



Endoscopic Rhinology: New Possibilities in Diagnosing Diseases of the Nasal and Maxillary Sinus Cavities

Otamuratova Durdona Umar kizi

Is A 3rd-Year Student At Alfraganus University, Faculty Of General Medicine And Pediatrics

ABSTRACT

This article analyzes the modern role of endoscopic rhinology in diagnosing diseases of the nasal and maxillary (paranasal) sinus cavities, particularly chronic rhinosinusitis. Based on international scientific publications, it covers the comparative diagnostic efficacy of diagnostic nasal endoscopy and computed tomography, their sensitivity and specificity indicators, as well as modern diagnostic criteria based on the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS2020). The article also examines the historical development of functional endoscopic sinus surgery (FESS), its impact on clinical outcomes, and its importance in improving patients' quality of life.

Keywords:

endoscopic rhinology, chronic rhinosinusitis, diagnostic nasal endoscopy, computed tomography, EPOS2020, functional endoscopic sinus surgery (FESS), nasal polyp, Lund-Kennedy scale, Lund-Mackay scale, SNOT-22.

Introduction

Chronic rhinosinusitis (CRS) is an inflammation of the mucous membrane of the nose and surrounding maxillary sinus cavities lasting at least 12 weeks, and it is one of the widespread conditions occurring in approximately 5–15% of the general population [1]. According to studies conducted in the United Kingdom, CRS has been recorded in approximately 11% of the population, significantly and negatively affecting patients' quality of life and placing a substantial economic burden on society and the healthcare system [2].

According to the latest, 2020 version of the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS2020), diagnosing CRS requires that a patient have at least two symptoms — nasal blockage/congestion, nasal discharge (anterior or posterior), facial pain or pressure sensation, and reduced sense of smell — persisting for more than 12 weeks, and these symptoms must be objectively confirmed through endoscopic or radiological examination [1]. CRS is divided into two main phenotypes —

the form occurring with nasal polyps (CRSwNP) and the form without polyps (CRSSNP), which are distinguished from one another specifically through nasal endoscopy [1].

The introduction of the endoscopic diagnostic method into medicine dates back to the 1970s–1980s. The diagnostic endoscopy concept developed by Austrian scientist Walter Messerklinger and his student Heinz Stammberger made it possible to gain a new understanding of the ventilation and drainage pathways of the nasal and maxillary sinus cavities [3]. Together with his American colleague David Kennedy, this method became widely known worldwide under the name "functional endoscopic sinus surgery" (FESS) and was introduced to English-speaking countries in 1985–1986 [3]. In this way, endoscopy initiated revolutionary changes not only in surgery but also in the field of diagnostics, as it made it possible to directly and precisely view changes in the lateral nasal wall and the middle nasal meatus (meatus medius).

Today, diagnostic nasal endoscopy (DNE) is one of the primary methods used alongside computed tomography (CT) in detecting CRS. However, the scientific literature presents varying findings regarding the diagnostic accuracy of these two methods, their interrelationship, and their role in clinical practice. The purpose of this article is to analyze the modern possibilities of endoscopic rhinology in diagnosing chronic rhinosinusitis, the comparative effectiveness of diagnostic nasal endoscopy and computed tomography, and the impact of endoscopic sinus surgery on clinical outcomes, based on recent scientific literature.

Materials and Methods

For this study, peer-reviewed primary scientific articles, systematic reviews, and meta-analyses published between 2015 and 2025 in authoritative international scientific databases (PubMed, PMC, Cureus, Biomedicine, Journal of Laryngology & Otology) were selected. The selection criteria included sources examining the comparative analysis of diagnostic nasal endoscopy and computed tomography in diagnosing chronic rhinosinusitis, the EPOS2020 international guidelines, and the clinical outcomes of functional endoscopic sinus surgery.

Using a descriptive-analytical method, the diagnostic sensitivity, specificity, predictive values (PPV, NPV), and correlation indicators between the Lund-Kennedy endoscopic scale and the Lund-Mackay radiological scale from the selected sources were comparatively analyzed. Additionally, data on patient-reported outcome measures (PROM), such as the Sino-Nasal Outcome Test (SNOT-22) used to assess clinical outcomes after endoscopic sinus surgery, were summarized.

Results

The analyzed studies showed that diagnostic nasal endoscopy has high sensitivity in detecting chronic rhinosinusitis. Specifically, a study conducted with 109 patients in Kanpur (India) found that DNE had a sensitivity of 93.42%, a specificity of 75.75%, a positive predictive value of 89.33%, and a negative predictive value of 83.33%, with a statistically

significant association found between endoscopic and radiological findings ($\chi^2 = 55.20$; $p < 0.00000001$) [4]. In another study, DNE showed a sensitivity of 94% and a specificity of 75%, with a high correlation observed between the Lund-Kennedy endoscopic scale and the Lund-Mackay CT scale (Pearson coefficient $r = 0.881$; $p < 0.0001$).

At the same time, some studies observed that the positive findings of computed tomography were somewhat higher than those of diagnostic endoscopy (88.6% versus 82.9%, respectively), indicating CT's superiority in detecting pathology in deeper-located sinuses — particularly the posterior ethmoid and sphenoid cavities. As an overall conclusion, DNE is regarded as a highly effective primary method suitable for outpatient settings, while CT is recognized as the "gold standard" necessary for fully assessing anatomical location and planning surgical procedures [4].

Studies examining the outcomes of endoscopic sinus surgery (ESS/FESS) confirm its positive effect on patients' quality of life. A recently conducted systematic review and meta-analysis found that quality of life (QOL) indicators improved to a statistically significant degree ($p < 0.001$) in patients who underwent ESS, and the disease recurrence rate was approximately 6% [5]. Furthermore, recent studies have shown that ESS significantly reduces not only the primary symptoms in the nasal and maxillary sinus cavities, but also the symptoms of Eustachian tube dysfunction that accompany chronic rhinosinusitis, since the paranasal sinuses are anatomically directly connected to the middle ear via the Eustachian tube [6].

Discussion

The results obtained show that diagnostic nasal endoscopy and computed tomography are complementary rather than competing methods in diagnosing CRS, working in collaboration with one another. The high sensitivity of DNE allows it to be recommended in practice as a primary, rapid, and minimally invasive screening method, while the high accuracy of CT is of incomparable importance in severe or recurrent cases, especially in planning surgical procedures [4]. Therefore, the modern clinical approach calls for applying both methods sequentially and in a complementary manner:

an initial diagnosis is first made through endoscopic examination, after which anatomical confirmation is carried out using CT in complex or questionable cases.

The functional approach founded by Messerklinger and Kennedy — namely, the strategy aimed at identifying and treating changes in the middle nasal meatus (osteomeatal complex), the original source of the disease — forms the theoretical foundation of modern rhinology [3]. This approach serves not only to reduce the scope of surgery but also to improve diagnostic accuracy, since in many cases inflammation in the larger sinuses is actually a secondary result of obstruction in the smaller, but functionally important, drainage pathways.

It is also worth noting the systemic, not merely local, effect of endoscopic sinus surgery — the improvement of Eustachian tube function following ESS [6] once again confirms the anatomical and functional connection between the nasal and maxillary sinus cavities and the middle ear. This requires otorhinolaryngologists to comprehensively assess patients not only in terms of nasal complaints but also ear-related complaints. In the modern literature, the use of biological agents (such as dupilumab) alongside surgery in severe and recurrent cases is also being discussed, though endoscopic surgery still remains the primary and widely used treatment method in this regard [5].

Conclusion

The analysis conducted shows that endoscopic rhinology has risen to a qualitatively new level in recent decades in diagnosing diseases of the nasal and maxillary sinus cavities, particularly chronic rhinosinusitis. Diagnostic nasal endoscopy has secured its place as a primary diagnostic method with high sensitivity that is minimally invasive and can be used in outpatient settings, while computed tomography holds its place as the precise method necessary for fully assessing anatomical aspects and planning surgery. The complex and stepwise application of both methods in accordance with the EPOS2020 international guidelines reduces diagnostic errors and enables the correct choice of treatment strategy.

It has been scientifically confirmed that functional endoscopic sinus surgery, developed on the basis of the Messerklinger technique, significantly improves patients' quality of life, reduces disease symptoms, and has a relatively low recurrence rate. In the future, further advancement of endoscopic technique and imaging technologies (including digital navigation systems), as well as the development of diagnosis and treatment based on individualized approaches, will serve to make this field even more effective. Therefore, it remains a pressing task to provide practicing otorhinolaryngologists and rhinologists with regular professional development in modern endoscopic diagnostic methods, as well as to widely introduce endoscopy and computed tomography into clinical practice as mutually complementary methods.

References

1. Fokkens W.J., Lund V.J., Hopkins C., Hellings P.W., Kern R., Reitsma S., et al. European Position Paper on Rhinosinusitis and Nasal Polyps 2020 (EPOS2020). — *Rhinology*, 2020.
2. Noon E., Hopkins C. Review article: outcomes in endoscopic sinus surgery. — 2016. DOI: 10.1186/s12901-016-0030-8.
3. Coulson C. The early history and development of functional endoscopic sinus surgery. — *The Journal of Laryngology & Otology*, 2020, Vol. 134, Issue 1, pp. 8–13. DOI: 10.1017/S0022215119002457.
4. Singh A.K., Kanaujia S.K., Khan M.S. Determination of Sensitivity and Specificity of Diagnostic Nasal Endoscopy Compared to Computed Tomography Scan of Nasal and Paranasal Sinuses Among Patients Suffering From Chronic Rhinosinusitis. — *Cureus*, 2025. DOI: 10.7759/cureus.87760.
5. Weissman B., Shen K., Flanagan O.L., Chowdhury S., Sawires J. Comparing Medical and Surgical Management of Chronic Rhinosinusitis: A Systematic Review of Dupilumab and Endoscopic Sinus Surgery. — *Cureus*, 2025. DOI: 10.7759/cureus.79742.
6. Yang K.S., Chen W.C., Wu C.N., Wee Y.S., Wang C.S., Wu C.C., Luo S.D. Endoscopic Sinus Surgery Significantly Reduces Eustachian Tube Dysfunction Symptoms in Patients with Chronic Rhinosinusitis: A Systematic Review and Meta-

Analysis. — Biomedicines, 2024. DOI:
10.3390/biomedicines12112484.