Section: Ent & Head and Neck Surgery

Original Research Article

A COMPARATIVE STUDY BETWEEN DIAGNOSTIC NASAL ENDOSCOPY AND COMPUTED TOMOGRAPHY PARANASAL SINUS IN PATIENTS WITH CHRONIC SINO NASAL DISEASES

Reshma S[1], Rohini D Urs[2], Dauphin D Kuriakose[3], Lakka Snigdha[4]

[1]Assistant Professor, Department of Ent & Head and Neck Surgery, Adichunchanagiri Institute of Medical Sciences, Adichunchanagiri University, B.G Nagara, Mandya, Karnataka, India.
[2]Assistant Professor, Department of Ent & Head and Neck Surgery, Adichunchanagiri Institute of Medical Sciences, Adichunchanagiri University, B.G Nagara, Mandya, Karnataka, India.
[3]Junior Resident, Department of Ent & Head and Neck Surgery, Adichunchanagiri Institute of Medical Sciences, Adichunchanagiri University, B.G Nagara, Mandya, Karnataka, India.
[4]Junior Resident, Department of Ent & Head and Neck Surgery, Adichunchanagiri Institute of Medical Sciences, Adichunchanagiri University, B.G Nagara, Mandya, Karnataka, India.

Received *: 26/07/2026*
Received in revised form *: 24/08/2026*
Accepted *: 04/09/2026*

Corresponding Author:
Dr. Reshma S,
Assistant Professor, Department of Ent & Head and Neck Surgery, Adichunchanagiri Institute of Medical Sciences, Adichunchanagiri University, B.G Nagara, Mandya, Karnataka, India.
Email: reshmasuresh543@gmail.com

DOI: 10.70034/ijmedph.2026.3.706

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (3); 4575-4580

ABSTRACT

Background: Computed Tomography scan and Diagnostic Nasal Endoscopy, both having merits and demerits, this study will help in having an insight into the necessity if either or both in combination are needed. **Objectives**: To compare the Plain Computed Tomography Paranasal sinus findings with Nasal endoscopic findings in patients with Chronic Para Nasal Sinus Disease. **Materials and Methods:** 75 patients with chronic sinonasal disease not responding to medical line of treatment and planned for surgical management were evaluated with diagnostic nasal endoscopy and Computed Tomography Paranasal sinus and findings were compared.

Results: Maximum cases were between 20-40 years of age with male predominance. Most common symptom was headache (80%) and inferior turbinate hypertrophy (63%) being most predominant sign. 51 cases had septal deviation using DNE while 57 cases in CT. Attachment of uncinate can be appreciated in both but CT scan gives better visualization. Middle meatus secretions was visualized in 62% on right and 56% on left in DNE. Pneumatised uncinate and Agger nasi is seen better in CT. Polyps were better visualized on DNE.

Conclusion: CT scan has got a better advantage in detecting the anatomical variants and condition of sinus cavity while DNE is better for conditions like middle meatal secretions, condition of mucosa, polyps. Thereby indicating that both CT scan and DNE are complimentary to each other.

Keywords: Chronic sinonasal disease, CT paranasal sinus, Diagnostic nasal endoscopy.

INTRODUCTION

Chronic sinonasal diseases are common conditions that significantly affect quality of life and frequently present with nonspecific symptoms such as nasal obstruction, headache, nasal discharge and postnasal drip. Because these symptoms may overlap with allergic rhinitis and other sinonasal disorders, clinical symptoms alone are insufficient to establish a diagnosis of chronic rhinosinusitis (CRS). Objective evidence of sinonasal inflammation is therefore recommended for confirmation of CRS.[1,2] Diagnostic nasal endoscopy (DNE) and computed tomography (CT) of the paranasal sinuses are the two principal modalities used for objective assessment of sinonasal disease. DNE provides direct visualization of the nasal cavity, middle meatus, mucosa, secretions, polyps and ostiomeatal complex, and can identify abnormalities that may

not be apparent on routine anterior rhinoscopy.[1,2] It also permits targeted assessment of mucosal disease and collection of secretions for microbiological evaluation.

CT of the paranasal sinuses provides detailed information regarding the bony anatomy, paranasal sinus involvement, ostiomeatal complex and anatomical variations that are particularly important during preoperative planning for endoscopic sinus surgery. Variations such as concha bullosa, Haller cells, Onodi cells and abnormalities of the uncinate process are more readily demonstrated on CT.[3,4] Previous comparative studies have demonstrated good correlation between CT and endoscopic findings for several important anatomical structures, although discrepancies may occur in the assessment of mucosal and subtle endoscopic abnormalities.[3,4]

Despite the widespread use of both modalities, differences exist in their ability to demonstrate anatomical variations, mucosal abnormalities, polyposis and sinus cavity disease. The present study was undertaken to compare the findings of DNE and CT of the paranasal sinuses in patients with chronic sinonasal disease and to determine the relative diagnostic utility of each modality. The study also aims to assess whether these investigations should be considered complementary in the evaluation and preoperative assessment of patients with chronic sinonasal disease.

MATERIALS AND METHODS

The observational analytical study was conducted over a period of 18 months from January 2025 to June 2026. A total of 75 patients with clinically suspected chronic sinonasal diseases, attending ENT OPD were chosen for the study by purposive sampling. Patients above 18 years, presenting with headache, nasal obstruction and such symptoms, not responding to medical line of treatment for more than three months and are planned for surgical management were included in the study. Patients with acute attack of sinusitis, suspected or histopathology confirmed sinus malignancies and patients without consent were excluded from the study. Detailed history taking and clinical examination of these patients were done. General information like age, sex, patient symptoms and examination findings were recorded. All patients underwent diagnostic nasal endoscopy and computed tomography of para nasal sinus and the findings were recorded. The DNE and CT findings were compared in terms of nasal cavity findings, anatomic variants and mucosal findings.

RESULTS

Data was obtained from the seventy-five patients attending the Department of ENT with symptoms of chronic sinonasal disease, not responding to medical line of treatment for more than four weeks and are planned for surgical management. Diagnostic nasal endoscopy and computed tomography of paranasal sinus was done in these patients. The data was later analysed from their proforma sheets. Observations and analysis were done under the following divisions.

Table 1: Age wise distribution of patients

Age groups	No of patients	Percentage of Patients
1-20yrs	14	18.67
21-40yrs	37	49.33
41-60yrs	21	28.00
61-80yrs	3	4.00
Total	75	100.00
Mean age	33.68	
SD age	11.97	

The age of the study population ranged from 19 years to 68 years. Maximum numbers of patients were in 20 to 40 years of age group; 49% of patients being in 2nd & 3rd decade of age. The mean age of the patients was 33.68 years with a standard deviation of 11.97. The study showed male preponderance i.e. 57.3% of study population were male and 42.7 % were female. Thus, the male to female ratio is 1.3:1.

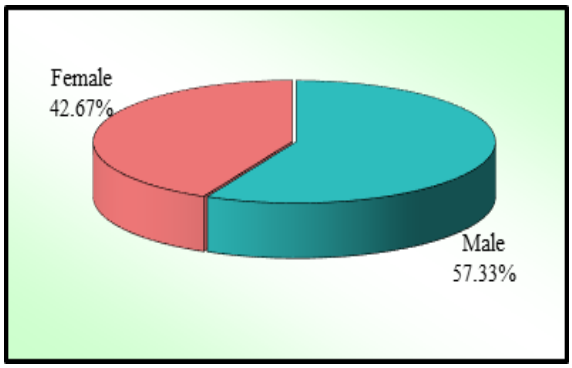

Figure 1: Gender wise distribution of patients

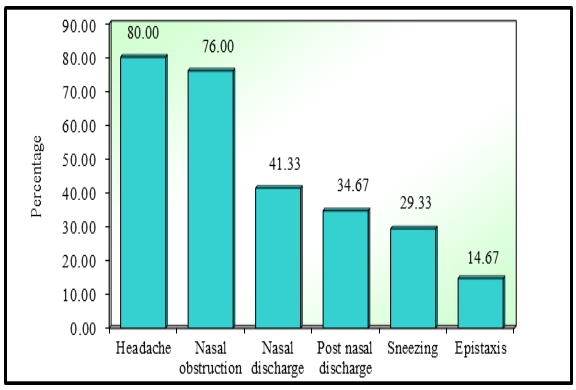

Figure 2: Symptoms wise distribution of patients

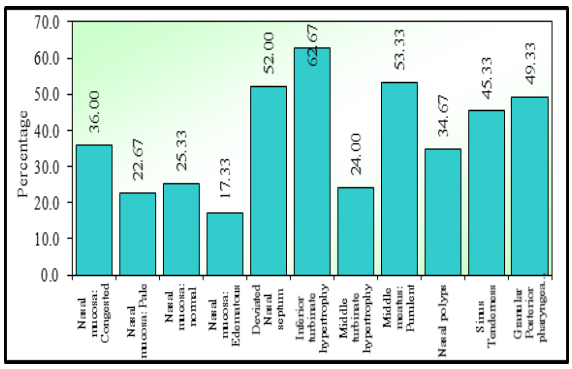

Figure 3: Signs wise distribution of patients

Common symptoms with which the patients presented were headache (80%) and nasal obstruction (76%). Nasal discharge (41%) and epistaxis (14%) were less common. Postnasal discharge was seen in 34.6% of patients and sneezing in 29.3%.

In our study, commonest sign was inferior turbinate hypertrophy which is seen in 62.7% of patients followed by purulent middle meatal discharge in 53.3% and deviated nasal septum in 52% of the patients. The next most common sign seen was granular posterior pharyngeal wall in 49.3% of patients. Hypertrophied middle turbinate was found in 24 % of the patients. Other signs like sinus tenderness were seen in 45.3%, oedematous nasal mucosa in 17%, congested mucosa in 36% and pale mucosa in 22.7%. Normal mucosa was seen in 25.3% of the patients.

Comparison of DNE and CT methods with findings of nasal cavity

In our study of 75 cases, 51 cases had septal deviation using DNE while using CT, 57 cases had septal deviation. 33 (44%) cases showed attachment of uncinate process to lamina papyracea on right and left in DNE as well as in CT. 16 (21.3%) cases showed uncinate attachment to middle turbinate on right side and left in DNE as well as CT. Uncinate attachment to the skull base was seen in 26 (34.7%) cases in both DNE and CT. Secretions in the middle meatus was visualized in 47 (62%) on right and 42 (56%) cases on the left side in DNE while it was not visualized in CT. Maxillary ostium patency was established in 26 (34.7%) cases on the right and 28 (37.3%) cases on the left using DNE whereas in CT 30 (40%) cases on right and 27(36%) cases on left had patency. Allergic mucosal bands were seen in 32% in DNE.

Table 2: Comparison of DNE and CT methods with findings of nasal cavity

Nasal cavity	DNE				CT			
	Right	%	Left	%	Right	%	Left	%
Septal Deviation	51			68.00	57			76.00
Uncinate attachments: to lamina papyracea	33	44.00	33	44.00	33	44.00	33	44.00
Uncinate attachment: to middle turbinate	16	21.33	16	21.33	16	21.33	16	21.33
Uncinate attachments: to skull base	26	34.67	26	34.67	26	34.67	26	34.67
Middle meatus secretions	47	62.67	42	56.00	NV	0.00	NV	0.00
Maxillary ostium patency	26	34.67	28	37.33	30	40.00	27	36.00
Allergic mucosal bands	24	32.00	24	32.00	NV	0.00	NV	0.00

Comparison of DNE and CT methods in relation to anatomic variant

A pneumatised uncinate was seen in 3 (4%) cases on right side and 1(2%) case on left in CT. Agger nasi was seen in 13 (17%) patients on left and 23 (30.7%) on right on DNE and in 25 (33%) cases on left and 30 (40%) cases on right with CT scan. Haller cells were visualized in 9 (12%) cases on right side and on left side in 7 (9%) cases in CT. Only CT showed Onodi cells in 4 (5.3%) cases on the right side. Accessory maxillary ostium was seen only in DNE in 18 (24%) cases on right side and 23 (30.7%) cases on left. Paradoxical middle turbinate was seen in 3 (4%) cases on left side in DNE whereas CT shows 2 (2%) case on right and 6 (8%) cases on left side. 16 (21%) cases had concha bullosa on right side and 15 (20%) cases on left using DNE while 22(29%) cases had concha bullosa on right and 17(22%) cases on left when their CT was done.

Table 3: Comparison of DNE and CT methods in relation to anatomic variant

Anatomic variants	DNE				CT			
	Right	%	Left	%	Right	%	Left	%
Pneumatised uncinate	0	0.00	0	0.00	3	4.00	1	1.33
Agger nasi	13	17.33	23	30.67	25	33.33	30	40.00
Haller or Infraorbital Cells	NV	0.00	NV	0.00	9	12.00	7	9.33
Onodi or Sphenoethmoidal Cells	NV	0.00	NV	0.00	4	5.33	0	0.00
Accessory maxillary ostiumpresence	18	24.00	23	30.67	NV	0.00	NV	0.00

Middle turbinate: paradoxical	0	0.00	3	4.00	2	2.67	6	8.00
Middle turbinate: concha bullosa	16	21.33	15	20.00	22	29.33	17	22.67

Comparison of DNE and CT method in relation to mucosal changes and other pathological conditions

In DNE 12 (16%) cases showed middle turbinate hypertrophy on right side and 11 (14.7%) cases showed on left side whereas in CT 10 (13.3%) cases showed hypertrophy of middle turbinate on right and 11 (14.7%) cases on the left. 35 (46.7%) cases showed hypertrophy of inferior turbinate on right and left side each in DNE whereas 33(44%) cases showed hypertrophy of inferior turbinate on right and left side each in CT. 22 (29.3%) cases had polyp on right side and 26 (34.7%) cases had on the left side in DNE whereas 14 (18.7%) cases had polyp on right and 17 (22.7%) cases on left using CT. The integrity of bone such as erosions, expansion or dehiscence was only visualized using CT scan. 26 (34.7%) cases had right frontal sinus haziness and 41 (54.7%) cases had left haziness in CT. 52 (69.3%) cases had right anterior ethmoid sinus haziness and 50 (66.7%) cases had haziness on the left side in CT. 43 (57.3%) cases showed haziness in maxillary antrum on right and 46 (61.3%) cases showed on left. 21 (28%) cases showed posterior ethmoid sinus haziness on right side and 29 (38.7%) cases on left side in CT. Sphenoidal sinus was hazy in 17 (22.7%) cases on right and 13 (17.3%) cases on the left.

Table 4: Comparison of DNE and CT in relation to mucosal changes and other pathological conditions

Pathological conditions	DNE				CT			
	Right	%	Left	%	Right	%	Left	%
Inferior turbinate: hypertrophy	35	46.67	35	46.67	33	44.00	33	44.00
Middle turbinate: hypertrophy	12	16.00	11	14.67	10	13.33	11	14.67
Polyp	22	29.33	26	34.67	14	18.67	17	22.67
Frontal sinus haziness	NV	0.00	NV	0.00	26	34.67	41	54.67
Anterior ethmoidal cells haziness	NV	0.00	NV	0.00	52	69.33	50	66.67
Maxillary sinus haziness	NV	0.00	NV	0.00	43	57.33	46	61.33
Sphenoidal sinus haziness	NV	0.00	NV	0.00	17	22.67	13	17.33
Posterior ethmoidal sinus haziness	NV	0.00	NV	0.00	21	28.00	29	38.67

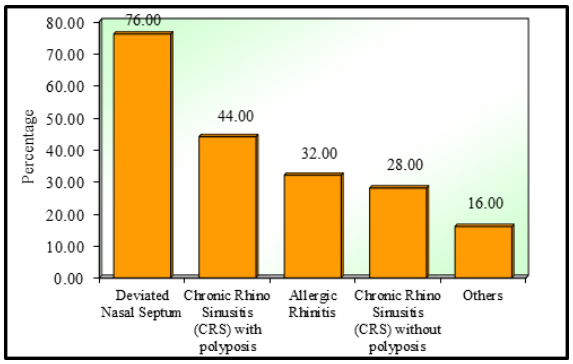

Figure 5: Diagnosis wise distribution of patients

44% of the patients in our study suffered from chronic rhino sinusitis with polyposis whereas 28% presented with chronic rhino sinusitis without polyposis. Allergic rhinitis was diagnosed in 32%. 76 % of the patients had deviated nasal septum and 16% had other diagnosis like fungal rhinosinusitis, atrophic rhinitis etc.

DISCUSSION

Chronic rhinosinusitis (CRS) is a heterogeneous inflammatory disorder in which symptoms alone are insufficient to establish the diagnosis. Objective evidence of sinonasal inflammation is recommended and may be obtained by nasal endoscopy or computed tomography (CT). Current clinical practice guidelines therefore consider both modalities appropriate for objective confirmation of CRS, while emphasizing that CT findings should be interpreted in conjunction with clinical and endoscopic findings.[1,2] The present study compared diagnostic nasal endoscopy (DNE) and CT of the paranasal sinuses in 75 patients with chronic sinonasal disease who had persistent symptoms despite medical treatment and were planned for surgical management. The findings demonstrate that DNE and CT provide complementary information rather than being interchangeable investigations.

In the present study, the majority of patients were between 20 and 40 years of age, with a mean age of 33.68 years, and there was a male predominance (57.3%). Similar demographic patterns have been reported in previous studies of chronic sinonasal disease. Sheetal et al. reported a predominance of patients in the 20–40-year age group, while Zojaji et al. reported a mean age of approximately 33 years and a male predominance.[3,4] The predominance of younger adults in the present study is therefore consistent with previously reported patient populations undergoing evaluation for chronic sinonasal disease.

Headache (80%) and nasal obstruction (76%) were the most frequent presenting symptoms in the present study, followed by nasal discharge (41%) and postnasal discharge (34.7%). This symptom profile is comparable with previous studies, in which nasal obstruction, headache and nasal discharge were among the commonest presenting complaints.[3,4] However, these symptoms are nonspecific and may occur in several sinonasal and non-sinonasal conditions. This emphasizes the importance of objective assessment rather than

relying solely on symptoms for the diagnosis of CRS.

The principal finding of the present study was the complementary diagnostic contribution of DNE and CT. DNE provided direct visualization of the nasal cavity, mucosa, middle meatus and polyps, whereas CT provided superior assessment of the paranasal sinuses and deeper anatomical structures. In the present series, septal deviation was identified in 68% of patients by DNE and 76% by CT. The greater detection rate on CT may be explained by its ability to demonstrate posterior and bony components of septal deviation that may not be adequately appreciated endoscopically. Similar observations have been reported previously, with CT demonstrating structural abnormalities that may be difficult to evaluate completely on endoscopy.[3,5]

The uncinate process and its attachment are important considerations during functional endoscopic sinus surgery (FESS). In the present study, attachment of the uncinate process to the lamina papyracea, middle turbinate and skull base was identified in similar proportions by DNE and CT. Sheetal et al. also demonstrated good agreement between CT and endoscopic assessment of uncinate attachment.[3] Nevertheless, CT provides a more comprehensive three-dimensional appreciation of the osteomeatal complex and its relationship with adjacent structures, which is particularly valuable during preoperative planning.

DNE demonstrated a clear advantage in assessing mucosal abnormalities. Middle meatal secretions were identified in 62.7% of patients on the right and 56% on the left by DNE, whereas these findings could not be directly assessed on CT. Similarly, the character of the nasal mucosa, including congestion, oedema and pallor, can be directly visualized by endoscopy but cannot be reliably characterized by CT. This is consistent with the established role of nasal endoscopy in directly demonstrating purulence, mucosal oedema and polyps, which constitute important objective evidence of sinonasal inflammation.[1,2] Previous comparative studies have likewise demonstrated the value of endoscopy in identifying mucosal disease that may be underestimated or missed on CT.[6,7]

Nasal polyposis was also detected more frequently by DNE than CT in the present study. Polyps were identified in 29.3% of patients on the right and 34.7% on the left by DNE, compared with 18.7% and 22.7%, respectively, on CT. This difference is likely attributable to the ability of endoscopy to identify small or early polyps within the middle meatus and other accessible regions, whereas CT more readily demonstrates extensive polypoidal disease. Duarte et al. similarly reported cases in which nasal polyposis was identified by endoscopy despite a non-diagnostic CT scan.[7] Thus, DNE may have an important role in detecting limited mucosal disease and in determining the presence and extent of nasal polyposis.

In contrast, CT demonstrated a distinct advantage in identifying anatomical variants of the paranasal sinuses. Agger nasi cells, Haller cells, Onodi cells, pneumatisation of the uncinate process, concha bullosa and paradoxical middle turbinate were more effectively characterized on CT. In the present study, Agger nasi cells were identified in 33.3–40% of patients on CT compared with 17.3–30.7% on DNE. Haller cells and Onodi cells could not be adequately assessed by DNE but were demonstrated on CT. These findings are consistent with previous anatomical studies showing that CT is particularly useful for demonstrating sinonasal anatomical variations and their relationship to critical structures.[8,9] Such information is important in preoperative planning because variants such as Haller and Onodi cells may alter the anatomy of the osteomeatal complex and may have implications for surgical safety.

Concha bullosa was detected in 29.3% of patients on the right and 22.7% on the left by CT, compared with 21.3% and 20%, respectively, on DNE. CT is able to distinguish different patterns of middle turbinate pneumatisation more accurately than endoscopy. Similar observations have been reported in previous CT-based studies, where concha bullosa, agger nasi cells, Haller cells and Onodi cells were among the commonly encountered anatomical variations.[8,9] Therefore, although DNE can identify clinically apparent turbinate abnormalities, CT remains superior for detailed anatomical characterization.

The ability of CT to assess the paranasal sinus cavities was another major advantage demonstrated in the present study. Frontal, anterior and posterior ethmoid, maxillary and sphenoid sinus disease could be evaluated directly on CT, whereas DNE provides only indirect information about the status of these sinuses through visualization of their drainage pathways. In the present study, anterior ethmoid and maxillary sinus involvement were particularly common. Previous studies have similarly demonstrated a high frequency of maxillary and ethmoidal involvement in CRS.[3,4] Importantly, CT also permits assessment of bony integrity, including erosion, expansion and dehiscence, which cannot be adequately evaluated by routine diagnostic nasal endoscopy.

The present findings are broadly consistent with earlier comparative studies. Zojaji et al. demonstrated good agreement between CT and endoscopic surgical findings for several sinonasal structures but also highlighted situations in which CT could miss disease identified endoscopically.[4] Sheetal et al. concluded that CT is particularly valuable for anatomical abnormalities and preoperative assessment, while endoscopy provides additional information regarding mucosal disease.[3] Similarly, studies evaluating the diagnostic accuracy of DNE have demonstrated that endoscopy has good sensitivity for CRS and may provide useful objective evidence without exposing patients to

radiation [6]. A recent systematic review and meta-analysis also reported high sensitivity for DNE, while emphasizing that both DNE and CT have limitations and that diagnostic performance varies according to the reference standard and disease phenotype.[10]

The clinical implication of these findings is that DNE and CT should not be regarded as competing diagnostic modalities. DNE is inexpensive relative to CT, avoids radiation exposure and provides real-time visualization of the nasal mucosa, secretions, polyps and middle meatus. CT, on the other hand, provides a comprehensive assessment of sinonasal anatomy, anatomical variants, sinus opacification and bony relationships and is particularly important for surgical planning. Current guidelines therefore support objective confirmation of CRS by either endoscopy or CT, with CT being particularly useful when disease persists despite treatment, when endoscopic findings are inconclusive, or when surgery is being considered.[1,2]

The present study has certain limitations. The sample size was relatively small and patients were selected from a surgical population with chronic sinonasal symptoms, which may limit generalizability to the broader CRS population. In addition, the study primarily compared the findings obtained by DNE and CT and did not use a uniform independent reference standard such as histopathology or intraoperative findings for all parameters. Therefore, the observed differences should be interpreted as differences in diagnostic yield rather than absolute superiority of one modality.

Overall, the findings of the present study support a complementary role for DNE and CT in the evaluation of chronic sinonasal disease. DNE is superior for direct assessment of mucosal changes, middle meatal secretions and early or limited polyposis, whereas CT is superior for demonstrating sinus involvement, anatomical variations and bony anatomy. Hence, in patients with persistent chronic sinonasal symptoms, particularly those being considered for endoscopic sinus surgery, the combined interpretation of DNE and CT provides a more comprehensive assessment than either modality alone.

CONCLUSION

CT PNS and diagnostic nasal endoscopy provide complementary information in the evaluation of chronic sinonasal disease. CT is superior for delineating paranasal sinus involvement, bony anatomy and anatomical variations, whereas DNE provides better assessment of the nasal mucosa, middle meatal secretions and nasal polyps. Neither modality completely replaces the other. A combined approach, guided by the clinical presentation and intended management, provides a more comprehensive assessment and may improve diagnostic accuracy and preoperative planning.

Conflict of Interest

The authors declare that there are no financial, personal or professional conflict of interests that could have influenced the conduct, analysis, reporting or publication of this study.

Acknowledgements

The authors are very grateful to all the staffs and postgraduates of Department of ENT for helping in collection of samples. We are thankful to the Department of Radiology for providing required facilities.

REFERENCES

1. Rosenfeld RM, Piccirillo JF, Chandrasekhar SS, et al. Clinical practice guideline (update): adult sinusitis. Otolaryngol Head Neck Surg. 2015;152(2 Suppl):S1-S39.
2. Payne SC, et al. Clinical Practice Guideline: Adult Sinusitis Update. Otolaryngol Head Neck Surg. 2025.
3. Sheetal D, Devan PP, Manjunath P, Martin P, Satish Kumar K, Sreekantha, Satisha TG, Manjunatha Goud BK. CT PNS – Do we really require before FESS? J Clin Diagn Res. 2011;5(2):179-181.
4. Zojaji R, Mirzadeh M, Naghibi S. Comparative evaluation of preoperative CT scan and intraoperative endoscopic sinus surgery findings in patients with chronic rhinosinusitis. Iran J Radiol. 2008;5(2):77-82.
5. Fiker kasapoglu, Selcukonart, Oguzbasut: Preoperative evaluation of Chronic Rhinosinusitis patients by conventional radiographies, computed tomography and nasal endoscopy. Kulak Burun Bogaz Ihtis Derg. 2009;19(4):184-191.
6. Rafael José Geminiani, Rodrigo Faller Vitale, Adriano Baptista Mazer, et al. Comparison between Computed Tomography Scan and Nasal Endoscopy in Diagnosis of Chronic Rhinosinusitis. Intl Arch Otorhinolaryngol. 2007; 11(4):402-405.
7. 7. Duarte AF, de Soler RC, Zavarezzi F. Nasal endoscopy associated with paranasal sinus computerized tomography scan in the diagnosis of chronic nasal obstruction. Rev Bras Otorrinolaringol. 2005;71(3):361-363.
8. Bolger WE, Butzin CA, Parsons DS. Paranasal sinus bony anatomic variations and mucosal abnormalities: CT analysis for endoscopic sinus surgery. Laryngoscope. 1991; 101:56-64.
9. Earwaker J. Anatomic variants in sinonasal CT. Radiographics. 1993; 13:381-415.
10. Lu Y, Gao X, Wang X, Wang W, Xu J. Diagnostic accuracy of nasal endoscopy, computed tomography and magnetic resonance imaging for chronic rhinosinusitis and sinonasal polyps: a systematic review and meta-analysis. J Laryngol Otol. 2026;140(4):387-395.