

A comparative study of clinical and radiological findings in operated patients of chronic rhinosinusitis

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Abstract

Background: Chronic rhinosinusitis (CRS) is a common inflammatory disorder affecting 11% of the population, leading to significant morbidity and economic burden. It presents with nasal obstruction, discharge, facial pain, and anosmia, with or without nasal polyps. Anatomical variations also contribute to disease severity. This study evaluates the correlation between clinical and radiological findings in CRS patients undergoing surgery.

Methods: A prospective study of 50 CRS patients undergoing surgery was conducted from May 2022 to June 2024. All patients underwent nasal endoscopy and non-contrast CT scans. Findings were analyzed based on Kennedy CT staging and intraoperative observations.

Results: The male-to-female ratio was 1.27:1, with 50% of patients in their 3rd and 4th decades. Nasal blockage (82%) was the most common symptom. Nasal endoscopy detected polyps in 68% and deviated nasal septum in 64%. Computed tomography of paranasal sinuses (CT PNS) showed sinus involvement in 90%, with maxillary (94%) and ethmoid (90%) sinuses most commonly affected. Kennedy CT staging correlated best with intraoperative findings in stages II and IV.

Conclusion: CRS is a prevalent condition, primarily presenting with nasal blockage. Nasal endoscopy is a valuable diagnostic tool, while CT scan remains the gold standard for disease assessment and surgical planning. However, CT findings may overestimate disease extent, highlighting the need for intraoperative confirmation.

Keywords: CRS; Nasal Blockage; CT PNS; ENT

1. Introduction

Chronic rhinosinusitis (CRS) is a heterogeneous group of disorders characterized by persistent inflammation of the nose and paranasal sinuses for a duration of at least 12 weeks. It presents with two or more of the following symptoms: nasal blockage, nasal discharge, facial pain (pressure or fullness), and a decreased sense of smell.[1] CRS represents a significant global disease burden, impacting at least 11% of the population.[2] Certain anatomical variations in nose contribute to obstruction of the osteomeatal complex, impairing drainage and ventilation, which increases the risk of sinus mucosal disease.

Based on endoscopic findings, CRS is broadly classified into three subtypes: chronic rhinosinusitis with nasal polyps (CRSwNP), chronic rhinosinusitis without nasal polyps (CRSSNP), and fungal rhinosinusitis.[3] Among these, patients with nasal polyps tend to have a greater disease burden, increased severity, and poorer treatment outcomes compared

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to those without polyps.[4] Recent advancements in endoscopic techniques and imaging modalities have considerably enhanced the understanding of CRS pathogenesis.

2. Materials and Methods

This study involves 50 patients who presented to the ENT Department of a tertiary care hospital between May 2022 and June 2024 with clinical features indicative of chronic rhinosinusitis (CRS) which were then confirmed via radiological investigation and who subsequently underwent surgical intervention.

2.1. Inclusion criteria

All the patients with chronic rhinosinusitis > 12 weeks duration of having 2 major or 1 major and 2 minor criteria (as described by Lanza Kennedy classification) who got operated and gave informed consent.

2.2. Exclusion criteria

- Acute sinusitis, Neoplastic, acute condition, invasive fungal sinusitis
- Patient treated with facial trauma
- complicated sinusitis
- only medical management-patient refuses for surgery
- lost on follow up
 - Nasal endoscopy was conducted in all patients to assess the presence of edematous mucosa, polyps, mucopus, or other gross pathology.
 - A non-contrast computed tomography (CT) scan of the paranasal sinuses was performed to assess disease extent and anatomical variations.
 - Intraoperative findings were documented as per the Kennedy CT staging system.

2.2.1. Kennedy CT staging system [6]

- STAGE 0 Normal
- STAGE 1 Anatomic abnormalities, all unilateral sinus disease, Bilateral disease limited to ethmoidal sinuses
- STAGE 2 Bilateral ethmoidal disease with involvement of one dependent sinus
- STAGE 3 Bilateral ethmoidal disease with involvement of two or more dependent sinuses on each side
- STAGE 4 Diffuse sinonasal polypsis

2.3. Postoperative Follow-Up Schedule

Patients were followed up at 1 week, 2 weeks, 6 weeks, and 3 months. Nasal endoscopy was performed during each visit and findings were noted.

3. Results

In this study data was collected from 50 patients admitted in ENT department of our hospital from May 2022 and June 2024. Our observations are the male-to-female ratio was 1.27:1, with 50% of patients in their 3rd and 4th decades.

Table 1 Symptom wise distribution

Presenting complaints	Number of patients (n=50)
Nasal blockage	48(98%)
Nasal discharge	30(60%)
Headache	23(46%)
Sneezing	11(22%)
Facial pain	4(8%)
Anosmia	1(2%)
Fever/Malaise	1(2%)

Present study shows most common presenting symptom as nasal blockage followed by nasal discharge followed by headache followed by sneezing, facial pain, anosmia, fever/malaise.

Table 2 Correlation between nasal endoscopy and CT PNS findings

	Present study (n=50)	
Findings	Nasal endoscopy	CT PNS
Polyposis	34(68%)	45(90%)
u/l polyposis	12(24%)	18(40%)
b/l polyposis	22(44%)	27(60%)
Deviated nasal septum	32(64%)	29(58%)
Hypertrophy of Inferior turbinate	11 (22%)	14(28%)
Concha bullosa	2 (4%)	5(10%)
Paradoxical middle turbinate	2(4%)	4(8%)
Bulla ethmoidalis	-	3(6%)
Narrowed infundibulum	-	1(2%)
Agger nasi cell	-	3(6%)

In this study, polyposis was the most common finding, followed by a deviated nasal septum. CT scan better detects polyposis, inferior turbinate hypertrophy, concha bullosa, paradoxical middle turbinate, bulla ethmoidalis, narrowed infundibulum, and agger nasi cell. Concha bullosa was suspected in 2 cases on endoscopy but confirmed on CT. CT is crucial for identifying CRS factors and anatomical variations, aiding in surgical planning.

Table 3 Comparison between CT scan and intraoperative findings

KENNEDY CT Staging	No. Of Cases	Intraoperative finding Present study		Rathor a bhattacharjee et al.		
		Similar to CT Scan findings	Not Similar to CT Scan findings	n=34	Similar to CT Scan findings	Not Similar to CT Scan findings
Stage (i)	20	14(70%)	6(30%)	18	12(66.7%)	6(33.3%)
Stage (ii)	4	3(75%)	1(25%)	5	3(60.0%)	2(40.0%)
Stage (iii)	2	1(50%)	1(50%)	6	5(83.3%)	1(16.7%)
Stage (iv)	22	18(81.81%)	4(18.18%)	5	4(80.0%)	1(20.0%)

Analysis of Kennedy CT staging with intraoperative findings shows the highest similarity in stages IV and II, followed by I and III. In stage I, 6 of 20 cases appeared diseased on CT but were disease-free intraoperatively. In stage II, 1 of 4 cases showed discrepancies in sinus involvement. In stage III, 1 of 2 cases had mucosal thickening on CT but intraoperatively. only right frontal sinus showed disease. In stage IV, 4 cases showed all sinus involvement on CT, but intraoperatively it was not found.

CT PNS is highly sensitive, detecting minimal mucosal thickening to extensive polyposis, sometimes exaggerating sinus involvement. In this study and Rathor & Bhattacharjee's study, 12 operated cases showed discrepancies between CT findings and intraoperative observations, with CT often indicating mucosal thickening in disease-free sinuses.

4. Discussion

A prospective study of 50 CRS patients (May 2022–June 2024) found male-to-female ratio of 1.27:1, with 50% in their 3rd and 4th decades. Nasal blockage (82%) was the most common symptom, followed by nasal discharge (60%), headache (46%), sneezing (22%), and anosmia (2%).

CT scans showed a deviated septum in 58%, turbinate hypertrophy in 28%, nasal cavity involvement in 90%.

Kennedy CT staging correlated best with intraoperative findings in Stage IV and II cases. This study emphasizes the importance of clinical, endoscopic, and radiological assessments in CRS diagnosis and surgical planning.

5. Conclusion

CRS is a common rhinological condition, mainly affecting those in their 30s and 40s, with nasal polyposis being prevalent. Key symptoms include nasal blockage, discharge, headache, sneezing, facial pain, and anosmia.

Nasal endoscopy is most simple and effective tool which provides very good information about the disease and diagnosis.

CT of the paranasal sinuses is the gold standard investigation.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict-of-interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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