

**From Speculum to Scope: Advancing Sinonasal Disease****Shubhangi Singh<sup>1</sup>, Shiv Shanker Kaushik<sup>2</sup>, Richa Gupta<sup>3</sup>**<sup>1</sup>Resident, Department of ENT, Pacific Medical College and Hospital, Bhilon Ka Bedla, Girwa, Udaipur, Rajasthan<sup>2</sup>Associate Professor, Department of ENT, Pacific Medical College and Hospital, Bhilon Ka Bedla, Girwa, Udaipur, Rajasthan<sup>3</sup>HOD and Professor, Department of ENT, Pacific Medical College and Hospital, Bhilon Ka Bedla, Girwa, Udaipur, Rajasthan

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Conflict of interest: Nil

**Abstract****Background:** Sinonasal diseases are common in otorhinolaryngology, ranging from inflammation to complex infections and neoplasms. Anterior rhinoscopy is often used for initial evaluation but is limited to the anterior nasal structures thus missing deeper pathologies. Nasal endoscopy offers a more comprehensive view allowing detailed visualization of both the anterior and posterior nasal cavities. Despite its superior diagnostic capabilities, nasal endoscopy is still underused due to factors like cost and expertise.**Objective:** To compare merits and demerits of nasal endoscopy vs. anterior rhinoscopy in diagnosis of sinonasal disease.**Methods:** A prospective observational study was conducted on 110 patients presenting in the Department of ENT, PMCH, Udaipur from April 2024 to March 2025 with symptoms of sinonasal disease. Each patient underwent both anterior rhinoscopy and diagnostic nasal endoscopy.**Results:** Nasal endoscopy proved significantly better than anterior rhinoscopy for detecting sinonasal abnormalities, identifying conditions like concha bullosa (40.90% vs. 2.72%), ethmoidal polyps (19.09% vs. 9.09%) etc. It also provided a more detailed assessment of regions such as the sphenoidal recess and superior turbinates and nasopharynx, which were not accessible with anterior rhinoscopy.**Conclusion:** The study highlights the critical role of nasal endoscopy in accurately diagnosing sinonasal disease, particularly in chronic or refractory cases where subtle or posterior pathology may be present. Despite being more resource-intensive, nasal endoscopy should be integrated into routine clinical practice for comprehensive evaluation, as it enables precise diagnosis, better treatment planning, and improved patient outcomes.**Keywords:** Anterior Rhinoscopy, Concha Bullosa, Diagnostic Nasal Endoscopy, Ethmoidal Polyps, Nasal Cavity, Nasal Endoscopy, Nasopharynx, Otorhinolaryngology, Sinonasal Disease and Sphenoidal Recess.**DOI:** 10.25258/ijcpr.18.1.33

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**Introduction**

Sinonasal disease is among the most common conditions encountered in otorhinolaryngology (ENT) practice. These disorders, affecting the nasal cavity and paranasal sinuses, range from simple inflammatory conditions to more complex infections and neoplasms. Accurate and timely diagnosis is essential for effective management and improved patient outcomes. A variety of diagnostic modalities are available to evaluate sinonasal pathology, ranging from basic clinical examinations to more advanced endoscopic techniques.

Advancements in technology have been central to the evolution of medicine, especially in otorhinolaryngology-head and neck surgery, where

innovations in diagnostic and therapeutic tools have significantly enhanced the detection and management of diseases. Nasal endoscopy stands out as one of the key breakthroughs in this field. In the 1960s, the development of the rod optic endoscope by Hopkins revolutionized the optical quality available to surgeons, laying the foundation for the shift from traditional to minimally invasive sinus surgery in the 1970s [1]. Pioneers such as Messerklinger, Stammberger, Draf, and Wigand utilized this technology to transform sinus procedures, enhancing precision and reducing invasiveness [1, 2].

Today, nasal endoscopy allows for a comprehensive and detailed examination of the nasal and sinus cavities, providing a level of visualization that is unattainable with traditional diagnostic techniques like anterior rhinoscopy, which is limited to assessing only the anterior nasal structures [3]. Anterior rhinoscopy is often the first-line tool, offering a quick and accessible method to assess the nasal cavity. However, it provides only a limited view and may miss deeper or more subtle pathology. While anterior rhinoscopy remains a common first-line diagnostic method, its ability to identify deeper or posterior lesions, such as those in the middle meatus, sphenoidal recess, or posterior nasal cavity, is restricted. In contrast, nasal endoscopy offers a more thorough examination, enabling the detection of pathologies like nasal polyps, sinus obstruction, and hidden mucosal abnormalities that anterior rhinoscopy may miss.

Despite its advantages, nasal endoscopy is still underutilized in some clinical settings, often due to concerns about cost, required expertise, and time constraints. As a result, anterior rhinoscopy continues to be a standard diagnostic tool in many practices, especially in outpatient settings. This study systematically compares the diagnostic efficacy of nasal endoscopy and anterior rhinoscopy in identifying sinonasal pathologies, with a particular focus on their relative diagnostic yield, visualization capabilities, and clinical relevance. Additionally, the study helped in exploring the frequency and types of anatomical variants around the osteomeatal complex and assess the distribution of sinonasal mucosal abnormalities and other pathological changes.

## Materials and Methods

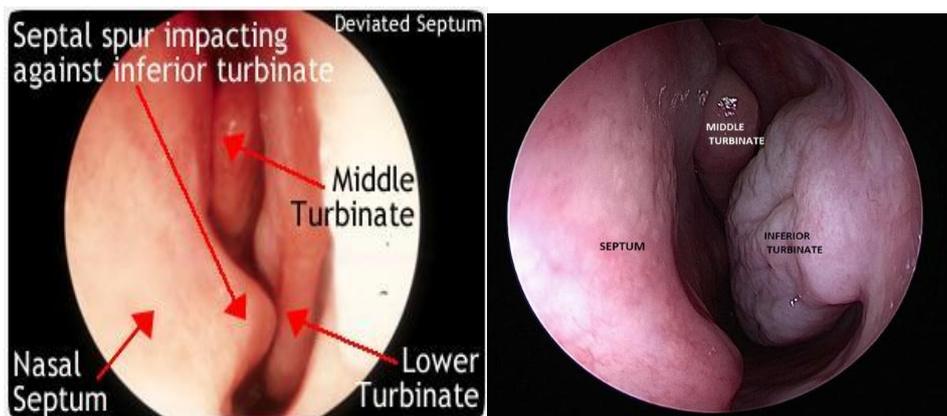


Figure 1: Nasal Endoscopy

## Results and Discussion

**Study Design and Setting:** A prospective observational study was conducted at ENT Department, PMCH, Udaipur over a period of 12 months from April 2024 to March 2025. Informed written consent was obtained from all participants.

**Study Population:** A total of 110 patients, presenting with symptoms of sinonasal disease (nasal obstruction, discharge, facial pain, or hyposmia), were included.

### Inclusion Criteria:

- All patients irrespective of age and gender
- Patients with nasal obstruction, discharge, headache, epistaxis, post nasal drip, facial pain or smell disturbances

### Exclusion Criteria:

- Previous nasal surgery
- People not willing to participate in study

**Clinical Assessment Procedure:** Each participant underwent a detailed history with meticulous clinical examination of ear, nose and throat, followed by:

Anterior Rhinoscopy using a Thudicum nasal speculum and headlight under standard illumination. Structures were assessed.

Nasal Endoscopy (Figure 1) using a 0-degree rigid nasal endoscope (4 mm, Karl Storz) connected to a light source and camera system. Structures were evaluated.

Both procedures were performed by the same otolaryngologist to reduce interobserver variability. Findings were recorded on a standardized proforma.

**Table 1: Symptom wise distribution**

S. No.	Symptoms	Number (Percentage )
1	Nasal Blockage	75 (68.18%)
2	Nasal Discharge	52 (47.27%)
3	Headache	48 (43.63%)
4	Facial Pain	26 (23.63%)
5	Epistaxis	10 (9.0%)
6	Post Nasal Drip	7 (6.36%)
7	Anosmia/ Hyposmia	5 (4.54%)

**Table 2: Comparative table between anterior rhinoscopy and nasal endoscopy**

S. No.	Findings	Anterior Rhinoscopy No. (%)	Nasal Endoscopy No. (%)	p-value
1	Middle Meatus discharge	60 (54.54%)	82(74.54%)	p = 0.00308(s)
2	DNS	42 (38.19%)	64(58.18%)	p = 0.00460 (s)
3	Post spur	0	12(10.90%)	p = 0.001099(s)
4	Inferior Turbinate Hypertrophy	45 (40.90%)	49 (44.54%)	p = 0.68264(ns)
5	Antro choanal Polyp	5 (4.54%)	9(8.18%)	p = 0.40734(ns)
6	Ethmoidal Polyp	10(9.09%)	21(19.09%)	p = 0.05265(ns)
7	Pneumatized uncinata	0	9(8.18%)	p = 0.00647(s)
8	Concha Bullosa	3(2.72%)	45(40.90%)	p < 0.00001(s)
9	Spheno ethmoidal Recess	0	22(20.0%)	p < 0.00001(s)
10	Superior turbinate	0	36(32.72%)	p < 0.00001(s)
11	Nasopharynx	0	100(90.90%)	p < 0.00001(s)

S= significant p- value; NS = Not Significant P- value

The study was conducted on 110 patients presenting with various sinonasal symptoms, encompassing a wide age range from 10 to 65 years, which underscores the diverse demographic affected by sinonasal diseases. This age distribution reflects the broad spectrum of patients impacted by these conditions, ranging from pediatric to geriatric populations. While sinonasal issues can occur at any age, chronic conditions such as nasal polyps, chronic rhinosinusitis, and Deviated Nasal Septum (DNS) are predominantly observed in adults, with a noted peak incidence in the middle-aged population, typically between 30 and 50 years [4]. The inclusion of pediatric patients highlights the importance of recognizing sinonasal diseases early in life, as children may present with symptoms like nasal obstruction, nasal discharge, and headaches, which, if untreated, can affect quality of life and lead to complications [5]. Moreover, pediatric sinonasal diseases often require distinct diagnostic considerations and management strategies compared to adults due to anatomical and physiological differences.

The gender distribution in this study showed a predominance of males (58.18%) compared to females (41.81%), a finding consistent with other epidemiological reports in otorhinolaryngology. This male predominance may be attributed to several factors, including sociocultural influences that affect health-seeking behavior and access to medical care. In many societies, males are more likely to seek timely medical evaluation for chronic conditions, possibly due to greater health awareness

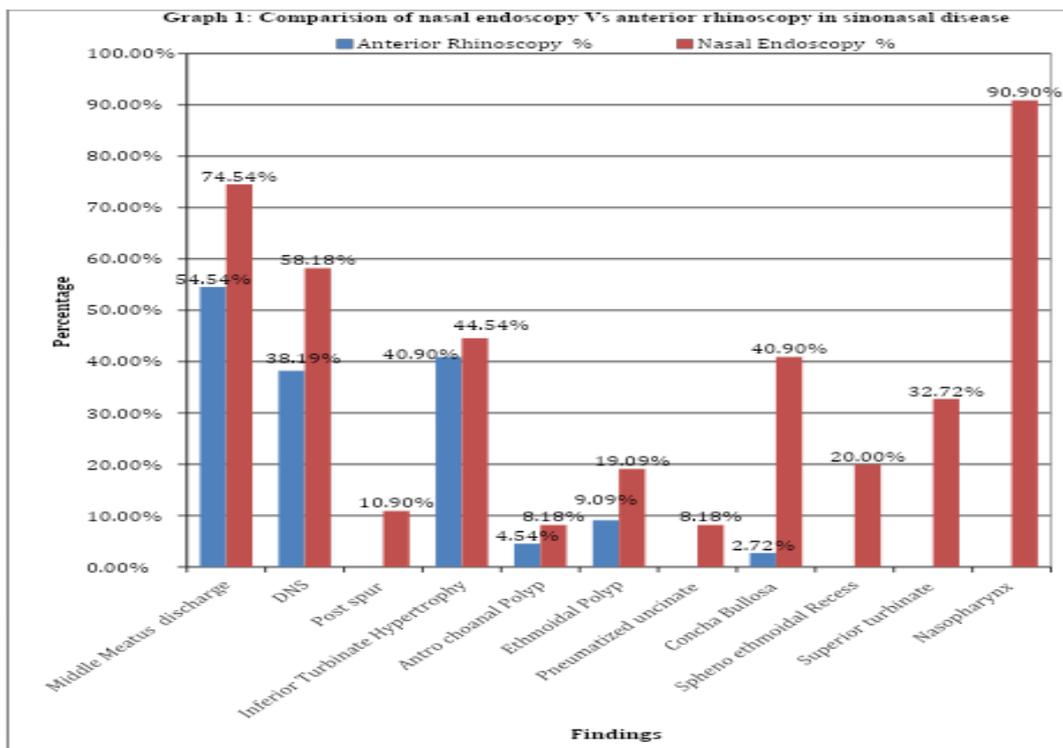
or fewer social barriers [6,7]. Additionally, certain sinonasal pathologies such as nasal polyps and chronic rhinosinusitis have demonstrated a slight male preponderance in multiple studies, though the pathophysiological reasons behind this gender bias remain unclear and are an area of ongoing research [8]. Understanding these disparities is essential, as they may impact disease detection rates and outcomes, especially in regions where females face significant healthcare access limitations due to socioeconomic or cultural barriers. The symptomatology of the study population mirrors the typical clinical presentation of sinonasal diseases. As discussed in Table 1, Nasal blockage was the most common symptom, affecting 68.18% of patients, followed by nasal discharge in 47.27%. These symptoms are hallmark features of both acute and chronic rhinosinusitis and are often indicative of underlying anatomical obstructions such as DNS or turbinate hypertrophy, as well as inflammatory processes like nasal polyposis [9,10]. Headache, reported in 43.63% of patients, is frequently associated with sinus congestion leading to increased pressure within the paranasal sinuses, causing discomfort or pain. This finding aligns with other clinical studies by Hwang, P.H. & Lanza, D.C, that identify headache as a common, though sometimes under-recognized, symptom of sinonasal inflammation [11]. Facial pain and post-nasal drip were also notable symptoms, affecting 23.63% and 6.36% of patients respectively, frequently linked to chronic inflammatory conditions where mucus accumulates in the nasal and sinus cavities, often irritating the mucosa and draining into the pharynx.

Less frequently observed were anosmia or hyposmia (4.54%) and epistaxis (9%), symptoms that, while less common, are significant clinical indicators; anosmia is a key marker for nasal polyps or other obstructive pathologies that impair olfactory airflow, and epistaxis can signify mucosal irritation or vascular fragility within the nasal passages [12].

Regarding symptom duration, 22.4% of patients presented with acute symptoms lasting less than four weeks, 37.9% had subacute symptoms lasting between four and twelve weeks, and 39.7% exhibited chronic symptoms persisting for more than twelve weeks. This distribution underscores the high burden of chronic sinonasal disease within the study population and emphasizes the importance of timely and accurate diagnostic evaluation. Chronic and subacute presentations often require more sophisticated diagnostic tools beyond simple anterior rhinoscopy, as subtle mucosal changes and posterior nasal cavity pathologies may be missed without enhanced visualization [4]. This chronicity highlights the need for effective diagnostic modalities that facilitate early detection and appropriate management, preventing disease progression and improving patient outcomes. The comparison between anterior rhinoscopy and nasal endoscopy in detecting sinonasal pathologies revealed significant differences in their diagnostic capabilities, as shown in table 2 and graph 1. Nasal endoscopy proved superior for identifying both anterior and posterior nasal cavity conditions, as well as deeper sinus structures, which are often missed by anterior rhinoscopy.

Specifically, in this study, Middle meatus discharge was detected in 54.54% of patients by anterior rhinoscopy compared to 74.54% by nasal endoscopy, consistent with previous findings by Maru and Gupta, who reported 57% detection on anterior rhinoscopy versus 69% on endoscopy [7]. This disparity reflects the enhanced capability of nasal endoscopy to visualize posterior nasal passages and sinus drainage pathways where discharge may accumulate or originate, thereby improving diagnostic accuracy for inflammatory or infectious processes [11]. In our study, Detection of DNS was 38.19% with anterior rhinoscopy but significantly higher at 58.18% using nasal endoscopy, underscoring the limitations of anterior rhinoscopy in assessing posterior septal deviations or complex anatomical variations [5].

Furthermore, post-nasal spurs—osteological projections contributing to nasal obstruction—were not visualized by anterior rhinoscopy but identified in 10.90% of patients by nasal endoscopy, a critical finding as these spurs can exacerbate mucosal inflammation and sinus drainage obstruction, perpetuating chronic disease [10]. Concha bullosa, a pneumatized and enlarged middle turbinate known to influence sinonasal airflow and disease pathogenesis, was noted in only 2.72% of patients by anterior rhinoscopy, but its detection rose dramatically to 40.90% via nasal endoscopy. This illustrates the superior ability of endoscopy to assess middle turbinate anatomy, which is often obscured in traditional examination [8]



Graph 1: Comparison of nasal endoscopy Vs anterior rhinoscopy in sinonasal disease

In our study, Ethmoidal polyps were detected in 19.09% of cases using nasal endoscopy compared to 9.09% with anterior rhinoscopy, aligning with literature by Maru, K.Y. & Gupta, Y that reports many polyps localized to the middle meatus or ethmoidal region are commonly missed without endoscopic evaluation [7]. Similarly our study shows, pneumatization of the uncinat process, an anatomical variant that can predispose to chronic rhinosinusitis by obstructing sinus drainage, was entirely missed by anterior rhinoscopy but identified in 8.18% of cases on nasal endoscopy. This finding is comparable to the 19% prevalence reported by Awasthi et al., underscoring the clinical relevance of identifying subtle anatomical variations through advanced imaging [8].

Notably, in our study the nasopharynx was not visualized at all by anterior rhinoscopy but examined successfully in 90.90% of patients using nasal endoscopy. This capability is crucial for detecting nasopharyngeal pathologies such as tumors, lymphoid hyperplasia, and chronic infections that may contribute to persistent sinonasal symptoms or mimic other diseases. The enhanced visualization of areas like the sphenoidal recess (20%) and superior turbinates (32.72%) further exemplifies the extended diagnostic reach of nasal endoscopy beyond the limitations of anterior rhinoscopy.

In this study, nasal endoscopy was essential for confirmatory diagnosis in 22 cases of DNS, 4 cases of antrochoanal polyps, and 11 cases of ethmoidal polyps. Shelkar et al. also reported that anterior rhinoscopy failed to identify pathology in 39% of cases that were subsequently diagnosed on nasal endoscopy, highlighting the necessity of endoscopic examination in comprehensive sinonasal assessment [9]. Nasal endoscopy offers clear advantages over anterior rhinoscopy by detecting a broader range of sinonasal pathologies, especially those in deeper nasal and sinus structures that anterior rhinoscopy often misses.

This makes it essential for diagnosing complex or persistent conditions. However, nasal endoscopy is more costly, requires specialized training, and may be less accessible in resource-limited settings. It is also more invasive, requiring patient cooperation or sedation, which can be challenging for children or the elderly. Despite these limitations, its superior diagnostic capability makes it a valuable tool for accurate diagnosis and better treatment planning

The results of this study highlight important clinical implications in the evaluation and management of sinonasal disease. Anterior rhinoscopy, though widely used as an initial diagnostic tool, is limited by its restricted field of view and inability to assess deeper nasal and sinus structures. As demonstrated in this study, it missed several clinically significant

findings such as post-nasal spurs, pneumatized uncinat processes, and posterior ethmoidal polyps, which were successfully identified using nasal endoscopy. Furthermore, critical anatomical areas like the nasopharynx, sphenoidal recess, and superior turbinates were not visualized at all with anterior rhinoscopy but were well evaluated with nasal endoscopy.

These limitations can lead to underdiagnosis or mismanagement, particularly in patients with chronic or refractory symptoms. For instance, 40% of patients in this study had chronic symptoms lasting more than 12 weeks, where subtle or posterior pathologies may play a crucial role—conditions that anterior rhinoscopy failed to detect. The superior sensitivity of nasal endoscopy allows for the early detection of structural abnormalities, inflammation, and mucosal changes, leading to more accurate diagnoses and timely intervention.

Clinically, the routine incorporation of nasal endoscopy in the diagnostic workup of patients with persistent sinonasal symptoms could enhance disease management, reduce recurrence rates, and improve patient outcomes. It allows clinicians to better assess surgical indications, monitor post-operative recovery, and tailor medical therapy based on a more precise anatomical and pathological understanding.

However, practical barriers to widespread use—such as equipment costs, need for clinician expertise, and patient tolerance—must be acknowledged. These challenges particularly affect primary care settings and resource-limited environments, where anterior rhinoscopy may remain the only accessible diagnostic tool. As such, increasing training opportunities and advocating for wider availability of endoscopic tools could help bridge this diagnostic gap in broader clinical practice.

## Conclusion

This study clearly demonstrates the diagnostic superiority of nasal endoscopy over anterior rhinoscopy in evaluating sinonasal disease. Nasal endoscopy identified a broader range of pathologies—including those affecting posterior and deeper nasal structures—that anterior rhinoscopy could not detect. Conditions such as concha bullosa, ethmoidal polyps, post-nasal spurs, and nasopharyngeal abnormalities were significantly underdiagnosed using anterior rhinoscopy alone.

Nasal endoscopy provides critical insights into anatomical variations and pathological changes that directly impact clinical decision-making. Despite its limitations regarding cost, availability, and invasiveness, its benefits in accurate diagnosis, especially for complex or persistent cases, justify its

use as a standard part of sinonasal evaluation. Nasal endoscopy should be regarded as the gold standard for comprehensive sinonasal assessment. Its routine use in specialized settings can lead to improved diagnostic accuracy, better-targeted treatments, and ultimately, enhanced patient outcomes in sinonasal disease management.

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