



## Original Research Article

# A COMPARATIVE EVALUATION OF DIAGNOSTIC NASAL ENDOSCOPY AND RADIOLOGICAL FINDINGS IN CHRONIC RHINOSINUSITIS: A PROSPECTIVE STUDY

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### ABSTRACT

**Background:** Chronic rhinosinusitis (CRS) is a common inflammatory disorder of the nose and paranasal sinuses characterized by symptoms persisting for more than 12 weeks. Diagnostic Nasal Endoscopy (DNE) and Computed Tomography (CT) scan are important modalities used in the diagnosis and evaluation of CRS. The present study was conducted to compare DNE findings with CT findings and to assess the diagnostic accuracy of DNE in chronic rhinosinusitis patients.

**Materials and Methods:** A prospective cross-sectional study was conducted among 80 patients clinically diagnosed with CRS at a tertiary care institute over a period of 6 months. Patients underwent DNE using 0° and 30° rigid nasal endoscopes followed by CT scan of the paranasal sinuses. Findings related to osteomeatal complex pathology, turbinate hypertrophy, septal deviation, polyps, and anatomical variants were compared between DNE and CT scan. Data was analysed and sensitivity, specificity, and diagnostic accuracy were calculated.

**Results:** Among the 80 study participants, 58.8% were males and 41.3% were females, with a mean age of 36.2± 11.09 years. DNE demonstrated an overall diagnostic accuracy of 91.25% when compared with CT findings. DNE showed excellent diagnostic performance for turbinate hypertrophy, septal deviation, and nasal polyps, with diagnostic accuracy approaching 100%. Moderate diagnostic accuracy was observed for osteomeatal complex occlusion and maxillary ostium patency. DNE showed high specificity but lower sensitivity for anatomical variants such as concha bullosa and agger nasi cells.

**Conclusion:** DNE is a reliable and effective diagnostic tool for evaluating mucosal disease and visible intranasal abnormalities in CRS. However, CT scan remains superior for assessment of deeper sinus pathology and anatomical variations.

**Keywords:** Chronic rhinosinusitis, Computed tomography scan, Diagnostic nasal endoscopy.

## INTRODUCTION

Chronic rhinosinusitis (CRS) is a common inflammatory condition involving the mucosa of the nose and paranasal sinuses, characterized by persistence of symptoms for more than 12 weeks. It is one of the most frequently encountered disorders in otorhinolaryngology practice and has a significant

impact on quality of life due to symptoms such as nasal obstruction, nasal discharge, facial pain or pressure, headache, and reduction in the sense of smell.<sup>[1,2]</sup> CRS contributes substantially to healthcare expenditure and loss of productivity because of recurrent hospital visits and prolonged medical treatment. Accurate diagnosis and assessment of disease extent are therefore essential

for effective management and prevention of complications.

The diagnosis of CRS is based on clinical symptoms supported by objective findings on nasal endoscopy and radiological imaging. Diagnostic Nasal Endoscopy (DNE) allows direct visualization of the nasal cavity, middle meatus, osteomeatal complex, mucosal edema, discharge, nasal polyps, and anatomical variations.<sup>[3]</sup> It is considered a simple, minimally invasive, and cost-effective outpatient procedure that improves diagnostic precision compared to routine anterior rhinoscopy. Computed Tomography (CT) scan of the paranasal sinuses is regarded as the gold standard imaging modality for evaluating sinonasal anatomy, extent of mucosal disease, sinus involvement, and anatomical variants prior to functional endoscopic sinus surgery.<sup>[4]</sup>

CT imaging is especially useful for assessing deeper sinus structures that may not be adequately visualized on endoscopy. Several studies have demonstrated the complementary role of DNE and CT scan in the evaluation of CRS. While DNE is superior in detecting mucosal changes, middle meatal secretions, and nasal polyps, CT scan provides better delineation of sinus pathology and anatomical variations such as concha bullosa, agger nasi, Haller cells, and Onodi cells.<sup>[5,6]</sup> Despite advances in diagnostic modalities, controversy still exists regarding the comparative diagnostic efficacy of DNE and CT in chronic rhinosinusitis. Hence, the present study was undertaken to compare Diagnostic Nasal Endoscopy findings with CT scan findings in patients with chronic rhinosinusitis and to evaluate the diagnostic accuracy of DNE in relation to CT imaging.

**Aim:** To compare the DNE findings with CT findings preoperatively in chronic rhinosinusitis patients.

**Objectives:** 1) To evaluate the accuracy of diagnostic nasal endoscopy, and to compare it with a gold standard modality CT scan and 2) to compare the anatomical variants in DNE and CT findings.

## MATERIALS AND METHODS

**Study Area:** A tertiary care institute

**Study Design:** Prospective cross-sectional study

**Study Period:** 6 months

**Study Population:** Patients clinically diagnosed with chronic rhinosinusitis attending the Department of Otorhinolaryngology.

**Inclusion Criteria:** Patients aged 18- 60 years presenting with symptoms such as nasal obstruction, nasal discharge, facial pain, headache, or postnasal drip persisting for more than 12 weeks and not responding to medical management.

**Exclusion Criteria:** Patients with acute sinusitis, previous nasal or sinus surgery, gross septal deviation, facial trauma, sinonasal tumors, pregnant women, and those unwilling to undergo CT scan or Diagnostic Nasal Endoscopy (DNE).

**Sample Size:** Based on the expected patient load during the study period, a sample size of 80 patients was considered.

**Study Tools:** Diagnostic Nasal Endoscopy (DNE) using 0° and 30° rigid nasal endoscopes and Computed Tomography (CT) scan of the paranasal sinuses.

**Methodology:** After obtaining informed written consent, detailed demographic and clinical history was recorded for all participants. Diagnostic Nasal Endoscopy was performed using 0° and 30° rigid nasal endoscopes to assess the osteomeatal complex, middle meatus, mucosal edema, discharge, polyps, turbinate hypertrophy, septal deviation, and anatomical variants. Subsequently, all patients underwent CT scan of the paranasal sinuses in coronal, axial, and sagittal sections without contrast. Findings of DNE were compared with CT scan findings to evaluate the diagnostic accuracy of DNE in chronic rhinosinusitis. Data were entered into Microsoft Excel and analysed using SPSS version 24.0. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean and standard deviation. Sensitivity, specificity and accuracy was calculated.

## RESULTS

[Table 1] depicts the sociodemographic distribution of the study participants. Among the total 80 subjects included in the study, males constituted the majority with 47 participants (58.8%), while females accounted for 33 participants (41.3%). The mean age of the study population was 36.2± 11.09 years, indicating that most patients belonged to the young and middle-aged adult population. The findings suggest a male predominance in chronic rhinosinusitis cases within the studied cohort.

[Table 2] had all 80 patients included in the study were positive for chronic rhinosinusitis on CT scan. Diagnostic nasal endoscopy (DNE) identified 73 of these cases as positive, while 7 cases were negative on DNE despite positive CT findings. The sensitivity and overall diagnostic accuracy of DNE were 91.25%. Since there were no CT-negative cases in the study population, specificity and negative predictive value could not be assessed.

[Table 3] shows that Diagnostic Nasal Endoscopy (DNE) had high diagnostic performance when compared with CT findings for most sinonasal abnormalities. DNE demonstrated excellent sensitivity, specificity, and diagnostic accuracy for turbinate hypertrophy, septal deviation, and nasal polyps, with values close to or equal to 100%. The diagnostic accuracy for osteomeatal complex occlusion and maxillary ostium patency was moderate, ranging from 67.5% to 78.8%. Frontal recess patency showed high sensitivity but lower specificity. For anatomical variants such as concha bullosa and agger nasi cells, DNE showed high

specificity but lower sensitivity, indicating that CT scan was better in detecting deeper anatomical variations. Overall, DNE was highly reliable for

detecting mucosal disease and visible intranasal abnormalities, while CT was superior for evaluating anatomical variants and deeper sinus pathology.

**Table 1: Sociodemographic Distribution**

Socio- Demography	Frequency	Percent
Males	47	58.8%
Females	33	41.3
Total	80	100%
Mean age	36.2± 11.09	

**Table 2: Diagnostic Accuracy of DNE On Comparison with CT Findings**

DNE	CT positive	CT negative	Total
Positive	73	-	73
Negative	7	-	7
Total	80	-	80

**Table 3: Comprehensive Diagnostic Performance of DNE Compared with CT Findings**

Parameter	Sensitivity (%)	Specificity (%)	Diagnostic accuracy (%)
Right-sided Osteomeatal Complex Occlusion	70.9	64.0	68.8
Left-sided Osteomeatal Complex Occlusion	67.3	68.0	67.5
Right-sided Maxillary Ostium Patency	77.3	85.7	78.8
Left-sided Maxillary Ostium Patency	73.5	91.7	76.2
Right-sided Frontal Recess Patency	94.4	42.3	77.5
Left-sided Frontal Recess Patency	94.2	50.0	78.8
Right-sided Middle Turbinate Hypertrophy	100.0	97.3	97.5
Left-sided Middle Turbinate Hypertrophy	100.0	97.4	97.5
Right-sided Inferior Turbinate Hypertrophy	100.0	98.0	98.8
Left-sided Inferior Turbinate Hypertrophy	100.0	100.0	100.0
Right-sided Septal Deviation	100.0	98.0	98.8
Left-sided Septal Deviation	97.6	100.0	98.8
Right-sided Polyps	94.7	96.7	96.2
Left-sided Polyps	94.1	98.4	97.5
Anatomical Variants	53.3	94.3	71.2
Right-sided Concha Bullosa	75.0	100.0	97.5
Left-sided Concha Bullosa	37.5	100.0	97.5
Right-sided Agger Nasi Cells	36.4	100.0	82.5
Left-sided Agger Nasi Cells	28.6	100.0	81.2

## DISCUSSION

In the present study, the majority of patients were males (58.8%) with females constituting 41.3% of the study population. The mean age of the patients was 36.2± 11.09 years, indicating that chronic rhinosinusitis (CRS) was more common among young and middle-aged adults. Similar male predominance was observed in the study conducted by Sweta S Lohiya et al,<sup>[5]</sup> where 55% of the patients were males and the majority belonged to the third and fourth decades of life. K Nathan et al,<sup>[7]</sup> also reported a higher prevalence of CRS among males with most patients belonging to the productive age group.

In the present study, DNE demonstrated an overall diagnostic accuracy of 91.25% when compared with CT findings. These findings are comparable with the study conducted by K Nathan et al,<sup>[7]</sup> who reported a sensitivity of 92.31% and diagnostic accuracy of 88.75% for DNE in diagnosing CRS. Similarly, Deosthale et al,<sup>[8]</sup> observed a sensitivity of 94% and specificity of 75% for DNE compared to CT scan findings. Sweta S Lohiya et al,<sup>[5]</sup> also concluded that the addition of DNE improves diagnostic accuracy

and reduces unnecessary CT utilization in patients with CRS.

The high diagnostic accuracy observed in the present study highlights the usefulness of DNE as an effective outpatient diagnostic tool for evaluating mucosal disease, polyps, discharge, and osteomeatal complex abnormalities. However, CT remains superior in assessing deeper sinus pathology and anatomical variations.

The present study demonstrated excellent diagnostic performance of DNE for turbinate hypertrophy, septal deviation, and nasal polyps, with diagnostic accuracy values approaching 100%. Similar observations were reported by Raushan et al,<sup>[9]</sup> and Tyagi et al,<sup>[10]</sup> who found DNE to be superior in identifying mucosal abnormalities, polyps, and middle meatal secretions.

In the current study, osteomeatal complex occlusion and maxillary ostium patency showed moderate diagnostic accuracy. This finding is consistent with Shahizon et al,<sup>[11]</sup> who reported that CT scan was superior in visualizing deeper structures such as the osteomeatal complex, sinus cavities, and maxillary ostium. The relatively lower specificity observed for frontal recess patency may be due to limited endoscopic visualization of deeper anatomical areas.

The present study also showed that DNE had high specificity but relatively lower sensitivity for anatomical variants such as concha bullosa and agger nasi cells. Similar findings were observed by Tegnoor et al,<sup>[6]</sup> and Vandana Mendiratta et al,<sup>[12]</sup> who concluded that CT scan is superior for detecting anatomical variations and assessing the extent of sinus disease. Overall, the findings of the present study support the complementary role of DNE and CT in the evaluation of chronic rhinosinusitis.

## CONCLUSION

Diagnostic Nasal Endoscopy (DNE) is a reliable and effective diagnostic tool in the evaluation of chronic rhinosinusitis, showing high diagnostic accuracy for mucosal abnormalities, turbinate hypertrophy, septal deviation, and nasal polyps. DNE demonstrated good correlation with CT findings in most clinically significant parameters. However, CT scan remained superior in assessing deeper sinus pathology and anatomical variations. Hence, DNE and CT scan should be considered complementary modalities for accurate diagnosis and preoperative evaluation of chronic rhinosinusitis.

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