

Chronic Rhinosinusitis: Contemporary Diagnosis and Evidence-Based Management

Dr. Surendra Kumar Sharma¹, Dr. Sharadkumar Pralhad Sawant²

¹ENT Specialist, S.K. Govt. Hospital, Sikar

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Abstract

Chronic rhinosinusitis (CRS) is a persistent inflammatory disorder of the nasal cavity and paranasal sinuses associated with substantial morbidity, impaired quality of life, sleep disturbance, and reduced productivity. Its clinical presentation is heterogeneous, reflecting differences in inflammatory mechanisms, anatomical factors, comorbidities, and disease phenotypes. Advances in endoscopic assessment, computed tomography, inflammatory profiling, and targeted biological therapies have transformed contemporary approaches to diagnosis and management.

CRS is generally defined by the presence of characteristic sinonasal symptoms for at least 12 weeks, accompanied by objective evidence of inflammation on nasal endoscopy, anterior rhinoscopy, or computed tomography. Clinically, it is classified into chronic rhinosinusitis with nasal polyps (CRSwNP) and chronic rhinosinusitis without nasal polyps (CRSSNP). Accurate diagnosis requires careful history-taking, assessment of symptom burden, identification of associated conditions, and exclusion of alternative diagnoses. Nasal endoscopy and non-contrast computed tomography of the paranasal sinuses play complementary roles in confirming disease and planning treatment.

Management aims to control inflammation, improve sinonasal function, reduce exacerbations, and restore quality of life. Saline nasal irrigation and intranasal corticosteroids constitute the foundation of medical treatment. Selected patients may benefit from short courses of systemic corticosteroids, appropriately indicated antimicrobial therapy, endoscopic sinus surgery, or biologic agents. Antibiotics should not be routinely prescribed for stable CRS, and antifungal therapy is not recommended for routine treatment. Biologic agents have expanded treatment options for selected patients with severe CRSwNP, particularly when conventional medical and surgical treatment has failed or surgery is unsuitable.

This narrative review summarizes the contemporary understanding of CRS, including its pathophysiology, clinical classification, diagnostic evaluation, evidence-based medical and surgical management, emerging targeted therapies, complications, and future directions. An individualized, multidisciplinary approach remains essential for optimizing outcomes and minimizing unnecessary treatment.

Keywords: Chronic rhinosinusitis, nasal polyps, nasal endoscopy, computed tomography, intranasal corticosteroids, endoscopic sinus surgery, biologic therapy, evidence-based management.

1. Introduction

Chronic rhinosinusitis is one of the most common chronic inflammatory disorders encountered in otorhinolaryngology. It affects the nasal mucosa and paranasal sinuses and may produce persistent nasal obstruction, nasal discharge, facial pressure, and reduction or loss of smell. In addition to local symptoms, CRS can interfere with sleep, concentration, occupational performance, and general well-being. Its prolonged course and tendency to recur make it an important clinical and public health concern.

The traditional concept of sinusitis emphasized infection of the paranasal sinuses. Contemporary understanding recognizes CRS as a heterogeneous inflammatory condition in which mucosal inflammation, impaired mucociliary clearance, epithelial barrier dysfunction, host immune responses, and environmental factors interact. Microorganisms may contribute to selected disease processes, but persistent CRS cannot be explained solely by bacterial infection. Consequently, treatment based exclusively on repeated antibiotic courses is inappropriate for many patients. [1–3]

The European Position Paper on Rhinosinusitis and Nasal Polyps 2020 (EPOS 2020) and the International Consensus Statement on Allergy and Rhinology: Rhinosinusitis 2021 provide comprehensive frameworks for classification, diagnosis, and management. The American Academy of Otolaryngology–Head and Neck Surgery Foundation subsequently updated its adult sinusitis guideline in 2025, reinforcing objective confirmation of CRS, appropriate use of topical therapy, assessment of modifying conditions, and selective use of biologic agents. [1–3]

CRS is conventionally classified into chronic rhinosinusitis with nasal polyps (CRSwNP) and chronic rhinosinusitis without nasal polyps (CRSSNP). These phenotypes differ in their clinical manifestations, inflammatory characteristics, treatment response, and recurrence patterns. However, phenotype alone does not fully describe the underlying inflammatory mechanisms, and endotyping has become increasingly important in selected patients. [1,2]

Contemporary management therefore requires accurate diagnosis, assessment of disease severity, identification of associated disorders, appropriate pharmacotherapy, and timely consideration of surgery or targeted treatment. The present narrative review examines these developments from the perspective of clinical ENT practice.

OBJECTIVES

The objectives of this review are:

1. To describe the contemporary concepts and pathophysiology of chronic rhinosinusitis.
2. To discuss clinical presentation, classification, and diagnostic criteria.
3. To outline the roles of nasal endoscopy, computed tomography, and selected laboratory investigations.
4. To review evidence-based medical treatment and the appropriate use of antibiotics and systemic corticosteroids.
5. To discuss indications for endoscopic sinus surgery and biologic therapy.

6. To highlight comorbidities, complications, limitations in current evidence, and future research priorities.

REVIEW METHODOLOGY

This article is a narrative review of published literature on adult CRS. The discussion draws on major international position papers, clinical practice guidelines, systematic reviews, randomized controlled trials, and influential clinical studies, including EPOS 2020, ICAR-RS 2021, and the 2025 American Academy of Otolaryngology–Head and Neck Surgery Foundation adult sinusitis guideline.

The literature was considered for its relevance to disease classification, diagnostic evaluation, medical treatment, surgery, biologic therapy, and long-term disease control. This was not a systematic review: no prospectively registered protocol, reproducible database search strategy, formal risk-of-bias assessment, or quantitative synthesis was undertaken. The recommendations presented should therefore be interpreted as a clinically oriented synthesis rather than an exhaustive systematic evaluation of all available evidence.

CONCEPT AND CLASSIFICATION OF CHRONIC RHINOSINUSITIS

CRS is defined by persistent sinonasal symptoms lasting at least 12 weeks, together with objective evidence of inflammation. In adults, the commonly accepted symptom criteria include at least two symptoms, one of which should be nasal obstruction or nasal discharge, with or without facial pain or pressure and reduction or loss of smell. Objective evidence is required to avoid diagnosing CRS on symptoms alone. [1–3]

Clinical phenotypes

1. Chronic rhinosinusitis with nasal polyps (CRSwNP)

CRSwNP is characterized by inflammatory polypoid lesions arising from the sinonasal mucosa, usually visible in the middle meatus or nasal cavity on endoscopic examination. Patients commonly report bilateral nasal obstruction, impaired olfaction, nasal discharge, and reduced quality of life. Type 2 inflammation, involving pathways associated with eosinophils and cytokines such as interleukin-4, interleukin-5, and interleukin-13, is prominent in many cases, although inflammatory patterns vary between populations and individuals. Asthma and aspirin-exacerbated respiratory disease may coexist. [1,2]

2. Chronic rhinosinusitis without nasal polyps (CRSsNP)

CRSsNP is diagnosed when the clinical and objective criteria for CRS are met but nasal polyps are absent on appropriate examination. Its inflammatory profile is heterogeneous and may include different combinations of neutrophilic, eosinophilic, and other immune responses. Facial pressure, nasal discharge, obstruction, and reduced quality of life may occur, but no single symptom reliably distinguishes this phenotype from CRSwNP. [1,2]

Phenotypic classification supports clinical decision-making, while endotyping may provide additional information about the dominant inflammatory pathways. Endotyping is particularly relevant when considering advanced treatments for severe or recurrent disease.

PATHOPHYSIOLOGY

The pathogenesis of CRS is multifactorial and incompletely understood. Current evidence supports interactions among epithelial barrier dysfunction, innate and adaptive immune responses, mucociliary impairment, microbial communities, environmental exposures, and host susceptibility. [1,2]

1. Mucosal inflammation and epithelial dysfunction

The sinonasal epithelium provides a physical and immunological barrier against inhaled particles and microorganisms. Disruption of epithelial integrity may increase exposure to environmental stimuli and contribute to persistent inflammation. Altered mucociliary clearance may further impair removal of mucus, allergens, and particulate matter.

2. Immune dysregulation

Many cases of CRSwNP, particularly in populations with high rates of type 2 inflammation, demonstrate eosinophilic inflammation and elevated type 2 cytokine activity. These pathways contribute to mucosal oedema, polyp formation, and impaired olfactory function. Other patients exhibit non-type 2 or mixed inflammatory patterns. This heterogeneity partly explains why treatment responses differ among individuals. [1,2]

3. Microbial factors

Bacterial communities and their interactions with the host immune system may influence disease activity in selected patients. However, the presence of microorganisms does not establish that persistent bacterial infection is the primary cause of every CRS presentation. Antibiotic prescribing should therefore be guided by clinical circumstances rather than by the chronic diagnosis alone.

4. Host susceptibility and comorbidities

Asthma, aspirin-exacerbated respiratory disease, allergic disease, immunodeficiency, cystic fibrosis, and primary ciliary dyskinesia may modify disease presentation, severity, recurrence, and treatment response. Recognizing these associations is important when disease is severe, unusually persistent, recurrent, or refractory to appropriate treatment. [1–3]

CLINICAL PRESENTATION AND DIAGNOSTIC EVALUATION

1. Clinical history

A detailed history is the first step in the assessment of suspected CRS. The ENT specialist should document symptom duration, severity, progression, previous treatments, response to medication, prior sinonasal surgery, and the effect of symptoms on daily functioning.

Important symptoms include:

- **Nasal obstruction:** Persistent blockage caused by mucosal oedema, secretions, or nasal polyps.
- **Nasal discharge:** Anterior rhinorrhoea or posterior nasal drainage.
- **Facial pain or pressure:** May accompany CRS but is not specific and should prompt consideration of alternative causes when it is the predominant symptom.
- **Olfactory dysfunction:** Reduced or absent smell, particularly common in CRSwNP.
- **Sleep and quality-of-life impairment:** Fatigue, sleep disturbance, reduced concentration, and diminished work productivity.

The clinician should also enquire about asthma, allergic rhinitis, sensitivity to aspirin or other cyclooxygenase-1 inhibitors, recurrent respiratory infections, previous surgery, smoking, occupational exposures, and relevant family history. [1–3]

2. Physical examination and nasal endoscopy

Anterior rhinoscopy may identify mucosal oedema, secretions, or visible polyps, but its ability to assess the middle meatus and deeper sinonasal structures is limited.

Nasal endoscopy provides a more comprehensive assessment. It allows direct visualization of the middle meatus, nasal polyps, mucopurulent secretions, mucosal oedema, crusting, and relevant anatomical abnormalities. Endoscopy also facilitates targeted sampling when microbiological investigation is clinically indicated.

The presence or absence of nasal polyps should be documented because it influences classification and subsequent management. Nevertheless, a normal or inconclusive endoscopic examination does not always exclude CRS, particularly when disease is confined to sinuses that cannot be directly visualized. In such circumstances, CT may be useful. [1–3]

3. Computed tomography of the paranasal sinuses

Non-contrast computed tomography (CT) of the paranasal sinuses is the principal imaging investigation for evaluating the extent and distribution of sinonasal inflammation and defining relevant anatomy. It can demonstrate mucosal thickening, partial or complete sinus opacification, ostiomeatal complex obstruction, and anatomical variations important for surgical planning.

CT should be interpreted in conjunction with clinical findings. Incidental mucosal abnormalities may occur in individuals without clinically significant CRS; therefore, imaging findings alone should not establish the diagnosis. Radiation exposure should also be considered when deciding whether imaging is necessary.

CT is particularly useful when endoscopic findings are inconclusive, symptoms persist despite appropriate treatment, complications or alternative pathology are suspected, or surgery is being considered. Routine imaging is not required for every patient with typical, uncomplicated symptoms when sufficient diagnostic evidence is already available. [1–3]

4. Symptom severity and patient-reported outcomes

Objective findings do not always correlate closely with the patient's perceived disease burden. Patient-reported outcome measures help assess the impact of CRS and monitor response to treatment.

The 22-item Sino-Nasal Outcome Test (SNOT-22) is widely used to evaluate sinonasal symptoms, sleep-related problems, functional impairment, and emotional consequences. It can support baseline assessment, shared decision-making, and postoperative follow-up. However, it should complement rather than replace clinical examination and objective confirmation of inflammation. [1,2]

5. Additional investigations

Additional testing should be guided by the clinical presentation rather than performed indiscriminately.

- **Allergy assessment:** Consider when allergic symptoms or relevant exposure patterns suggest that identifying allergic disease would change management.
- **Immune evaluation:** Consider in patients with recurrent or unusually severe infections, persistent disease despite appropriate treatment, or a history suggestive of immunodeficiency.
- **Microbiological culture:** Consider in selected patients with persistent purulent disease, treatment failure, acute exacerbations, or unusual organisms. Endoscopically directed specimens are generally preferable to indiscriminate nasal swabs.
- **Histopathology:** May be indicated for atypical, unilateral, rapidly progressive, destructive, or otherwise suspicious lesions to exclude neoplasia, granulomatous disease, or other pathology.
- **Additional systemic investigations:** May be appropriate when clinical findings suggest cystic fibrosis, primary ciliary dyskinesia, vasculitis, or another underlying disorder.

Unilateral nasal obstruction, recurrent unilateral bleeding, orbital symptoms, facial numbness, or a suspicious mass should prompt careful assessment for alternative diagnoses rather than being attributed automatically to CRS.

EVIDENCE-BASED MANAGEMENT

The principal goals of CRS management are to reduce inflammation, improve drainage and mucociliary function, restore olfaction where possible, improve quality of life, and minimize exacerbations and

treatment-related harm. Treatment should be individualized according to phenotype, disease severity, comorbidities, previous response, patient preference, and available resources.

1. Patient education and treatment adherence

Patients should understand that CRS is often a chronic inflammatory disorder requiring sustained management rather than repeated short courses of medication. Education should include correct nasal spray technique, appropriate irrigation practices, expected treatment duration, potential adverse effects, and the importance of follow-up.

Shared decision-making is particularly important when discussing surgery, systemic corticosteroids, and biologic therapy. Treatment choices should reflect both objective disease findings and the patient's priorities.

2. Saline nasal irrigation

Saline nasal irrigation is a foundational treatment for CRS. It helps remove mucus, crusts, allergens, and particulate material while supporting mucociliary clearance. It is inexpensive, generally well tolerated, and may be used alongside intranasal corticosteroids. [1,2,4]

High-volume irrigation may provide better distribution through the nasal cavity than low-volume sprays in selected patients, particularly following endoscopic sinus surgery. The technique should be appropriate for the patient's anatomy and clinical circumstances.

Patients must use sterile, distilled, or previously boiled and cooled water for irrigation and clean the irrigation device according to manufacturer instructions. Untreated tap water should not be used for nasal irrigation.

3. Intranasal corticosteroids

Intranasal corticosteroids are a cornerstone of long-term treatment for both CRSwNP and CRSsNP. They reduce mucosal inflammation and can improve nasal obstruction, discharge, and polyp-related symptoms. Their relatively favorable safety profile makes them suitable for sustained treatment in many patients. [1,2,4]

Commonly used agents include mometasone, fluticasone, and budesonide. The choice of preparation and delivery method should account for disease distribution, patient preference, adherence, and local availability.

Correct technique is essential. Patients should generally direct the spray away from the nasal septum to reduce local irritation and epistaxis. Local dryness, irritation, and nosebleeds may occur. Persistent bleeding or other adverse effects warrant reassessment.

High-volume corticosteroid-containing irrigation may be considered in selected patients, particularly following surgery, but the formulation, dose, duration, and safety considerations should be individualized. Such use may be off-label depending on the preparation and jurisdiction.

4. Systemic corticosteroids

Short courses of oral corticosteroids may be considered for selected patients with severe CRSwNP, substantial obstruction, or marked olfactory impairment when the anticipated benefit outweighs the risk. They can provide temporary improvement in symptoms and polyp burden, but recurrence is common after treatment ends. [1,2]

Repeated or prolonged courses should be avoided whenever possible because of cumulative risks, including hyperglycaemia, hypertension, mood changes, osteoporosis, infection, adrenal suppression, and other systemic complications.

The decision to prescribe systemic corticosteroids should take account of comorbidities, previous exposure, alternative treatments, and the patient's overall risk profile. They should not be considered a substitute for appropriate long-term anti-inflammatory treatment or further assessment of refractory disease.

5. Antibiotic therapy

Antibiotics have a limited and selective role in CRS. Persistent inflammation alone does not establish an ongoing bacterial infection, and routine or repeated empirical antibiotic courses are not recommended for stable CRS without an acute exacerbation. The 2025 adult sinusitis guideline specifically advises against routine antimicrobial therapy for CRS without acute exacerbation and against prescribing antibiotics merely to satisfy a prerequisite for imaging or surgery. [3]

Antimicrobial treatment may be appropriate when a clinically significant acute bacterial exacerbation is suspected or confirmed. The choice of agent should consider the clinical presentation, allergy history, previous antimicrobial exposure, local resistance patterns, microbiological results when available, and relevant comorbidities.

Long-term low-dose macrolide therapy has been investigated for possible immunomodulatory effects in selected patients. However, evidence of benefit is inconsistent, and patient selection remains uncertain. Potential harms include antimicrobial resistance, drug interactions, cardiac arrhythmias, and other adverse effects. It should not be used routinely without a clear rationale and appropriate monitoring.

6. Other pharmacological treatments

Antihistamines may be useful when concomitant allergic rhinitis is present but are not primary treatments for CRS in the absence of allergic disease. Decongestants are not suitable for sustained routine management, particularly topical preparations that may cause rebound congestion when used excessively.

Antifungal therapy is not recommended for routine treatment of CRS because available evidence has not demonstrated sufficient clinical benefit to justify its risks and costs. [2,3]

Treatment should therefore prioritize therapies with an appropriate evidence base rather than escalating medication solely because symptoms persist.

ROLE OF ENDOSCOPIC SINUS SURGERY

Functional endoscopic sinus surgery (FESS), also described as endoscopic sinus surgery (ESS), is an important treatment option for patients whose CRS remains inadequately controlled despite appropriate medical management.

The aims of surgery are to remove obstructing disease where indicated, improve access to the affected sinuses, restore ventilation and drainage, obtain tissue for histopathology when necessary, and facilitate the delivery of topical treatments. The extent of surgery should be tailored to disease distribution, anatomy, inflammatory phenotype, previous procedures, and the patient's clinical needs. [1,2,5]

Indications

Surgery may be considered when:

1. Symptoms and objective evidence of CRS persist despite appropriate medical treatment.
2. Nasal polyposis causes substantial obstruction or olfactory dysfunction.
3. Recurrent exacerbations or disease burden remain unacceptable.
4. CT and endoscopic findings support an operative target.
5. Tissue diagnosis is required for a suspicious or atypical lesion.
6. A complication or another specific clinical indication requires surgical intervention.

The decision should not be based on a CT score or symptom score alone. Patients should receive a balanced explanation of expected benefits, limitations, alternatives, recurrence risk, and potential complications.

Benefits and limitations

ESS can improve disease-specific quality of life, nasal obstruction, olfaction, and access for postoperative topical treatment in appropriately selected patients. However, surgery does not eliminate the underlying inflammatory predisposition. Persistent inflammation and recurrent polyps may occur, particularly in severe type 2 disease and in patients with asthma or aspirin-exacerbated respiratory disease. [1,2,5]

Potential complications include bleeding, infection, adhesions, orbital injury, cerebrospinal fluid leak, and rare intracranial complications. Appropriate preoperative imaging, surgical expertise, anatomical knowledge, and postoperative surveillance are essential for reducing risk.

Postoperative care

Postoperative management commonly includes saline irrigation, topical intranasal corticosteroids, endoscopic review, and removal of crusts or adhesions when indicated. The precise regimen depends on the extent of surgery, healing, inflammatory phenotype, and individual risk factors.

Long-term follow-up is particularly important in CRSwNP because recurrence may necessitate adjustment of topical treatment, additional interventions, or consideration of biologic therapy.

BIOLOGIC THERAPY AND PRECISION MEDICINE

Biologic agents have expanded treatment options for selected patients with severe CRSwNP. These treatments target specific inflammatory pathways and may be particularly useful when conventional medical and surgical management provides inadequate control or surgery is unsuitable. They are not routinely indicated for CRSsNP. [1–3]

1. Available biologic agents

Dupilumab blocks signalling through the interleukin-4 receptor alpha subunit, inhibiting interleukin-4 and interleukin-13 pathways. Randomized clinical trials have demonstrated improvements in nasal polyp burden, nasal congestion, and disease-specific quality of life in appropriately selected patients with severe CRSwNP. [6]

Omalizumab targets immunoglobulin E (IgE) and has demonstrated efficacy in selected patients with CRSwNP. It may be particularly relevant when allergic disease or other appropriate indications coexist. [7]

Mepolizumab targets interleukin-5, a cytokine involved in eosinophilic inflammation. Clinical trial evidence supports its use in selected patients with severe recurrent CRSwNP. [8]

These agents differ in their molecular targets, eligibility criteria, administration schedules, costs, and potential adverse effects. Selection should be based on disease severity, inflammatory characteristics, comorbidities, prior treatment, patient preference, and applicable regulatory guidance.

2. Patient selection and monitoring

Biologic therapy should be considered through individualized assessment rather than prescribed solely because nasal polyps are present. Factors supporting consideration include substantial disease-related quality-of-life impairment, persistent symptoms despite appropriate treatment, previous surgery with recurrent disease, or inability to undergo surgery.

The 2025 American Academy of Otolaryngology–Head and Neck Surgery Foundation guideline recommends discussing the role of biologics with patients with CRSwNP when previous medical and surgical therapy has failed or surgery is not a viable option. It recommends against routine biologic prescribing for CRSsNP. [3]

Before initiating treatment, clinicians should document symptom burden, endoscopic findings, relevant imaging, previous treatments, comorbidities, and treatment goals. Follow-up should assess clinical response, olfaction, polyp burden, quality of life, adverse effects, treatment adherence, and the continuing need for therapy.

Biologics may improve disease control but are associated with substantial costs and may require ongoing administration. Their long-term role, optimal duration, comparative effectiveness, and cost-effectiveness relative to surgery and conventional treatment remain important areas of investigation.

COMORBIDITIES AND MULTIDISCIPLINARY MANAGEMENT

CRS should be assessed as part of the patient's broader health profile, particularly in severe or recurrent disease. International guidance emphasizes the importance of identifying associated conditions that may modify diagnosis, treatment response, and prognosis. [1–3]

1. Asthma and aspirin-exacerbated respiratory disease

Asthma frequently coexists with CRSwNP. Aspirin-exacerbated respiratory disease, characterized by respiratory reactions to aspirin and other cyclooxygenase-1 inhibitors in susceptible individuals, is particularly relevant in patients with asthma and recurrent nasal polyposis.

Coordination between ENT specialists, respiratory physicians, and allergy specialists can improve management. In selected patients, treatment may include optimized asthma therapy, endoscopic sinus surgery, biologic treatment, or specialist-supervised aspirin desensitization when appropriate.

2. Allergic rhinitis

Allergic rhinitis may contribute to nasal symptoms and should be identified when suggested by the clinical history. Management may include allergen avoidance measures where practical, intranasal corticosteroids, and antihistamines for allergic symptoms. Allergy testing should be undertaken when the result is likely to influence treatment decisions.

3. Immunodeficiency and mucociliary disorders

Patients with unusually severe, recurrent, or treatment-resistant disease may require investigation for immunodeficiency, cystic fibrosis, or primary ciliary dyskinesia. Identifying these conditions can alter management and may warrant collaboration with immunology, pulmonology, or other relevant specialties.

4. Patient-centred long-term care

Effective management requires regular review of symptoms, treatment adherence, adverse effects, quality of life, and objective disease activity. ENT specialists should provide patients with realistic expectations, recognizing that complete and permanent resolution may not be achievable in every case. Long-term treatment should aim for sustained disease control with the lowest reasonable treatment burden.

COMPLICATIONS

Although CRS is usually managed as a chronic inflammatory condition, complications may arise, particularly in the setting of acute exacerbations or disease extending beyond the paranasal sinuses.

Potential complications include orbital cellulitis, subperiosteal or orbital abscess, intracranial infection, meningitis, epidural or subdural empyema, brain abscess, and frontal bone osteomyelitis. These complications are uncommon but potentially serious.

Urgent assessment is required when a patient develops visual disturbance, proptosis, painful or restricted eye movements, severe progressive headache, altered mental status, focal neurological signs, or rapidly progressive facial swelling. Suspected orbital or intracranial complications require prompt imaging, specialist referral, and coordinated medical and surgical management as indicated.

Persistent unilateral symptoms, unexplained bleeding, facial numbness, or destructive imaging findings should also prompt investigation for neoplastic, granulomatous, or other alternative pathology.

DISCUSSION

Chronic rhinosinusitis represents a heterogeneous group of inflammatory disorders rather than a single disease process. Contemporary evidence supports an integrated approach that combines clinical assessment, objective confirmation, phenotype recognition, targeted treatment, and long-term monitoring. The central challenge for the ENT specialist is to distinguish patients who can be adequately managed with topical therapy from those who require further investigation, surgery, or advanced treatment. [1–3]

Accurate diagnosis remains fundamental. Symptoms such as nasal obstruction, discharge, and facial pressure overlap with allergic rhinitis, migraine, nonallergic rhinitis, and other conditions. Requiring objective evidence of inflammation helps reduce diagnostic uncertainty and unnecessary treatment. Nasal endoscopy provides direct visualization of the nasal cavity and middle meatus, while CT contributes information about disease distribution and surgical anatomy. Neither investigation should be interpreted independently of the clinical presentation.

Topical therapy remains the foundation of treatment. Saline irrigation and intranasal corticosteroids are supported by clinical guidelines and can improve symptoms while limiting the need for systemic medication. However, treatment effectiveness depends substantially on adherence, correct administration, and appropriate follow-up. Patient education is therefore not merely supplementary but an essential component of care. [1–4]

Antibiotic stewardship is another important consideration. The persistent nature of CRS may encourage repeated antibiotic prescribing, particularly when mucopurulent secretions are present. However, chronic inflammation does not necessarily indicate active bacterial infection. Avoiding routine antibiotics in stable disease reduces unnecessary exposure, adverse effects, and antimicrobial resistance. Antibiotics should be reserved for appropriately selected clinical situations, with microbiological investigation considered when treatment failure or unusual infection warrants it. [2,3]

Endoscopic sinus surgery remains an important option for patients with persistent symptoms and objective disease despite appropriate medical management. Surgery improves access for topical therapy and can provide substantial symptom relief, but recurrence remains possible. This is particularly relevant in patients with severe CRSwNP, asthma, and other markers of persistent inflammatory disease. Continued medical management after surgery is therefore important rather than optional in many patients. [1,2,5]

Biologic therapies represent a significant advance in the treatment of severe CRSwNP. Trials of dupilumab, omalizumab, and mepolizumab demonstrate that targeting specific inflammatory pathways can improve important clinical outcomes in appropriately selected populations. [6–8] Nevertheless, these treatments should be integrated into an individualized care pathway. High acquisition costs, treatment duration, patient eligibility, and uncertainty regarding optimal long-term sequencing require careful consideration. The 2025 adult sinusitis guideline reinforces patient education and selective use rather than indiscriminate prescribing. [3]

A further implication of contemporary evidence is the importance of comorbidity assessment. Asthma, aspirin-exacerbated respiratory disease, immunodeficiency, cystic fibrosis, and primary ciliary dyskinesia may influence disease severity and treatment response. Management is likely to be more effective when ENT specialists coordinate care with respiratory physicians, allergists, immunologists, and other relevant clinicians.

Future advances are likely to involve improved inflammatory biomarkers, better prediction of treatment response, comparative studies of surgery and biologics, and more cost-effective models of long-term care. However, diagnostic and therapeutic approaches must remain grounded in clinical evidence, with appropriate attention to regional disease patterns, resource availability, and patient preferences.

Overall, the most defensible strategy is a stepwise, individualized approach: confirm the diagnosis objectively, initiate evidence-based topical treatment, assess modifying conditions, consider surgery when indicated, and reserve systemic or targeted treatments for patients likely to benefit.

LIMITATIONS OF THE REVIEW

This article is a narrative review rather than a systematic review or meta-analysis. The literature was selected to provide a clinically relevant overview of major guidelines, consensus documents, and influential therapeutic studies. No formal protocol, exhaustive database search, independent study selection, quantitative synthesis, or structured risk-of-bias assessment was undertaken.

The evidence base includes heterogeneous patient populations, differing definitions of disease severity, variable treatment protocols, and outcomes measured over different follow-up periods. Some recommendations may require adaptation to local guidelines, regulatory approvals, medicine availability, and healthcare resources. In addition, the evidence supporting newer biologic treatments continues to evolve, particularly regarding long-term comparative effectiveness, treatment duration, and cost-effectiveness.

These limitations should be considered when interpreting the review. The article is intended to support clinical understanding and should not replace individualized clinical judgment or consultation of current specialty guidelines.

CONCLUSION

Chronic rhinosinusitis is a heterogeneous inflammatory disorder requiring accurate diagnosis, appropriate classification, and individualized long-term management. Objective confirmation by nasal endoscopy or CT is essential, while symptom assessment and patient-reported outcome measures help establish disease burden and monitor response.

Saline nasal irrigation and intranasal corticosteroids remain the foundation of treatment. Antibiotics should be used selectively rather than routinely, systemic corticosteroids should be limited to appropriate indications, and endoscopic sinus surgery should be considered when disease remains inadequately controlled despite suitable medical management. Biologic agents provide additional options for selected patients with severe CRSwNP, particularly when conventional treatment has failed or surgery is unsuitable.

Recognition of comorbidities, patient education, shared decision-making, and postoperative follow-up are central to achieving sustained disease control. Continued research into inflammatory endotypes, predictive biomarkers, comparative treatment effectiveness, and cost-effective care will further strengthen contemporary ENT practice.

The ultimate objective is to reduce disease burden, improve olfactory and sinonasal function, minimize unnecessary treatment, and enhance the quality of life of patients living with chronic rhinosinusitis.

DECLARATION BY AUTHORS

Ethical Approval: Not applicable for this narrative review because no new human-participant research, patient intervention, or identifiable patient data are reported. The requirement for an institutional declaration should be confirmed with the target journal.

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References

1. Fokkens WJ, Lund VJ, Hopkins C, Hellings PW, Kern R, Reitsma S, et al. European Position Paper on Rhinosinusitis and Nasal Polyps 2020. *Rhinology*. 2020;58(Suppl S29):1-464. doi:10.4193/Rhin20.600.
2. Orlandi RR, Kingdom TT, Smith TL, Bleier B, DeConde A, Luong AU, et al. International consensus statement on allergy and rhinology: rhinosinusitis 2021. *Int Forum Allergy Rhinol*. 2021;11(3):213-739. doi:10.1002/alr.22741.
3. Payne SC, McKenna M, Buckley J, Colandrea M, Chow A, Detwiler K, et al. Clinical Practice Guideline: Adult Sinusitis Update. *Otolaryngol Head Neck Surg*. 2025;173(Suppl 1):S1-S56. doi:10.1002/ohn.1344.
4. Harvey R, Hannan SA, Badia L, Scadding G. Nasal saline irrigations for the symptoms of chronic rhinosinusitis. *Cochrane Database Syst Rev*. 2007;(3):CD006394. doi:10.1002/14651858.CD006394.pub2.
5. Bachert C, Han JK, Desrosiers M, Hellings PW, Amin N, Lee SE, et al. Efficacy and safety of dupilumab in patients with severe chronic rhinosinusitis with nasal polyps (LIBERTY NP SINUS-24 and LIBERTY NP SINUS-52): results from two multicentre, randomised, double-blind, placebo-controlled, parallel-group trials. *Lancet*. 2019;394(10209):1638-1650. doi:10.1016/S0140-6736(19)31881-1.
6. Gevaert P, Omachi TA, Corren J, Mullol J, Han J, Lee SE, et al. Efficacy and safety of omalizumab in nasal polyposis: 2 randomized phase 3 trials. *J Allergy Clin Immunol*. 2020;146(3):595-605. doi:10.1016/j.jaci.2020.05.032.
7. Han JK, Bachert C, Fokkens W, Desrosiers M, Wagenmann M, Lee SE, et al. Mepolizumab for chronic rhinosinusitis with nasal polyps (SYNAPSE): a randomised, double-blind, placebo-controlled, phase 3 trial. *Lancet Respir Med*. 2021;9(10):1141-1153. doi:10.1016/S2213-2600(21)00097-7.