



STUDY OF ENDOSCOPIC & RADIOLOGICAL FINDINGS IN CHRONIC RHINUSINUSITIS-A COMPARATIVE STUDY

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ABSTRACT

Background: Chronic rhinosinusitis (CRS) is a persistent inflammatory condition that significantly impairs quality of life and disrupts daily activities. Effective management depends on accurate diagnosis, for which nasal endoscopy and CT imaging play key roles in evaluating the extent of sinus disease. **Methodology:** The present study was a cross sectional study conducted at a tertiary care center over a period of 2 years including a total of 124 patients. All participants underwent diagnostic nasal endoscopy and non-contrast CT of the paranasal sinuses. Endoscopy was performed on the same day as CT, with the examiner blinded to imaging findings. A Lund-Mackay score ≥ 4 and a Lund-Kennedy score ≥ 2 were considered diagnostic for CRS. Data were compiled in Excel and analyzed using SPSS 18 and OpenEpi 2.3, with results expressed as means, percentages, and appropriate statistical tests. **Results:** of the 124 patients most patients were young adults with a mean age of 25.61 years, with a female predominance. The common symptoms included headache (95.2%), nasal obstruction (87.9%), and discharge (82.3%). On endoscopy, 79.8% of cases showed nasal polyps and 46.8% showed severe oedema. CT scans most frequently showed maxillary sinus involvement, and concha bullosa was the most common anatomical variation (30.6%). **Conclusion:** This study shows that headache, nasal obstruction, and nasal polyps were common in most cases of chronic rhinosinusitis, with many patients having moderate to severe disease. The endoscopic and CT findings highlight that combining both modalities is strongly recommended for accurate assessment and better treatment.

KEYWORDS : Rhinosinusitis; Paranasal Sinuses; Chronic Disease; Nasal Mucosa; Nasal Polyps

INTRODUCTION:

Chronic rhinosinusitis (CRS) is a common, multifactorial inflammatory disorder of the nasal and paranasal sinuses that affects millions worldwide. It causes significant morbidity and significantly reducing quality of life. Because CRS involves persistent mucosal inflammation, accurate diagnostic methods are essential for effective management and treatment. Traditionally, diagnosis has been based on a combination of clinical symptoms, nasal endoscopy, and imaging particularly computed tomography (CT) [1].

EPOS 2012 further highlights the importance of incorporating endoscopic or radiological findings in the diagnostic criteria for CRS. Currently, rigid nasal endoscopy and CT imaging remain the gold-standard tools for evaluation [2]. While many factors contribute to CRS, the central pathophysiological mechanism involves mucosal oedema and impaired mucociliary clearance (MCC) due to dysfunction of the epithelium, cilia, or mucus. This impairment leads to stasis of secretions and promotes chronic infection or persistent inflammation [3, 4].

Nasal endoscopy and CT imaging are essential diagnostic tools that provide complementary information in the evaluation of CRS [5, 6]. Endoscopy allows direct visualization of the nasal cavity and sinus openings, enabling assessment of mucosal changes, polyps, and osteomeatal complex patency. In contrast, CT imaging offers a detailed view of sinus anatomy, helping identify structural abnormalities and the extent of disease that may not be evident endoscopically [7].

Despite their proven value, previous studies have noted variability in the correlation between endoscopic and radiological findings, which can affect clinical decision-making [1]. This underscores the need to understand the specific strengths of each modality. Therefore, the present study aims to compare nasal endoscopy and CT imaging to

clarify their respective diagnostic contributions and enhance the accuracy and effectiveness of CRS management.

METHODOLOGY

The present study was a cross sectional study conducted over a period of two years including a total of 124 patients. All patients with chronic rhinosinusitis attending the ENT OPD of a tertiary care hospital and undergoing nasal endoscopy were included after obtaining informed consent and applying the inclusion and exclusion criteria.

Patients were included if they had symptoms suggestive of chronic rhinosinusitis such as nasal blockage (obstruction or congestion), nasal discharge (anterior or posterior including postnasal drip), facial pain or pressure (usually unilateral over the maxillary or frontal sinus), and an altered sense of smell, persisting for more than twelve weeks. Patients with radiological evidence of chronic rhinosinusitis showing mucosal thickening of the paranasal sinuses, previously treated cases of chronic rhinosinusitis, and clinically proven chronic rhinosinusitis not responding to routine medical management were also included.

Patients who were HIV positive or HBsAg positive, those with acute sinusitis, those with sinus malignancies, and those unwilling to undergo FESS were excluded from the study.

Methods (Short and Correct Version)

After the ethical approval and informed consent, all participants underwent diagnostic nasal endoscopy (DNE) and non contrast CT of the nose and paranasal sinuses. CT scans were obtained in axial, coronal, and sagittal planes, and scoring was performed by a radiologist using the Lund Mackay system. Each paranasal sinus was scored from 0 to 2 based on the degree of opacification, and the osteomeatal complex was graded as 1 (not obstructed) or 2 (obstructed). Bilateral scoring produced a total score ranging from 0 to 24. A

Lund Mackay score of 4 or more was considered diagnostic for CRS.

Endoscopic examination was performed on the same day as CT imaging, after the scan, to avoid post endoscopy mucosal changes influencing CT findings. DNE was carried out under local anesthesia using 4 percent xylocaine and a nasal decongestant. The otorhinolaryngologist performing the endoscopy was blinded to the CT results. Endoscopic findings were graded using the Lund Kennedy scoring system, assessing mucosal edema, secretions, and polyps. Bilateral scoring was performed, and a total score of 2 or more was considered diagnostic of CRS.

DATA ANALYSIS:

The collected data was compiled in Microsoft Excel 2010. Quantitative variables were expressed as mean, median, and standard deviation. Qualitative variables were expressed as percentage or proportion. Data was analyzed using SPSS software version 18 and OpenEpi software version 2.3. For quantitative data, the Student t test was applied as the test of significance, and for qualitative data, the Chi square test was used.

RESULTS

Table 1: Distribution According To Age Group And Gender

Parameter	Mean ±SD
Age Group	25.61 ± 7.25
Gender	51:73

The mean age of the participants was 25.61 ± 7.25 years, and the gender distribution was 51 males and 73 females.

Table 2: Distribution Of Symptoms, Signs, And Severity Grading.

Parameter	Frequency	Percentage
Symptoms		
Nasal obstruction	109	87.9
Nasal discharge	102	82.3
Head ache	118	95.2
Facial fullness	71	57.3
Facial pain	50	40.3
Decrease or loss of sense of smell	27	21.8
Others	12	9.7
Signs		
Congested mucosa	21	16.9
Hypertrophied turbinate	47	37.9
Discharge/ secretions in meatus	41	33.1
Grading of symptoms		
Mild	9	7.3
Moderate	75	60.5
Severe	40	32.3
Total	124	100

Nasal obstruction, discharge, and headache were the most common symptoms. Hypertrophied turbinates and meatal secretions were frequent signs. Most participants had moderate-to-severe symptoms.

Table 3: Distribution Of Olfactory Status, Nasal Polyps, And Mass Laterality

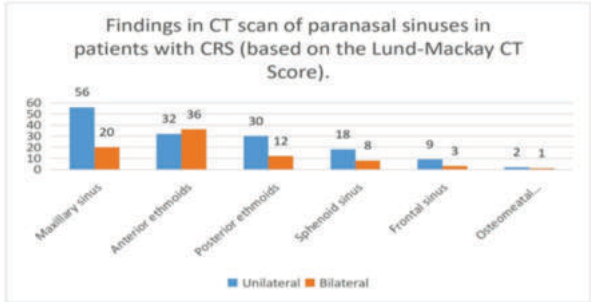
Smell	Frequency	Percentage
Abnormal	46	37.1
Normal	78	62.9
Polyp		
Present	99	79.8
Normal	25	20.2
Total	124	100
Mass		
Unilateral	68	68.7
Bilateral	31	31.3
Total	99	100

Most participants had a normal sense of smell (62.9%), while 37.1% showed olfactory abnormalities. Nasal polyps were present in 79.8% of cases. Among those with polyps, the mass was unilateral in 68.7% and bilateral in 31.3%.

Table 4: Distribution Of Nasal Endoscopic Findings

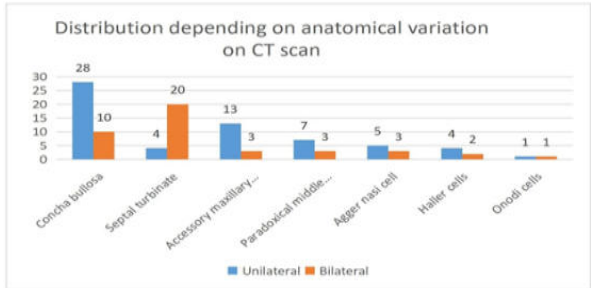
Nasal endoscopic finding	Frequency	Percentage
Nasal cavity polyp score		
No polyp	25	20.2
Restricted to the middle meatus	38	30.6
Below middle meatus	61	49.2
Nasal cavity oedema score		
None	19	15.3
Moderate	47	37.9
Severe	58	46.8
Nasal cavity secretion score		
None	53	42.7
Clear and thin	30	24.2
Thick and mucopurulent	41	33.1
Anatomical variation		
Concha bullosa	38	30.6
Septal turbinate	24	19.3
Accessory maxillary ostium	16	12.9

Nasal endoscopy showed that nearly half of the participants had polyps extending below the middle meatus. Oedema was moderate to severe in most cases, and thick mucopurulent secretions were observed in one-third of the subjects. Common anatomical variations included concha bullosa (30.6%), septal turbinate (19.3%), and accessory maxillary ostium (12.9%).



Graph 1: Findings in CT scan of paranasal sinuses in patients with CRS (based on the Lund-Mackay CT Score).

Maxillary sinus opacification was the most common CT finding, followed by involvement of the anterior and posterior ethmoids. Sphenoid and frontal sinus disease was less frequent, and osteomeatal complex obstruction was observed only in a small number of patients.



Graph 2: Distribution depending on anatomical variation on CT scan

Concha bullosa was the most common anatomical variation on CT, occurring predominantly unilaterally. Septal turbinate was mainly bilateral, while accessory maxillary ostium and paradoxical middle turbinate were mostly unilateral. Less frequent variations included agger nasi, Haller cells, and Onodi cells.

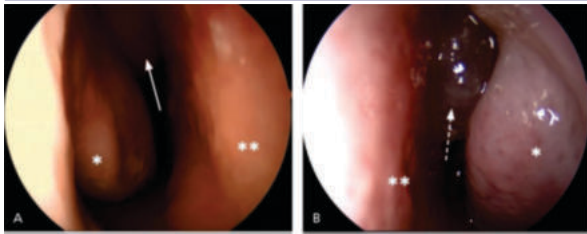


Figure 1: Anterior rhinoscopy view, which may be obtained using an otoscope or nasal speculum and headlight. (A) Normal right nasal cavity. (B) Left nasal cavity with a nasal polyp and classic watery appearance. Note the inferior turbinate (single asterisk), nasal septum (double asterisk), and middle turbinate (Arrow), and nasal polyp (dotted arrow).

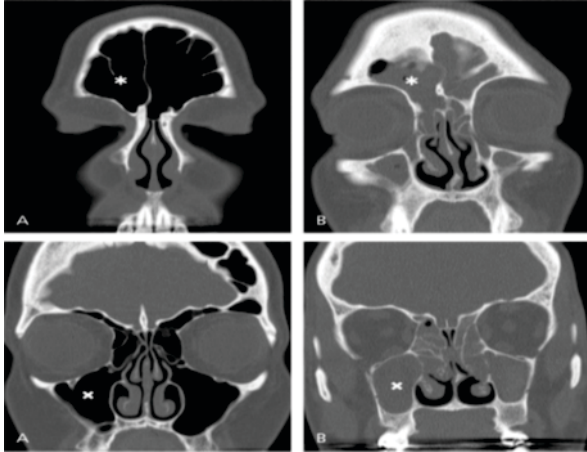


Figure 2: Coronal cuts from sinus computed tomography scans. (A) Normal scans showing well-aerated (black area) sinuses. (B) Scan showing opacification (gray area) of the paranasal sinuses, which is consistent with chronic rhinosinusitis. The frontal sinuses (asterisk) and maxillary sinuses (x) are marked for orientation.

DISCUSSION

In this study, we evaluated the clinical, endoscopic, and CT findings in patients with chronic rhinosinusitis to identify common patterns and anatomical variations influencing disease severity. The mean age of the participants was 25.61 ± 7.25 years, with a female predominance. Headache (95.2%), nasal obstruction (87.9%), and nasal discharge (82.3%) were the most prevalent symptoms, indicating a significant symptomatic burden among patients with chronic rhinosinusitis (CRS). On examination, hypertrophied turbinates (37.9%) and meatal secretions (33.1%) were frequently observed, and most patients presented with moderate to severe disease.

Nasal endoscopy showed that half of the participants had polyps extending below the middle meatus, with moderate to severe mucosal oedema in the majority, and one-third of the cases had mucopurulent secretions. These observations were consistent with the findings of Goel et al., [8] who reported that endoscopy is highly effective for detecting mucosal changes, polyps, and pathological secretions. They documented a sensitivity of 76.47% and a high specificity of 92.86%, concluding that endoscopy is superior for assessing localized disease, whereas CT provides enhanced visualization of the paranasal sinuses and the osteomeatal complex.

CT imaging in our study revealed that maxillary sinus opacification was the most common abnormality, followed by ethmoid sinus involvement. Frontal and sphenoid sinus disease was less frequently observed, and osteomeatal complex obstruction was noted in only a minority of cases. Concha bullosa was the most frequent anatomical variation

on CT (30.6%), occurring predominantly unilaterally, aligning with earlier studies that also reported concha bullosa as the most common sinonasal variation.

Al Shamy H et al. [9] (2018) also demonstrated a strong correlation between CT and nasal endoscopy, with each modality showing superiority in assessing specific anatomical structures. Their study highlighted that endoscopy was more sensitive for evaluating the frontal recess, sphenoethmoid recess, and hiatus semilunaris, whereas CT was more sensitive for maxillary sinus, uncinate process, and posterior ethmoid evaluation. The present study shows a similar pattern, reinforcing the need for combined use of both methods to achieve comprehensive assessment.

Kim et al., [9] in a recent meta-analysis, concluded that nasal endoscopy can reliably diagnose CRS when the Lund-Kennedy score is ≥ 2 , supporting its diagnostic utility. Our study also used a similar criterion, strengthening the validity of endoscopy as a primary diagnostic tool.

Dadgarnia et al. [10] (2019) reported significant improvement in olfactory scores following surgical intervention and found negative correlations between preoperative endoscopic/CT scores and olfactory outcomes. Although the present study did not evaluate postoperative outcomes, the high prevalence of polyps and mucosal oedema observed endoscopically suggests that olfactory dysfunction may be common in similar patient groups, consistent with their conclusions.

Overall, the findings of the present study, confirm that nasal endoscopy and CT imaging provide complementary diagnostic information. Endoscopy offers superior evaluation of mucosal pathology and polyp extension, while CT remains the modality of choice for assessing sinus involvement and anatomical variations. Together, they provide a more accurate assessment of disease severity and intensity, essential for optimal management of chronic rhinosinusitis.

CONCLUSION:

This study highlights the significant clinical, endoscopic, and radiological burden of chronic rhinosinusitis. The majority of patients were young adults, with a slightly higher representation of females. Headache, nasal obstruction, and nasal discharge were the most common symptoms, and most participants presented with moderate to severe symptom severity. Nasal endoscopy frequently revealed polyps, mucosal oedema, and mucopurulent secretions, along with common anatomical variations such as concha bullosa and septal turbinate.

CT evaluation based on the Lund Mackay scoring system showed maxillary sinus involvement as the most prevalent radiological finding, followed by ethmoid sinus disease, while sphenoid and frontal sinus involvement was less common. Overall, the study demonstrates a strong correlation between clinical symptoms, endoscopic findings, and radiological scores, emphasizing the importance of a combined diagnostic approach. These findings may assist clinicians in better understanding disease patterns and planning targeted management strategies for patients with chronic rhinosinusitis.

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