Section: ENT

Original Research Article

OUTCOME OF ENDOSCOPIC SINUS SURGERY WITH AND WITHOUT PARTIAL MIDDLE TURBINECTOMY - A COMPARATIVE STUDY

Aruna Kommineni[1], Lakshmi Sameeri K[1], T. Dinesh Singh[2]

[1]Associate Professor, Department of ENT, Surabhi Institute of Medical Sciences. Siddipet, Telangana, India.
[2]Professor, Department of ENT, Surabhi Institute of Medical Sciences. Siddipet, Telangana, India.

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Corresponding Author:
Dr. Aruna Kommineni,
Associate professor, Department of ENT, Surabhi Institute of Medical Sciences. Siddipet, Telangana, India.
Email: kommineniaruna@gmail.com

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ABSTRACT

Background: Chronic rhinosinusitis (CRS) is a common inflammatory condition that significantly affects quality of life. Functional endoscopic sinus surgery (FESS) is the standard surgical treatment for patients unresponsive to medical therapy. However, the role of partial middle turbinectomy during FESS remains controversial. This study was designed to compare the postoperative outcomes of endoscopic sinus surgery performed with and without partial middle turbinectomy in patients with chronic rhinosinusitis.
Materials and Methods: This prospective comparative study included 48 patients diagnosed with CRS and refractory to medical management. Participants were randomly divided into two groups: Group A underwent FESS with partial middle turbinectomy, while Group B underwent FESS alone. Preoperative and postoperative assessments were performed using diagnostic nasal endoscopy (DNE) scoring, evaluating parameters such as oedema, discharge, scarring, synechiae, and crusting. Symptom relief, including nasal discharge and nasal obstruction, was assessed at 1 week, 6 weeks, and 12 weeks. Statistical analysis was conducted using the Chi-square test, with $p < 0.05$ considered significant.
Results: Both groups showed significant postoperative improvement; however, Group A demonstrated superior outcomes. At 12 weeks, significant reductions in oedema, discharge, synechiae, and crusting were observed in Group A compared to Group B ($p < 0.05$). Symptom relief was also greater in Group A, with a marked reduction in nasal discharge and obstruction. Partial middle turbinectomy was associated with improved middle meatal patency and reduced postoperative adhesions.
Conclusion: FESS combined with partial middle turbinectomy provides better postoperative outcomes compared to FESS alone. It enhances sinus ventilation, reduces complications such as synechiae formation, and leads to improved symptom resolution. Selective partial middle turbinectomy can be considered a safe and effective adjunct in the surgical management of chronic rhinosinusitis.
Keywords: Chronic rhinosinusitis, functional endoscopic sinus surgery, middle turbinate, turbinectomy, nasal endoscopy, postoperative outcomes.

INTRODUCTION

Chronic rhinosinusitis (CRS) is a common inflammatory disorder of the nasal and paranasal sinus mucosa, characterized by persistent symptoms lasting for more than 12 weeks. It represents a significant global health burden, affecting approximately 10-15% of the population and leading to substantial impairment in quality of life and productivity.[1] Clinically, CRS presents with nasal obstruction, nasal discharge, facial pain or pressure, and olfactory disturbances, which often persist despite prolonged medical therapy.[2]
The pathogenesis of CRS is multifactorial, involving a complex interaction between host immune response, environmental factors, microbial agents, and anatomical variations. One of the central mechanisms implicated in disease progression is

obstruction of the osteomeatal complex, which results in impaired mucociliary clearance and reduced sinus ventilation. This leads to stagnation of secretions, chronic inflammation, and recurrent infections. Consequently, restoration of sinus drainage and ventilation remains the cornerstone of management in refractory cases.[3-5]

Functional endoscopic sinus surgery (FESS) has emerged as the gold standard surgical intervention for patients with CRS who do not respond to medical management. The primary objective of FESS is to remove obstructive pathology while preserving normal mucosa, thereby re-establishing physiological drainage pathways. Numerous studies have demonstrated that FESS is a safe and effective procedure, with success rates ranging from approximately 75% to over 95%, and is associated with significant improvement in symptoms and quality of life.[6] However, surgical outcomes are influenced by multiple factors, including disease severity, anatomical variations, surgical technique, and postoperative care.

The middle turbinate is a key anatomical structure within the nasal cavity that plays an essential role in regulating airflow, humidification, filtration, and olfaction. It also serves as an important surgical landmark during endoscopic sinus surgery.[7] Despite its functional importance, the management of the middle turbinate during FESS remains a subject of ongoing debate. Preservation of the middle turbinate is traditionally advocated to maintain normal nasal physiology and to serve as a reference point for future surgeries. However, postoperative complications such as lateralization of the turbinate and formation of synechiae may lead to obstruction of the middle meatus and compromise surgical outcomes.[8,9]

On the other hand, partial middle turbinectomy has been proposed as a strategy to improve surgical access, enhance visualization, and reduce the risk of postoperative adhesions and restenosis. Evidence from systematic reviews suggests that middle turbinate resection may reduce the incidence of synechiae formation and improve middle meatal patency, although its impact on overall quality of life and symptom improvement remains variable.[10,11] Some studies report better endoscopic outcomes with resection, while others demonstrate comparable results between resection and preservation, highlighting the lack of consensus in the literature.

Given these conflicting findings, the decision to perform partial middle turbinectomy during FESS continues to be controversial. There is a need for well-designed comparative studies to evaluate its role in improving postoperative outcomes. Therefore, the present study aims to compare the clinical and endoscopic outcomes of endoscopic sinus surgery performed with and without partial middle turbinectomy in patients with chronic rhinosinusitis.

MATERIALS AND METHODS

This prospective comparative study was carried out in the Department of Otolaryngology at Surabhi Institute of Medical Sciences, Siddipet, over a period of one year from January 2025 to December 2025. A total of 48 patients of either gender, aged between 18 and 60 years, who were clinically diagnosed and radiologically confirmed to have chronic rhinosinusitis unresponsive to medical therapy for more than three months were enrolled in the study. Patients presenting with acute sinonasal infections, allergic sinonasal polyposis, anatomical variations such as paradoxical or double middle turbinate, previous sinonasal surgery, autoimmune disorders, immunocompromised status, diabetes mellitus, systemic illnesses, or those unwilling to participate were excluded from the study. Written informed consent was obtained from all participants prior to enrolment, and the study protocol received approval from the Institutional Ethics Committee.

A predesigned semi-structured proforma was utilized to record demographic information, presenting symptoms, clinical examination findings, anterior rhinoscopy observations, nasal endoscopic findings, and radiological features. Disease severity was evaluated using the Lund–Mackay endoscopic scoring system, which assesses parameters including the presence of polyps, mucosal edema, and nasal discharge, with a score of ≥1 considered abnormal. Computed tomography (CT) scans of the paranasal sinuses in both coronal and axial sections were performed to corroborate endoscopic findings. All patients underwent routine preoperative investigations including haemoglobin estimation, total and differential leukocyte counts, random blood sugar levels, renal function tests, bleeding time, clotting time, and screening for HIV and hepatitis B surface antigen.

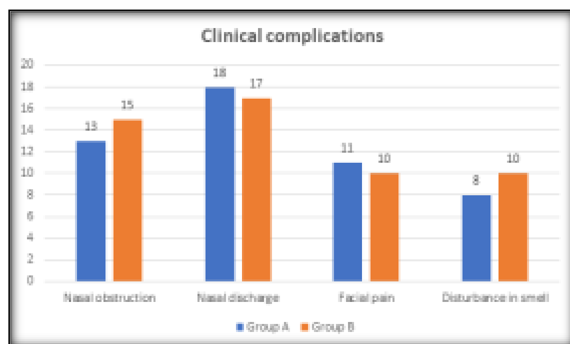
Participants were randomly assigned into two groups. Group 1 patients underwent endoscopic sinus surgery (ESS) combined with partial middle turbinectomy, whereas Group 2 patients underwent ESS alone without turbinectomy. All surgical procedures were performed under local anesthesia using 2% lignocaine with adrenaline (1:100,000) with the patient positioned in reverse Trendelenburg. A 0-degree, 4-mm Hopkins rod endoscope was employed for visualization during surgery. In patients allocated to Group 1, partial middle turbinectomy was performed by medializing the middle turbinate, incising its anterior superior attachment, dissecting along its length up to the basal lamella, and finally dividing the posterior attachment to achieve partial resection.

Postoperatively, patients were prescribed systemic antibiotics for a duration of 10 days and advised regular alkaline nasal douching for one month. Follow-up evaluations were conducted at 1 week, 6 weeks, and 3 months after surgery. Outcomes were assessed both subjectively, based on improvement in

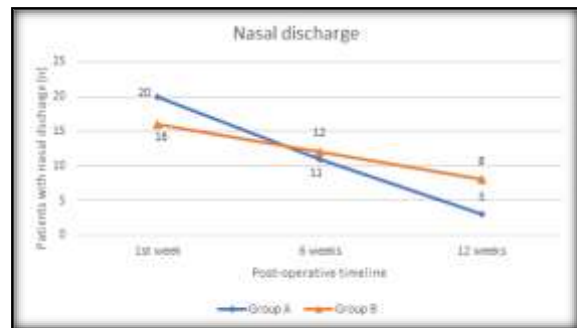
symptoms, and objectively through nasal endoscopic examination, focusing on middle meatal patency, presence of synechiae, crusting, scarring, mucosal edema, discharge, and recurrence of polyps. Postoperative findings were graded using a modified Lund–Mackay endoscopic scoring system.

All collected data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for Social Sciences (SPSS) version 26.0. The association between surgical outcomes in patients undergoing ESS with and without partial middle turbinectomy was evaluated using the Chi-square test. A p-value of less than 0.05 was considered statistically significant.

RESULTS



Graph 1: Clinical profile of study participants



Graph 2: Comparison of postoperative symptom relief (Nasal discharge)

Graph 3: Comparison of postoperative symptom relief (Nasal obstruction)

Table 1: Demographic details of study participants (n=48).

Parameter	Frequency	Percentage
Age (In years)		
Below 20	05	10.42%
21-40	26	54.16%
Above 40	17	35.42%
Gender		
Male	31	64.58%
Female	17	35.42%
BMI (Kg/m2)	24.03±3.18	

Table 2: Preoperative DNE score among study groups.

Parameter	Group A (n=24)	Group B (n=24)
Edema		
Mild	09 (37.5%)	06 (25%)
Severe	15 (62.5%)	18 (75%)
Discharge		
Clear thin discharge	10 (41.67%)	11 (45.83%)
Thick purulent discharge	14 (58.33%)	13 (54.17%)

Table 3: Comparison of postoperative assessment of DNE findings among two study groups at 1st week

Symptoms	Group A		Group B		p-value
	DNE score		DNE score		
	Score 0	Score 1	Score 0	Score 1	
Oedema	07 (29.1%)	17 (70.8%)	11 (45.8%)	13 (54.1%)	0.032
Discharge	05 (20.8%)	19 (79.1%)	10 (41.6%)	14 (58.3%)	0.048
Scarring	11 (45.8%)	13 (54.1%)	15 (62.5%)	09 (37.5%)	0.021
Synechiae	16 (66.6%)	08 (33.3%)	11 (45.8%)	13 (54.1%)	0.033
Crusting	15 (62.5%)	09 (37.5%)	10 (41.6%)	14 (58.3%)	0.731

Table 4: Comparison of postoperative assessment of DNE findings among two study groups at 6 weeks.

Symptoms	Group A			Group B			p-value
	Score 0	Score 1	Score 2	Score 0	Score 1	Score 2	
Oedema	17 (70.8%)	07 (29.1%)	-	14 (58.3%)	10 (41.6%)	-	0.001
Discharge	20 (83.3%)	04 (16.7%)	-	13 (54.1%)	11 (45.8%)	-	0.012

Scarring	15 (62.5%)	09 (37.5%)	-	20 (83.3%)	04 (16.7%)	-	0.031
Synechiae	20 (83.3%)	04 (16.7%)	-	11 (45.8%)	09 (37.5%)	04 (16.7%)	0.001
Crusting	18 (75%)	06 (25%)	-	12 (50%)	12 (50%)	-	0.047

Table 5: Comparison of postoperative assessment of DNE findings among two study groups at 12 weeks.

Symptoms	Group A		Group B		p-value
	DNE score		DNE score		
	Score 0	Score 1	Score 0	Score 1	
Oedema	23 (95.8%)	01 (4.2%)	16 (66.7%)	08 (33.3%)	0.016
Discharge	23 (95.8%)	01 (4.2%)	18 (75%)	06 (25%)	0.001
Scarring	21 (87.5%)	03 (12.5%)	23 (95.8%)	01 (4.2%)	0.001
Synechiae	22 (91.6%)	02 (8.3%)	11 (45.8%)	13 (54.1%)	0.001
Crusting	23 (95.8%)	01 (4.2%)	15 (62.5%)	09 (37.5%)	0.001

DISCUSSION

Chronic rhinosinusitis (CRS) remains a significant clinical entity due to its high prevalence, chronic course, and impact on quality of life. Functional endoscopic sinus surgery (FESS) has revolutionized the surgical management of CRS by focusing on restoration of physiological drainage pathways rather than extensive mucosal removal. However, the role of middle turbinate management, particularly partial middle turbinectomy, continues to be focused. we aimed to compare postoperative outcomes of FESS performed with and without partial middle turbinectomy, using both objective endoscopic findings and subjective symptom relief.

In our study, the majority of patients belonged to the 21-40 years age group (54.16%), with a male predominance (64.58%). These findings are consistent with earlier findings, which have reported higher incidence of CRS among young to middle-aged adults, likely due to increased environmental exposure and occupational factors. Similar male predominance has been documented in several studies, although gender distribution may vary depending on regional and demographic characteristics.[12,13] Preoperative endoscopic evaluation in our study revealed that most patients had severe mucosal edema and purulent discharge, indicating advanced disease. This observation aligns with the pathophysiological concept that obstruction of the osteomeatal complex leads to impaired mucociliary clearance and accumulation of secretions, thereby perpetuating chronic inflammation.[14]

At the first postoperative week, Group B (without turbinectomy) demonstrated comparatively better outcomes in terms of edema and discharge scores. This may be attributed to the preservation of mucosal integrity and reduced surgical trauma in the early postoperative period. However, Group A (with partial middle turbinectomy) showed significantly better outcomes in parameters such as synechiae formation and scarring ($p < 0.05$). Early postoperative adhesions are a well-recognized complication following FESS and are often associated with middle turbinate lateralization.[15] Partial turbinectomy likely reduces contact between the middle turbinate and lateral nasal wall, thereby decreasing the risk of adhesion formation.

At 6 weeks postoperatively, a clear trend toward improved outcomes in Group A became evident. Significant reductions in edema, discharge, synechiae, and crusting were observed in patients who underwent partial middle turbinectomy. These findings are in agreement with studies by Shih C et al,[16] and Soler ZM et al,[17] who reported improved middle meatal patency and reduced incidence of postoperative adhesions following middle turbinate resection. Improved ventilation and drainage following turbinectomy may facilitate mucosal healing and reduce persistent inflammation.

By 12 weeks, Group A demonstrated significantly superior outcomes in most parameters, including edema, discharge, synechiae, and crusting ($p < 0.05$), whereas scarring was slightly more favourable in Group B. The marked reduction in synechiae formation in Group A is particularly noteworthy, as synechiae can compromise surgical success by causing obstruction of the middle meatus and recurrence of symptoms. Similar findings have been reported by Lee JY et al,[18] who found that middle turbinate lateralization is a major contributor to surgical failure.

Symptomatically, both groups showed progressive improvement over time; however, Group A demonstrated significantly better relief from nasal discharge and nasal obstruction at 12 weeks. These findings are consistent with those of Soler et al,[19] who reported that improved endoscopic outcomes correlate with better symptom resolution and quality of life following FESS. The Kaplan–Meier like trend in our analysis further supports the observation that patients undergoing partial middle turbinectomy experience faster and more sustained symptom relief.

The improved outcomes observed in Group A can be explained by several mechanisms. Partial middle turbinectomy enhances surgical exposure, facilitates complete clearance of diseased tissue, and improves postoperative ventilation of the sinuses. Additionally, it reduces the likelihood of turbinate lateralization, which is a common cause of restenosis and recurrent disease.[20] However, the middle turbinate is an important anatomical structure with physiological functions, including regulation of airflow, humidification, and olfaction. Preservation of the middle turbinate also serves as an important landmark for revision surgeries.[21]

Despite these concerns, our findings suggest that partial middle turbinectomy, when performed judiciously, does not adversely affect outcomes and may, in fact, enhance surgical success. Similar conclusions have been drawn in systematic reviews, which indicate that selective resection of the middle turbinate can be beneficial in preventing postoperative complications without significantly compromising nasal function.[22] It is important to note that the benefits of middle turbinectomy must be weighed against potential risks, including bleeding, crusting, and alteration of nasal physiology. In our study, no major complications were observed, indicating that the procedure is safe when performed with proper technique. The use of endoscopic guidance and adherence to surgical principles are crucial in minimizing complications.

The strengths of this study include its prospective design, standardized surgical technique, and objective assessment using validated scoring systems. However, certain limitations must be acknowledged. The sample size was relatively small, and the follow-up period was limited to 12 weeks. Future studies with larger sample sizes and longer follow-up durations are needed to validate the disease recurrence and olfactory function.

CONCLUSION

In our study, functional endoscopic sinus surgery combined with partial middle turbinectomy yields superior postoperative outcomes compared to surgery without turbinectomy. Patients undergoing turbinectomy showed significantly better improvement in endoscopic parameters such as oedema, discharge, synechiae, and crusting, along with enhanced symptom relief, particularly in nasal obstruction and discharge. Partial middle turbinectomy appears to improve middle meatal patency and reduce postoperative adhesions, thereby facilitating better sinus ventilation and healing. Although preservation of the middle turbinate has anatomical advantages, selective partial resection can be considered a safe and effective adjunct in optimizing surgical outcomes in chronic rhinosinusitis.

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