENT specialist, were used to make the diagnosis. When the inferior turbinate occupied 50 percent or more of the nasal cavity, hypertrophy was deemed clinically significant, which is grade 2 (moderate hypertrophy, 50-75 percent of the nasal cavity) or grade 3 (severe hypertrophy, > 75 percent of the nasal cavity or touching the nasal septum). Radiological confirmation Computed tomography (CT) of the coronal, axial, and sagittal sections of the scan, with a slice thickness of 2 mm and a maximum diameter of the turbinate, was used to obtain radiological confirmation. Other inclusion criteria included persistent nasal obstruction for over six months and an ineffective response to at least three months of conservative medical treatment, including intranasal corticosteroids and antihistamines. Patients who had nasal obstruction that had been treated with nasal polyps, septal deviation, sinuitis or any other major sinonasal disease; uncontrolled allergic rhinitis or ongoing immunotherapy; previous nasal or turbinate surgery; defective state of the nasal mucosa, including Wegener granulomatosis, sarcoidosis, or cystic fibrosis; bleeding disorders or anticoagulant therapy; inability to comply with the study protocol; and cognitive impairment to hinder understanding and compliance were excluded. All participants had written informed consent. Age at baseline, sex, symptom duration, preoperative grade of hypertrophy of the turbinate, and preoperative grade of nasal obstruction were measured prior to surgery to compare the groups. They were all carried out in accordance with a prescribed departmental protocol, under the direct supervision of the same senior ENT consultant, to minimize operator variability. All surgeries were performed by means of oral intubation and general anesthesia. Premedication - Cotton pledgets moistened with noradrenaline (1:200000) were placed in each nasal canal for about 5 minutes to reduce bleeding and enhance visibility. Group A: Partial Inferior Turbinectomy (PIT): The inferior turbinate was seen with an endoscope or nasal speculum following just sufficient decongestion and anesthesia. The scissors were turbinectomy scissors used to excise the medial one-third of the superior hypertrophied inferior turbinate, including the mucosal and bony portions. Only the anterior two-thirds of the turbinate was resected to avoid leaving the posterior turbinate and to minimize the possible loss of too much tissue. Bleeding points were managed with caution of bipolar or nasal packing, when necessary. Group B: Submucosal Diathermy (SMD): The inferior turbinate was exposed, then an insulated diathermy needle was inserted into the submucosal space at the anterior of the turbinate and moved parallel to the bone. A low volume of coagulation current was used, with a 70-watt low-voltage current applied as the needle was gradually drawn out. The superior, middle, and inferior portions of the turbinate were covered by two to three passes until there was blanching and visible shrinkage of the mucosa. The mucosal surface was maintained as much as possible, and submucosal thermal injury was restricted to induce fibrosis and reduce the volume. Before the procedure was completed, Hemostasis was achieved. In both groups, the bilateral nostrils were packed with ribbon gauze immersed in antibiotics overnight. Patients were given systemic decongestants, antibiotics, and analgesics as per the departmental postoperative protocol, and packing was done after 48 hours. Patients were advised not to blow their noses or manipulate them. To enhance comfort and promote mucosal healing, nasal saline irrigation was recommended 1 month after the pack was removed. Postoperative treatment involved the use of systemic decongestants, antibiotics, and painkillers. Patients were advised not to rub their noses or blow them. Nasal saline irrigation was advised to be performed over one month after nasal packs were removed at 48 hours to facilitate healing and comfort. Each problem was addressed in accordance with the accepted guidelines. Predefined criteria and predetermined intervals were used to evaluate outcomes. On the first day of the postoperative period and at one-month follow-up, a 10-point Visual Analog Scale (VAS), a commo n patient-reported pain scale, was used to measure postoperative nasal pain. The patients were graded on a structured ordinal scale (0-3) to assess nasal obstruction before surgery and at 1 and 3 months after surgery. At two weeks and three months, endoscopy was used to measure nasal crusting by the standardized Lund and Kennedy system. At 3 months, diagnostic nasal endoscopy and the Lund and Kennedy indices were used to assess tissue healing. Direct inspection of nasal packing and clinical records categorized bleeding within 48 hours of surgery as minimal, moderate, or severe. Due to the apparent postoperative appearance depending on the procedure, formal blinding of the assessor was not feasible, but prespecified scales were to be used to minimize observer bias. There was no inter-rater reliability. The data analysis was conducted with SPSS version 26.0. Descriptive statistics have been used to summarize demographic and baseline clinical data, including age, gender, duration of nasal obstruction symptoms, preoperative turbinate grade, and preoperative nasal obstruction grade, and to compare them across groups to determine baseline comparability. Categorical data (postoperative nasal obstruction grade, nasal crusting grade, severity of bleeding, and Tissue healing grade) were represented by frequencies and percentages. Mean +/standard deviation was used to display continuous data, such as pain VAS values. Chi-square test and independent samples t-test were used. Besides p-values, which are also presented where necessary, are confidence intervals, such as 95% confidence intervals for mean differences and Cohen d (continuous outcomes), and risk differences or Cramér's V (categorical outcomes). A p-value less than 0.05 was taken as statistically significant.

RESULTS

Table 1: Distribution of Different Variables (n=60)

		Number (%)	
		Group A(n=30)	Group B (n=30)
Age (years)	18-40	16 (53.33%)	15 (50.0%)
	41-60	14 (46.67%)	15 (50.0%)
Gender	Male	18 (60.0%)	19 (63.33%)
	Female	12 (40.0%)	11 (36.67%)
Duration of symptoms (months)	≤12	11 (36.67%)	12 (40.0%)
	>12	19 (63.33%)	18 (60.0%)
Grading of Inferior Turbinate Hypertrophy	01	03 (10.0%)	02 (6.67%)
	02	07 (23.33%)	09 (30.0%)
	03	12 (40.0%)	11 (36.67%)
	04	08 (26.67%)	08 (26.67%)
Nasal obstruction grade	00	00 (0.0%)	01 (3.33%)
	01	06 (20.0%)	07 (23.33%)
	02	08 (26.67%)	09 (30.0%)
	03	16 (53.33%)	13 (43.33%)

Table 2: Comparison of VAS Score

VAS score	Group A (n=30)	Group B (n=30)	P-Value
	Mean ± SD	Mean ± SD	
Day 1	4.87 ± 1.14	2.20 ± 0.89	0.0001
1 month	2.90 ± 0.78	1.07 ± 0.77	0.0001

Table 3: Comparison of Outcome at 2 Weeks.

		(n=30)		P-Value
		Group A	Group B	
Nasal obstruction grade	00	07 (23.33%)	14 (46.67%)	0.299
	01	09 (30.0%)	07 (23.33%)	
	02	08 (26.67%)	05 (16.67%)	
	03	06 (20.0%)	04 (13.33%)	
Nasal crusting grade	00	13 (43.33%)	19 (63.33%)	0.298
	01	09 (30.0%)	06 (20.0%)	
	02	08 (26.67%)	05 (16.67%)	
Hemorrhage severity	Minimal	14 (46.67%)	21 (70.0%)	0.167
	Moderate	11 (36.67%)	07 (23.33%)	
	Severe	05 (16.67%)	02 (6.67%)	
Tissue Healing	Poor	15 (50.0%)	08 (26.67%)	0.087
	Moderate	07 (23.33%)	06 (20.0%)	
	Good	08 (26.67%)	16 (53.33%)	

Table 4: Comparison of Outcomes at 3 Months

		(n=30)		P-value
		Group A	Group B	
Nasal obstruction grade	00	20(66.67%)	25 (83.33%)	0.394
	01	04(13.33%)	03 (10.0%)	
	02	05(16.67%)	02 (6.67%)	
	03	01(3.33%)	00 (0.0%)	
Nasal crusting grade	00	19(63.33%)	23 (76.67%)	0.385
	01	10(33.33%)	07 (23.33%)	
	02	01(3.33%)	00 (0.0%)	
Hemorrhage severity	Minimal	22(73.33%)	26 (86.67%)	0.341
	Moderate	07(23.33%)	04 (13.33%)	
	Severe	01(3.33%)	00 (0.0%)	
Tissue Healing	Poor	06(30.0%)	02 (6.67%)	0.003
	Moderate	14(46.67%)	05 (16.67%)	
	Good	10(33.33%)	23 (76.67%)	

DISCUSSION

One of the most frequent reasons patients come to the ENT OPD is nasal blockage. One of the most common causes of nasal blockage is hypertrophy of the inferior turbinates, which can be caused by allergic or vasomotor rhinitis. Although a wide range of treatment options are available, the comparative benefits of the various treatments are highly disputed.[10,11,12] In the present study, the mean age was 46.90/+ 7.86 years. The average age of the patients in groups A and B was 46.07 ± 7.92 and 46.73 ± 8.61 years, respectively. The mean age of the groups did not differ significantly (p>0.05). The study mean of the groups that have undergone partial inferior turbinectomy and submucosal diathermy was 28.35 + 8.12 and 30.93 + 7.72 years respectively, as explained by Saleem et al. In a different study, Nawaz et al. found that PIT group had a mean age of 26.5 years, whereas SMD group had a mean age of 27.2 years.[13,14] Males predominated in both groups in this study (60.0% in the PIT group and 63.33% in the SMD group). Similarly, group B (partial inferior turbinectomy group) had 67.5% men, and group A (submucosal diathermy group) had 72.5% males, according to Nawaz et al. Of the 60 patients enrolled in the trial, 20 (66.7%) were male and 10 (33.3%) were female in Group B (PIT), while 12 (40.0%) were male and 18 (60.0%) were female in Group A (SMD), according to Vishnu and Rajamma.[14,15] Nasal blockage decreased significantly in both treatment groups, but in the current study, the differences in nasal obstruction grade between the two groups at 2 weeks and 3 months were not significant. Even though the percentage of patients who were completely relieved of obstruction was greater in the SMD group at the two follow-ups, the confidence intervals are wide, indicating that the extent of benefit is not certain. Thus, the findings need to be viewed as a positive outcome for SMD rather than as conclusive short-term obstruction relief. Gomaa et al. also reported no statistically significant difference in the effect of nasal obstruction between PIT and SMD at early follow-up, but Saleem et al. and Nawaz et al. reported better short-term outcomes of obstruction on turbinectomy.[9,13,14] Conversely, Gangararaj et al. found the initial relief with SMD but overall reversals with PIT at six months.[16] These variations can include differences in surgical procedure, initial severity, follow-up period, grading of outcomes, and sample size. In the current study, there was a significant reduction in postoperative pain after SMD, and effect sizes were large at both day 1 and one-month follow-up. The discovery is biologically plausible, as SMD preserves the surface mucosa and causes controlled submucosal damage, and PIT destroys mucosa and bony tissue, which may lead to increased raw surface area, inflammation, and postoperative pain. Vishnu and Rajamma and Gangaraj et al. have reported similar patterns of diminished pain in the aftermath of SMD; however, studies published on the topic have found a mixed pattern of pain depending on the situation of tissue removal, cautery settings, analgesic practices, and timing.[15,16] All these could justify the disparity between the current results and those that found a less pronounced pain difference in their studies. In this study, bleeding severity was numerically greater in PIT cases than in SMD cases, but the difference was statistically insignificant. It is comparable to the mechanism of PIT, where direct excision of tissue exposes vascular surfaces, whereas SMD can be applied by accomplishing volume reduction via submucosal mucosal coagulation, which preserves the mucosal integrity. Vishnu and Rajamma obtained similar results, as did Imad et al., Al-Baldawi, and Gangaraj et al., who reported increased rates of bleeding following PIT.[15,16,18,19] However, the given sample size of only 30 patients per group may have been underpowered to detect moderate differences in bleeding severity. Three months showed tissue healing was better in the SMD group, and crusting favored SMD numerically but was not significant. The mucosal surface could clarify the advancement of healing following SMD and the minimized raw area postoperatively. Conversely, PIT can cause an immediate decrease in turbinate volume but may be associated with increased mucosal injury, crust formation, and a slower recovery of epithelial cells. Inconclusive effects have been reported in previous research, with some showing lower crusting following SMD and others showing no significant differences in the long term.[9,15,16] The variability in the results among the research could be attributed to the differences in postoperative campaigns in using the nasal toilet, saline irrigation adherence, cauterization settings, and the time of the endoscopic follow-up.

Notably, the current findings cannot be used to generalize conclusions about the superiority of SMD across all outcomes; the most convincing data in this dataset pertain to reduced pain scores and enhanced tissue healing at 3 months.

LIMITATIONS

The current research has several limitations. To start with, the non-randomized design and lack of allocation concealment limit internal validity and create potential selection bias. Despite the comparability testing at baseline not showing statistically significant differences among groups, residual confounding was not corrected, and multivariable adjustment was not performed due to the small sample size. Second, the sample size in this case was relatively small and selected from a single center, which minimizes statistical power and limits generalizability. Third, a three-month follow-up was not long enough to evaluate long-term outcomes such as recurrent turbinate hypertrophy, sustained symptom relief, synechiae, or late crusting. Fourth, VAS, nasal obstruction grading, and Lund and Kennedy grading were found to be clinically useful, but some outcomes were partially subjective; it was not possible to blind the assessor, and inter-rater reliability was not evaluated. Fifth, they did not include patient satisfaction, disease-specific quality of life, or validated scales of nasal symptoms, such as the NOSE scale or SNOT-22. It is advised that multicenter randomized controlled trials include allocation concealment, blinded outcome assessment where possible, increased sample sizes, validated patient-reported outcome measures, and extended follow-up duration.

CONCLUSIONS

In this study, SMD was associated with less pain and enhanced tissue healing at 3 months after the operation compared to PIT. The outcomes of nasal obstruction, crusting, and hemorrhage showed a numerical advantage for SMD, although the results were not considered statistically significant. Therefore, SMD may be considered a safe and helpful option to manage inferior turbinate hyperplasia, but the results should be interpreted with caution, as it is a non-randomized study of smaller size or lacks sufficient follow-up.

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REFERENCES

1. Çukurova İ, Cingi C, Konstantinidis I. Inferior turbinate hypertrophy. In: Cingi C, Bayar Muluk N, editors. Airway Diseases: A Comprehensive Guide. Cham: Springer; 2023. p. 1-9. https://doi.org/10.1007/978-3-031-23621-1_56.
2. Nazari S. Medical management of turbinate hypertrophy. In: Khan HA, Frame JD, Bagheri SC, Bohluli B, editors. Rhinoplasty: A Case-Based Approach. Philadelphia: Elsevier; 2022. p. 53-55.
3. Abdullah B, Singh S. Surgical interventions for inferior turbinate hypertrophy: a comprehensive review of current techniques and technologies. Int J Environ Res Public Health. 2021;18(7):3441. https://doi.org/10.3390/ijerph18073441. PMID: 33810267.
4. Smith DH, Daines BS, Cazzaniga J, Bhandarkar ND. Surgical management of inferior turbinate hypertrophy in the era of widespread communicable disease. Cureus. 2023;15(1):e34280. https://doi.org/10.7759/cureus.34280. PMID: 36756013.
5. Al Jabr IK, Alaboud N, Al Habeeb FA. Comparison of different surgical treatment modalities for nasal obstruction caused by inferior turbinate hypertrophy. Saudi J Otorhinolaryngol Head Neck Surg. 2021;23(1):11-15.
6. Manimaran V, Babu DM, Lakshmanan S, Palanisamy T. Efficacy of submucosal diathermy of inferior turbinate in patients with chronic rhinosinusitis undergoing functional endoscopic sinus surgery. Indian J Otolaryngol Head Neck Surg. 2023;75(Suppl 1):973-977. https://doi.org/10.1007/s12070-021-03003-5. PMID: 37095761.
7. Al-Shouk AA, Tatar İ. The blood supply of the inferior nasal concha (turbinate): a cadaveric anatomical study. Anat Sci Int. 2021;96(1):13-19. https://doi.org/10.1007/s12565-020-00552-0. PMID: 32720122.
8. Shinde V, Kothari A, Ingale M, Satav A. A comparative study of outcomes of submucosal diathermy versus inferior turbinoplasty in patients with deviated nasal septum with inferior turbinate hypertrophy. Cureus. 2024;16(7):e64301. https://doi.org/10.7759/cureus.64301. PMID: 39004774.
9. Gomaa MA, Abdel Nabi OG, Abdel Kerim ARA, Aly A. Comparative study between partial surgical inferior turbinectomy and submucosal diathermy of inferior turbinate for treatment of inferior turbinate hypertrophy. Otolaryngology (Sunnyvale). 2015;5(6):217. https://doi.org/10.4172/2161-119X.1000217.
10. Rukh M, Tariq K, Alamgir A, Awais M, Ramzan S, Maqsood T. Comparative study between submucosal diathermy and partial turbinectomy in hypertrophied inferior turbinate causing nasal obstruction. J Rawalpindi Med Coll. 2025;29(4):573-576. https://doi.org/10.37939/jrmc.v29i4.2920.
11. Al-Zobair A, Mahbub M, Zaman S, Haque MM, Mannan N, Mahfuza A. Management of inferior turbinate hypertrophy: a comparative study between partial inferior turbinectomy and submucosal diathermy. Med Today. 2025;37(2):198-203. https://doi.org/10.3329/medtoday.v37i2.83167.
12. Bastawy M, Ghalla AH. Different methods of treatment of inferior turbinate hypertrophy: a meta-analysis study. Benha Med J. 2023;40(1):31-43. https://doi.org/10.21608/bmfj.2023.148663.1615.
13. Saleem M, Naeem M, Hyder S, Khan NA, Tirmizey MA. Turbinectomy versus submucosal diathermy for treatment of hypertrophic turbinate. J Univ Med Dent Coll. 2014;5(2):47-51.
14. Nawaz FH, Jawaid A, Bashir S. Comparison of nasal patency following submucosal diathermy of inferior turbinate versus inferior turbinectomy. Pak Armed Forces Med J. 2014;64(4):551-554.
15. Vishnu MS, Rajamma KB. Comparison of submucosal diathermy and partial inferior turbinectomy. Int J Sci Study. 2016;4(1):120-123.

16. Gangaraj SS, Thomas S. Partial inferior turbinectomy versus submucosal diathermy in hypertrophied inferior turbinates. Int J Otorhinolaryngol Head Neck Surg. 2020;6(11):2011-2015. https://doi.org/10.18203/issn.2454-5929.ijohns20204563.
17. Salzano FA, Mora R, Dellepiane M, Zannis I, Salzano G. Radiofrequency, high-frequency, and electrocautery treatments versus partial inferior turbinotomy: microscopic and macroscopic effects on nasal mucosa. Arch Otolaryngol Head Neck Surg. 2009;135(8):752-758. https://doi.org/10.1001/archoto.2009.87. PMID: 19687398.
18. Imad H, Javed, Sanaullah. Comparison of submucosal diathermy with partial inferior turbinectomy: a fifty case study. J Postgrad Med Inst. 2012;26(1):91-99.
19. Al-Baldawi MH. Management of inferior turbinate hypertrophy: a comparative study between partial turbinectomy and submucous diathermy. Iraqi J Community Med. 2009;22(4):264-267.

AUTHORS CONTRIBUTION

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The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.