



Advances in Allergy Testing, Evaluation, and treatment: For an Otorhinolaryngologist's Practice

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Abstract

Background: Allergic rhinitis (AR) is prevalent in otorhinolaryngology, impacting quality of life and often leading to complications like recurrent rhinoconjunctivitis, sinusitis, nasal polyps or otitis media. Recent advances in allergy testing, allergen immunotherapy (AIT), and the use of monoclonal antibodies have transformed diagnostic and therapeutic approaches to allergy management, offering precision medicine tailored to ENT practice.

Objective: To review recent developments in allergy testing, use of AIT, and the role of biologics, focusing on their application in otorhinolaryngology for improved diagnosis and management of allergic upper airway diseases.

Methods: This article is review of literature that, synthesizes evidence from recent literature (2023–2025), including systematic reviews, randomized controlled trials, and real-world studies. Key advancements in skin prick testing (SPT), molecular diagnostics, subcutaneous and sublingual Immunotherapy and role of biologics such as dupilumab, omalizumab, and mepolizumab and their relevance to ENT practice is elaborated.

Conclusion: Innovations in SPT, such as skin prick tape, enhance patient comfort and diagnostic consistency, making it ideal for ENT clinics. Molecular testing improves precision in identifying allergen components for AR and CRS. AIT, via subcutaneous or sublingual routes, induces long-term tolerance, reducing reliance on pharmacotherapy and preventing disease progression. Biologics, in the form of monoclonal antibodies targeting IL-4/IL-13, IgE, and IL-5 pathways demonstrate efficacy in severe CRSwNP (Chronic rhinosinusitis with nasal polyps) and AR (Allergic Rhinitis), decreasing nasal polyp size, improving symptoms, and reducing the need for surgery. Advances in allergy evaluation and treatment provide otorhinolaryngologists with effective tools to manage allergic upper airway diseases. Integrating these innovations into routine practice enhances diagnostic accuracy, optimizes treatment outcomes, and improves patient quality of life, with ongoing research promising further personalization.

Keywords: Allergic Rhinitis; Chronic Rhinosinusitis; Skin Prick Testing; Allergen Immunotherapy; Biologics; Otorhinolaryngology

Introduction

Allergic conditions frequently manifest in the upper airway presenting otorhinolaryngologists with challenges such as allergic

rhinitis (AR), chronic rhinosinusitis (CRS), and associated complications like nasal polyps or otitis media. These disorders not only impair quality of life but also contribute to recurrent infections and

surgical interventions. Recent advances over past few years have transformed diagnostic and therapeutic approaches, emphasizing precision medicine tailored to ENT practice. This article reviews key developments in allergy testing, including skin prick tests; allergen immunotherapy (AIT); and the expanding role of biologics, drawing on evidence relevant to otorhinolaryngology.

Advances in allergy testing

Allergy testing remains foundational for accurate diagnosis in ENT settings, where identifying triggers for AR or CRS can guide management and prevent escalations like polyp formation. Skin prick testing (SPT) continues to be the gold standard for confirming AR due to its high sensitivity and ability to detect immediate hypersensitivity [1]. However, primary care physicians increasingly rely on serum IgE testing for its ease of interpretation and comparability across patients but we as Otorhinologists must inculcate SPT in our practice [2].

Recent innovations have enhanced SPT's utility and patient comfort. For instance, the development of skin prick tape represents a less painful alternative, suitable for both clinical applications and research, offering a more consistent approach to testing in busy ENT clinics [3]. This tape-based method reduces variability in wheal measurement and minimizes discomfort, making it ideal for pediatric or sensitive patients common in otorhinolaryngology [4]. Modifications to traditional scratch and intradermal tests, including the skin puncture test, have also improved safety and frequency of use in diagnosing upper airway allergies [5].

Beyond SPT, personalized molecular testing is poised to revolutionize ENT diagnostics for conditions like CRS or recurrent tonsillitis by identifying specific allergen components [6]. The 2023 International Consensus on Allergic Rhinitis (ICAR-AR) update underscores the comprehensive evaluation of AR through advanced testing, integrating serum-specific IgE as a reasonable alternative when skin testing is contraindicated [7]. In ENT practice, incorporating these tests—such as in-office SPT or molecular assays—requires minimal investment and can enhance diagnostic accuracy for rhinitis subtypes, ultimately informing targeted therapies [8].

These advancements align with the evolving needs of otorhinolaryngologists, facilitating integration into routine practice for better patient outcomes in allergic upper airway diseases.

Advances in immunotherapy

Allergen immunotherapy (AIT) offers a disease-modifying approach for ENT conditions like AR and CRS, where pharmacotherapy often provides only symptomatic relief. AIT, typically administered via subcutaneous (SCIT) or sublingual (SLIT) routes, induces long-term tolerance and can prevent progression from AR to asthma [9,10]. Recent developments emphasize safety enhancements, with treatment durations ranging from 3 months to 3 years, making it feasible for ENT specialists to incorporate into practice [11].

In otorhinolaryngology, AIT is particularly valuable for patients with incomplete responses to medications or those seeking to avoid long-term pharmacotherapy [12]. The 2024-2025 literature highlights innovations such as standardized SLIT products for AR, which provide sustained symptom relief and reduce reliance on intranasal corticosteroids [13]. For seasonal AR, novel monoclonal antibodies are administered during pollen seasons—show efficacy in improving nasal and ocular symptoms, offering a targeted option for ENT-managed rhinitis [14].

EUFOREA guidelines advocate AIT for inducing immunological tolerance in AR, especially in integrated care models for rhinitis and related ENT disorders [15]. Real-world applications in ENT include its use for nonallergic rhinitis variants, with advances over the last decade improving efficacy in mixed rhinitis presentations [16]. Cutting-edge ENT immunotherapy innovations focus on personalized dosing and combination therapies, enhancing outcomes in allergic rhinitis and preventing exacerbations in CRS [17,18]. AIT's role in ENT extends to long-term remission, making it a cornerstone for patients with persistent symptoms, as supported by current management strategies [19,20].

The role of biologics

Biologics have emerged as transformative agents in otorhinolaryngology, particularly for severe, refractory allergic conditions like chronic rhinosinusitis with nasal polyps (CRSwNP) and comorbid AR or asthma. These monoclonal antibodies target specific inflammatory pathways, offering precision beyond traditional therapies.

Dupilumab, an IL-4/IL-13 inhibitor, has demonstrated superior efficacy in reducing nasal polyp size, improving quality of life, and alleviating symptoms in CRSwNP, often outperforming omalizumab and mepolizumab in real-world settings [21,22]. It also relieves otologic symptoms in patients with asthma and CRSwNP, addressing ENT-specific manifestations like Eustachian tube dysfunction [23]. Omalizumab, an anti-IgE biologic, blocks allergic cascades and is effective for AR and CRSwNP, with real-world data showing symptom improvement comparable to revision surgery in recurrent cases [24,25].

Mepolizumab, targeting IL-5, reduces exacerbations in eosinophilic CRSwNP, and when combined with dupilumab or omalizumab, enhances outcomes in patients with asthma comorbidity—a common ENT referral scenario [26,27]. Biologics like these have been shown to decrease the need for functional endoscopic sinus surgery (FESS) in CRSwNP, with all three agents significantly lowering surgical risks. [28,29].

In AR, biologics such as omalizumab and dupilumab provide causal treatment, especially in moderate-to-severe cases resistant to AIT or pharmacotherapy [30,31]. Safety profiles are favourable, with dupilumab effective even after omalizumab failure in severe allergic asthma overlapping with ENT issues [32,33]. Dosing considerations, such as IgE reductions with dupilumab, guide sequential biologic use in complex patients [34].

Conclusion

From an otorhinolaryngologist's viewpoint, advances in allergy testing, AIT, and biologics offer powerful tools to address the aller-

gic underpinnings of upper airway diseases. Integrating these into practice—such as adopting innovative SPT methods, employing AIT for tolerance induction, and utilizing biologics for severe cases—can optimize outcomes, minimize interventions, and improve patient quality of life. Ongoing research promises further personalization, urging ENT specialists to stay abreast of these evolving paradigms.

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