REVIEW

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Biologics for Chronic Rhinosinusitis With Nasal Polyps: Current Status and Clinical Considerations in Korea

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Chronic rhinosinusitis with nasal polyps (CRSwNP) is a prevalent condition that significantly impacts quality of life and places a burden on healthcare systems. The advent of biologics targeting type 2 immune pathways offers new therapeutic options for severe and/or uncontrolled CRSwNP. Initially, biologic use was guided by the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS) 2020 and the European Forum for Research and Education in Allergy and Airway Diseases (EUFOREA) guidelines, despite limited data on clinical indications, response measures, and treatment duration. Since then, numerous studies and the EPOS/EUFOREA 2023 update have refined these guidelines. The update defines clinical indications for biologics based on type 2 inflammation markers by lowering the blood eosinophil threshold from 250 to 150 cells/μL. The response to biologics is now more simply categorized into three levels based on reductions in nasal polyp size, improvements in quality of life, and enhancement of smell. Treatment evaluation is recommended at 6 months with annual follow-up. Longer administration intervals, such as every four weeks, have also proven effective in well-controlled patients. Although specific guidelines for discontinuation or switching biologics remain lacking, clinical judgment is essential in determining when treatment should be stopped or adjusted. Additionally, regulatory updates support the use of biologics for CRSwNP, and novel agents such as tezepelumab (an anti-thymic stromal lymphopoietin monoclonal antibody) continue to show promise. Finally, in Korea, biologics for CRSwNP are not covered by national health insurance, leading to extended dosing intervals due to high costs. Despite this limitation, studies have shown that adjusted dosing can maintain subjective quality of life. Recent studies by Korean authors have also explored practical considerations such as dosing intervals and comparisons to surgery. Further research is needed to optimize treatment strategies, particularly regarding cost-effectiveness and prospective studies tailored to the Korean healthcare system.

Keywords: Biologics; Sinusitis; Nasal polyps; Guideline; Research.

INTRODUCTION

Chronic rhinosinusitis with nasal polyps (CRSwNP) is one of the most common diseases encountered in the field of otorhinolaryngology [1]. It is typically characterized by a persistent disease burden that leads to long-term socioeconomic challenges and diminished quality of life [2]. Standard medical treatments include nasal saline irrigation, topical steroid sprays, long-term antibiotic therapy, and short courses of systemic glucocorticoids [3]. However, even repeated endoscopic sinus surgeries have proven insufficient in curing challenging refractory cases. Biologics targeting type 2 immune effectors—such as interleukin (IL)-4, IL-5, IL-13, and free immunoglobulin E (IgE)—have provided novel therapeutic options for patients with severe and uncontrolled CRSwNP [3,4].

The introduction of biologics for CRSwNP has given physicians an additional therapeutic option for patients with severe and/or uncontrolled disease [4]. However, at that time, detailed clinical data regarding their use were limited. Clinical decisions were primarily guided by the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS) 2020 and the European Forum for Research and Education in Allergy

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and Airway Diseases (EUFOREA) guidelines [3,4]. Since then, several clinical studies and review articles have been published on the use of biologics in CRSwNP. We also published review papers on the practical use of biologics for CRSwNP, tailored to the Korean context, in the *Journal of Rhinology* in 2021 [5] and in the online book *Chronic Rhinosinusitis Update* in 2022 [6].

As the body of knowledge expands, guidelines for indications, effectiveness, response definitions, administration intervals, treatment switches, cessation, and termination timing are gradually being established. In light of the EPOS/EUFOREA 2023 update [7], we aim to review and update the relevant information to better reflect the current situation in Korea.

More specifically, we will discuss the following topics: updates on the clinical indications for biologics in CRSwNP, definitions of response and treatment duration, criteria for discontinuing or switching biologics, and recent regulatory updates and emerging biologic agents.

UPDATED INDICATIONS OF BIOLOGICS FOR CRSWNP

In the new EPOS/EUFOREA 2023 criteria [7], the presence of bilateral polyps in patients who have undergone endoscopic sinus surgery remains the primary criterion, as in EPOS 2020 (Fig. 1). Debate has arisen regarding the extent of surgery [8]; however, evidence is limited to suggest that more extensive surgery yields improved outcomes for CRSwNP [9,10]. Therefore, the extent of surgery was not incorporated into the updated EPOS/EUFOREA 2023 criteria [7].

Next, defining type-2 inflammation clinically is crucial for successful biologic treatments. Specifically, the blood eosinophil threshold was reduced from ≥250 cells/μL to ≥150 cells/μL, in alignment with the updated Global Initiative for Asthma (GINA) guidelines [11]. This adjustment is the only revision; the other four criteria—including the need for systemic steroids (or a contraindication to them), a Sinonasal Outcome Test (SNOT)-22 score of ≥40, anosmia on smell testing, and comorbid asthma—remain unchanged from EPOS 2020. Biologic treatment for CRSwNP should be considered when at least three of these five criteria are met.

There was also discussion regarding whether other type-2 inflammatory diseases, apart from asthma, should serve as criteria for biologic use. However, the lack of correlation between CRSwNP and other type-2 conditions such as allergic rhinitis [3], atopic dermatitis [12,13] or eosinophilic esophagitis [14,15], resulted in the exclusion of these diseases from the criteria.

Recent studies have increasingly focused on the use of biologics in CRSwNP patients without a surgical history rather than solely in cases of postoperative recurrence. According to the previous EUFOREA consensus, patients without a surgical history must meet at least four of the aforementioned criteria to qualify for biological treatment [4]. Additionally, Huang et al. [16] provided a clinical commentary on the development of the mucosal concept in CRS, suggesting that preoperative biologic use may improve postoperative wound healing. Furthermore, a review by an expert group from the Asia-Pacific region and Russia suggested that biologics could serve as an alternative to surgery for patients who are either unsuitable for or decline surgical intervention. However, current guide-

Indications for biologics in CRSwNP

Bilateral nasal polyps after endoscopic sinus surgery

THREE criteria should be satisfied

Criteria	Cut-off values
Evidence of type 2 inflammation	Tissue eos ≥10/hpf or **blood eos ≥150*** or total IgE ≥10
Need for systemic OCS or contraindication to OCS	≥2 courses per yr. or long term (>3 mon.) low dose steroids
Significantly impaired quality of life	SNOT-22 ≥40
Significant loss of smell	Anosmic on smell test (score depending on test)
Diagnosis of comorbid asthma	In case of asthma: regular need for inhaled corticosteroids

*The only change is **the relaxation of blood eosinophil level threshold from 250 cells/μl to 150 cells/μl.**

Fig. 1. Revised indications for biologics in chronic rhinosinusits with nasal polyps based on EPOS/EUFOREA 2023. Adapted from Fokkens et al. Rhinology 2023;61(3):194-202 [7] under the terms of a Creative Commons License. CRSwNP, chronic rhinosinusitis with nasal polyps; eos, eosinophils; OCS, oral corticosteroid; IgE, immunoglobulin E; SNOT, Sinonasal Outcome Test.

lines still lack detailed discussion on biologic use in patients who have not undergone surgical treatment. Conversely, dupilumab has shown promise as a short-term adjuvant therapy for CRSwNP in the postoperative setting [17]. Additionally, a retrospective case-control study of 32 CRSwNP patients indicated that combining surgical therapy with biologics resulted in the greatest reduction in polyp burden compared to biologic therapy alone, although this difference did not reach statistical significance [18].

In pregnant women, omalizumab remains the only available biologic agent for CRSwNP. A cohort study showed no increase in congenital anomalies or adverse outcomes in a registry of pregnant asthmatics treated with omalizumab [19].

Given the strong efficacy of biologics in treating CRSwNP, their preventive use may be beneficial. However, there is currently no definitive evidence that biologics can prevent the development of nasal polyps [7]. A previous pediatric study on omalizumab in patients with pre-wheezing or non-asthmatic wheezing demonstrated that biologics could prevent additional sensitization, although they did not clinically prevent asthma [20]. In clinical practice, early use of biologics to prevent postoperative recurrence may be a viable preventive strategy. Nonetheless, the high cost of biologics remains a significant barrier to their widespread prescription.

DEFINING THE RESPONSE AND TREATMENT INTERVALS

Similar to the EPOS 2020 guidelines, the updated EPOS/EUFOREA defines response to biologics using five criteria: reduction in nasal polyp size, decreased need for systemic corticosteroids, improved quality of life, enhanced sense of smell, and impact on comorbidities (Fig. 2) [7].

The response was initially categorized into four levels based on EPOS 2020: no response (0 criteria met), poor (1–2 criteria met), moderate (3–4 criteria met), and excellent (5 criteria met). However, inherent limitations in this classification prevented certain patient groups, such as those with asthma, from achieving an "excellent" response. Thus, the response classification was simplified into three categories: no response (0 criteria met), poor–moderate (1–3 criteria met), and good–excellent (4–5 criteria met). Additionally, the reduced impact of comorbidities should only be considered in patients who actually have them. Furthermore, a reduced need for surgery is regarded as analogous to a decreased need for systemic corticosteroids, as both are considered rescue therapies.

The initial evaluation time for response was previously set at 16 weeks after the first administration [3], but this was considered too early [21,22]. Therefore, EPOS/EUFOREA 2023

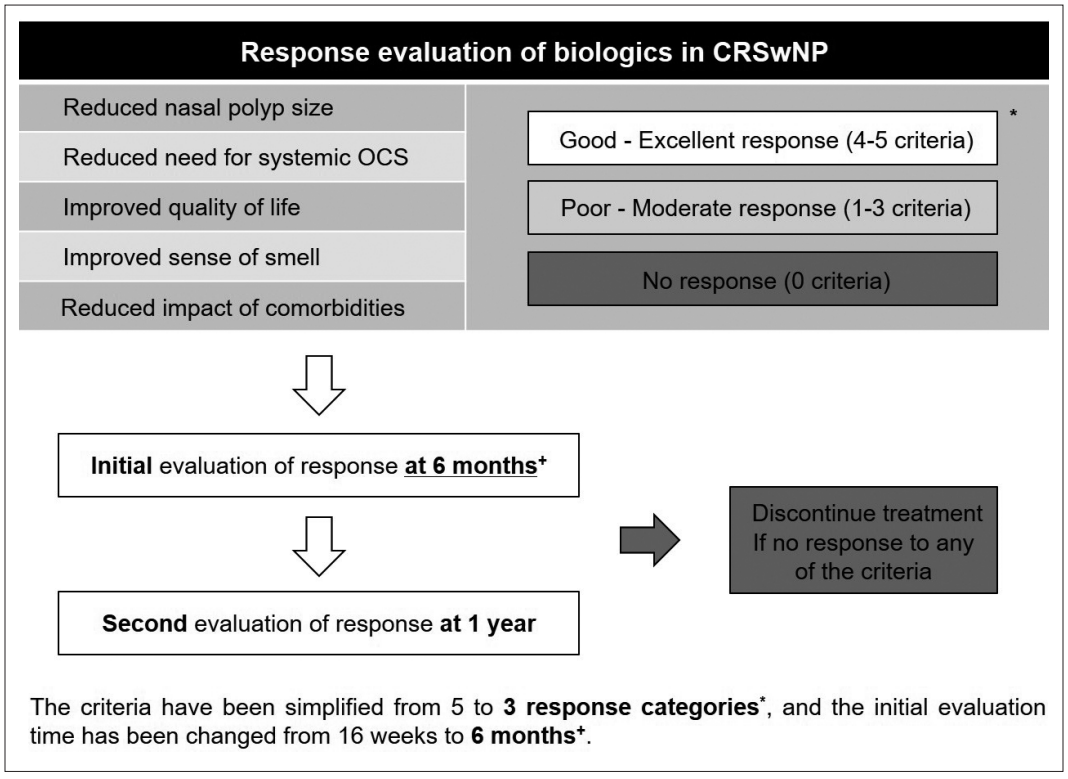

Fig. 2. Revised response criteria for biologics in chronic rhinosinusits with nasal polyps based on EPOS/EUFOREA 2023. Adapted from Fokkens et al. Rhinology 2023;61(3):194-202 [7] under the terms of a Creative Commons License. CRSwNP, chronic rhinosinusitis with nasal polyps; OCS, oral corticosteroid.

has adjusted the first evaluation time from 16 weeks to 6 months. A second evaluation is recommended at 1 year, with subsequent assessments conducted annually. For patients showing no response, options include discontinuing biologics, switching to an alternative biologic, or considering revision surgery. For a poor-to-moderate response, various strategies may be implemented based on patient preferences. If improvement is not deemed significant by either the physician or the patient, switching biologics, revision surgery, or a short course of systemic steroids may be warranted [21]. In cases of a good-to-excellent response, biologic treatments should be continued.

Although the effectiveness of biologics varies depending on the agent and patient severity, approximately 60% of patients experience an improved sense of smell following treatment [23]. Typically, it takes about one month to notice an effect, although this varies significantly among individuals—from a few days to several months [24,25]. Interestingly, contrary to common expectations, there is no positive correlation between reductions in polyp size and improvements in the sense of smell [26]. Once olfactory function improves, olfactory training is recommended to help reactivate the neurogenic pathways responsible for smell [27]. A prospective study of 111 patients using the Korean version of the Sniffin' Sticks II (KVSS-II) test demonstrated that a 12-week regimen of repeated short-term odor exposure effectively improved olfactory function in patients who had undergone sinonasal surgery to address sensorineural olfactory impairment [28]. However, definitive data on the time required for overall improvement beyond olfactory gains remain lacking. Meanwhile, the new EPOS/EUFOREA updates emphasize the need to collect real-life data, particularly regarding the use of biologics in non-operated or less severe patients [7].

The administration durations in previously published key studies—including LIBERTY SINUS-24 and -52 for dupilumab—were as follows: every two weeks for 24 weeks (SINUS-24) and every two weeks for 24 weeks followed by monthly dosing for an additional six months (SINUS-52) [29]. Other key studies on omalizumab (POLYP1 and POLYP2) used 2- or 4-week intervals [30]. However, in real-world clinical settings, physicians and patients have expressed concerns about these short administration intervals due to cost-effectiveness considerations. In these studies, reducing dupilumab dosing to once every four weeks produced outcomes comparable to biweekly administration. Additionally, a retrospective analysis of 44 CRSwNP patients in Korea revealed no significant difference in symptomatic satisfaction—measured by changes in SNOT-22 scores—between patients with administration intervals of less than 2 months and those with intervals of 2 months or longer [31]. Therefore, longer administration intervals may be a viable option for patients whose condition remains well controlled. Unfortunately, no specific guidelines have yet been established for dosing intervals in practical clinical settings.

REASONS TO SWITCH OR STOP BIOLOGICS AND TREATMENT TERMINATION

Although the unified airway concept emphasizes similarities between the upper and lower airways [32,33], the effectiveness of biologic agents varies according to their target site. Some biologics are more effective for upper airway conditions such as CRSwNP, while others demonstrate greater efficacy in lower airway conditions like asthma. In such cases, switching biologic agents should be considered; however, predicting which agent will be most beneficial remains challenging. Therefore, thorough investigation into biomarkers that predict favorable outcomes for specific biologics is essential. Moreover, no practical, evidence-based criteria exist for determining when to switch from one biologic to another or for selecting the preferred agent. It is crucial to gather data to establish practical guidelines for switching biologics in CRSwNP that are appropriate for the Korean context.

Hypereosinophilia is a common, transient phenomenon following the administration of anti-IL-4α, typically lasting between 2 and 6 months [29]. However, if hypereosinophilia persists alongside clinical symptoms, close monitoring is necessary, as it may lead to organ damage [34,35]. Routine blood eosinophil counts are recommended at one and three months after the initial administration. More frequent monitoring is advised for patients with high baseline eosinophil counts (>500/μL) or those with a history of long-term systemic steroid use prior to biologic treatment. Additionally, a thorough evaluation of symptoms and signs of vasculitis, along with regular monitoring for hypereosinophilia, is essential. In cases where eosinophil counts exceed 3,000 cells/μL, adjustments such as extending the administration interval to every four weeks or initiating a short course of systemic steroids may be warranted. Persistent vasculitis-related symptoms should prompt consultation with the internal medicine department [36].

Regarding the termination of biologics in CRSwNP, definitive guidelines are lacking. EPOS/EUFOREA 2023 recommends discontinuing biologics if there is no response based on the specified criteria [7]. However, clear guidance on the duration of treatment for well-controlled patients is absent. In previous CRSwNP trials, the maximum treatment duration with biologics has been one year [29,30]. Asthma trials may offer insights and serve as references for defining biologic treatment endpoints. For instance, the Xolair Persistency Of Response After Long-Term Therapy (XPORT) study—a multicenter, randomized, double-blind trial—concluded that

many patients with severe asthma remained well controlled even after discontinuing omalizumab [37]. Additionally, a prospective study on omalizumab in severe asthma patients found that long-term positive effects persisted for at least four years post-termination in 60% of participants [38]. Interestingly, the failure group in that study was more likely to have CRSwNP than the success group. Similarly, a randomized controlled trial on mepolizumab demonstrated only a modest 14% increase in asthma exacerbations during the year following discontinuation [39]. There was no significant increase in severe asthma exacerbations, and clinical parameters—including pulmonary function tests—showed no deterioration 1 year post-discontinuation.

Based on these findings, although the exact duration of biologic administration cannot be predetermined, discontinuation should be considered in clinically well-controlled CRSwNP patients. Comorbidities should be carefully assessed, as they may increase the risk of treatment failure [40].

RECENT REGULATORY UPDATES AND NOVEL BIOLOGIC AGENTS

As of November 2024, dupilumab and omalizumab remain the only biologics approved and available for CRSwNP in Korea (Table 1). The details related to the approval of each biologic agent by disease and country are as follows.

Dupilumab (an IL-4Rα antagonist) has been approved for multiple conditions, including atopic dermatitis, asthma (primarily type 2, eosinophilic, or systemic corticosteroid-dependent), CRSwNP, eosinophilic esophagitis, and prurigo nodularis in Europe, the United States, Korea, and Japan (Table 1). Recently, dupilumab became the first biologic approved in Japan for the treatment of chronic spontaneous urticaria. Additionally, it has been approved for chronic obstructive pulmonary disease in Europe. Notably, in Japan, dupilumab's approval for asthma encompasses the broader indication of bronchial asthma.

Omalizumab (a free IgE antagonist) has also been approved for allergic asthma, CRSwNP, and chronic spontaneous urticaria in Europe, the United States, and Korea. Interestingly, omalizumab has been approved for IgE-mediated food allergy in the United States and for seasonal allergic rhinitis in Japan.

Mepolizumab (an IL-5 antagonist) has been approved for eosinophilic asthma, CRSwNP, and eosinophilic granulomatosis with polyangiitis in Europe, the United States, and Japan. However, in Korea it is approved only for eosinophilic asthma, and it has not yet received approval for CRSwNP. In Japan, mepolizumab has recently been approved for CRSwNP, and its asthma indication covers a broader spectrum of bronchial asthma rather than being limited to eosinophilic asthma,

Table 1. Current approval status of biologics for type 2 inflammatory diseases (Nov. 2024)

Biologics	Mechanism	Korea (MFDS)	United States (FDA)	Europe (EMA)	Japan (PMDA)
Dupilumab (Dupixent®)	IL-4Rα antagonist	CRSwNP Eosinophilic (or OCS-dependent) asthma Atopic dermatitis Prurigo nodularis	CRSwNP Eosinophilic (or OCS-dependent) asthma Atopic dermatitis Prurigo nodularis Eosinophilic esophagitis	CRSwNP Type 2 asthma Chronic obstructive pulmonary disease Atopic dermatitis Prurigo nodularis Eosinophilic esophagitis	CRSwNP Bronchial asthma Atopic dermatitis Prurigo nodularis Chronic spontaneous urticaria
Omalizumab (Xolair®)	Free IgE antagonist	CRSwNP Allergic asthma Chronic spontaneous urticaria	CRSwNP Allergic asthma Chronic spontaneous urticaria IgE-mediated food allergy	CRSwNP Allergic asthma Chronic spontaneous urticaria	Seasonal allergic rhinitis Asthma Chronic spontaneous urticaria
Mepolizumab (Nucala®)	IL-5 antagonist	Eosinophilic asthma	CRSwNP Eosinophilic asthma Eosinophilic granulomatosis with polyangiitis Hypereosinophilic syndrome	CRSwNP Eosinophilic asthma Eosinophilic granulomatosis with polyangiitis Hypereosinophilic syndrome	CRSwNP Bronchial asthma Eosinophilic granulomatosis with polyangiitis
Reslizumab (Cinqair®)	IL-5 antagonist	Eosinophilic asthma	Eosinophilic asthma	Eosinophilic asthma	N/A
Benralizumab (Farsenra®)	IL-5Rα antagonist	Eosinophilic asthma	Eosinophilic asthma	Eosinophilic asthma	Bronchial asthma

MFDS, Ministry of Food and Drug Safety; FDA, U.S. Food and Drug Administration; EMA, European Medicines Agency; PMDA, Pharmaceuticals and Medical Devices Agency; IL, interleukin; R, receptor; CRSwNP, chronic rhinosinusitis with nasal polyps; OCS, oral corticosteroid; IgE, immunoglobulin E; N/A, not applicable

Table 2. Journal articles on biologics for CRSwNP authored by Korean rhinologists (Dec. 2024)

Authors	Year	Type	Methodology	Indexed database	Language	Conclusion
Yoon et al. [31]	2024	Original	Retrospective observational (44 pts.)	SCIE	English	Adjusting dupilumab dosing intervals based on initial SNOT-22 scores ensured sustained efficacy and patient satisfaction in Korean CRSwNP patients.
Kim et al. [43]	2024	Review	Meta-analysis	SCIE	English	Endoscopic sinus surgery was initially more effective, but after a year, outcomes were similar, with better olfactory improvement in the dupilumab group.
Kang et al. [44]	2024	Original	Retrospective observational (76 pts.)	Scopus	English	Dupilumab is generally safe but may cause adverse events like skin rash, requiring physician awareness.
Kang et al. [46]	2024	Original	Retrospective observational (40 pts.)	Scopus	English	Monthly dupilumab treatment, instead of the biweekly regimen, is as a safe and effective option for managing CRSwNP.
Kim and Cho [45]	2023	Review	Narrative	SCIE	English	Regular clinical monitoring of biological agents and the establishment of appropriate usage durations and intervals are necessary.
Cha et al. [41]	2023	Original	Survey among Korean rhinologists	KCI	English	Discrepancies exist between current guidelines for biologic treatment of CRSwNP and the practical situation, emphasizing the need for Korea-specific guidelines.
Kim et al. [47]	2023	Review	Meta-analysis	KCI	English	Dupilumab decreased subjective symptom scores, improved quality of life, and enhanced objective measures of progression compared to preoperative values.
Han et al. [48]	2023	Review	Narrative	KCI	Korean	The use of biologics in Korean patients, considering the unique endotype and comparing the efficacy of different biologics, is crucial for tailoring treatment.
Yang et al. [49]	2022	Review	Narrative	SCIE	English	Understanding the local and systemic pathomechanisms of CRSwNP and the role of biologics at each level can help interpret clinical outcomes.
Tai et al. [50]	2022	Review	Narrative	SCIE	English	The potential molecular therapeutic targets for treating CRSwNP with biologics are emphasized.
Yang and Kim [51]	2022	Review	Narrative	KCI	Korean	The pharmacokinetics and pharmacodynamics are explored in relation to the pathomechanism of each biologic.
Kim et al. [52]	2021	Review	Narrative	Scopus	Korean	Emerging biologics could provide a novel therapeutic option for managing uncontrolled CRSwNP.
Lee et al. [5]	2021	Review	Narrative	KCI	English	Efficient use of biologics is hoped for in severe, uncontrolled type 2 CRSwNP that does not respond to medical or surgical treatments.

Editorials or short commentaries were excluded due to a shortage of space. CRSwNP, chronic rhinosinusitis with nasal polyps; pts., patients; SCIE, Science Citation Index Expanded; KCI, Korea Citation Index; SNOT, Sinonasal Outcome Test

similar to dupilumab. Additionally, reslizumab (an IL-5 antagonist) is approved for eosinophilic asthma in Europe, the United States, and Korea. Benralizumab (an IL-5Rα antagonist) is also approved for eosinophilic asthma in Europe, the United States, and Korea. In Japan, benralizumab's approval for asthma is as broad as that for bronchial asthma, similar to the approvals for dupilumab and mepolizumab.

Beyond suppressing type 2 cytokines, biological agents that target type 1 cytokines or mucosa-derived cytokines such as IL-25, IL-33, and thymic stromal lymphopoietin—or that regulate B cell isotype switching—represent potential new therapeutic concepts. The following novel biologics and their latest approval details are described below.

Tralokinumab (an IL-13 antagonist) was approved for atopic dermatitis in the US (2021), Europe (2021), and Korea (2023). Lebrikizumab (also an IL-13 antagonist) received approval for atopic dermatitis in the US (2021), Europe (2023), and Korea (2024). Tezepelumab (a thymic stromal lymphopoietin antagonist) has been approved for asthma in the US (2021), Europe (2022), and Korea (2023). Tezepelumab targets thymic stromal lymphopoietin, an epithelial cytokine that activates multiple downstream inflammatory pathways, thereby reducing the overall inflammatory response.

SPECIFIC CONSIDERATIONS REGARDING THE USE OF BIOLOGICS FOR TREATING CRSWNP IN KOREA

A Korean Rhinologic Society study group surveyed 44 members regarding their experience with biologic treatments for CRSwNP [41]. The study revealed that 86.4% of respondents had prescribed biologics, with dupilumab as the preferred choice (71.1%). The primary indication for biologic use was recurrent nasal polyps after surgery (87.2%). However, high cost (48.6%) was the most common reason for discontinuation. Given the differences in CRS endotypes between Korea and Western countries, 93.2% of respondents agreed on the need for Korean-specific guidelines.

From a cost-effectiveness perspective, a comparative study has shown that even in the United States—where surgery and anesthesia costs are high—endoscopic sinus surgery is more cost-effective than biologics for CRSwNP [42]. Currently, no cost-effectiveness studies comparing surgery and biologics for CRSwNP have been conducted in Korea. However, because surgery and anesthesia costs are significantly lower in Korea than in the U.S., the high cost of biologics remains a major barrier to their widespread use, making surgical treatment the more accessible option.

In Korea, neither dupilumab nor omalizumab is covered by national health insurance for CRSwNP, meaning that patients must bear the full cost. As of August 2024, the publicly announced price of Dupixent in South Korea—according to the Ministry of Food and Drug Safety (MFDS)—is approximately 680,000 KRW, while Xolair is priced at approximately 216,000 KRW. Due to this substantial financial burden, many patients are unable to adhere to the originally recommended biweekly dosing schedule and instead receive monthly or even less frequent doses.

A retrospective study involving 44 Korean patients demonstrated that, even with adjusted dosing intervals, subjective quality of life was well maintained. Therefore, the authors suggest that if symptoms are adequately controlled and endoscopic findings remain stable, extending the dosing interval to one month or longer may be a feasible approach in Korea.

Recently, the indications for biologics in Korea have expanded. In addition to patients with recurrent CRSwNP after surgery, as recommended by the EPOS/EUFOREA update [7], biologics are also being used as an alternative to surgery in patients who have not undergone surgical intervention.

The articles published by Korean authors are summarized in Table 2 [5,31,41,43-52]. Since biologic use for CRSwNP began in Korea in 2021, most early publications were narrative reviews. However, more recently, original articles—including observational studies, case-controlled studies, and meta-analyses—have emerged. Practical considerations specific to Korea, such as interval dosing and comparisons to surgery, have been analyzed [31,43-45]. Despite this progress, well-controlled prospective studies are still lacking.

CONCLUSION

In the new EPOS/EUFOREA guidelines, the criterion for type 2 inflammation has been relaxed from a blood eosinophil count of ≥250 cells/μL to ≥150 cells/μL, while other indications remain unchanged. Although recurrence after endoscopic sinus surgery remains the primary criterion, positive results have recently been reported in non-operated CRSwNP patients and in less severe cases that do not fully meet the EPOS criteria. This suggests that, in practice, biologics may be effectively applied to a broader patient population in the future.

Regarding response evaluation, the categories have been simplified and the initial evaluation time extended from 16 weeks to 6 months. Originally, administration intervals were recommended every 2 or 4 weeks, but recent data demonstrating effective control with intervals of 4 weeks or even 2 months provide a rationale for extending dosing intervals. For patients with prolonged hypereosinophilia accompanied by symptoms or signs of vasculitis and a blood eosinophil count of 3,000 cells/μL, clinicians should consider extending

the administration interval to every four weeks, initiating a short course of systemic steroids, and consulting with internal medicine.

This update reviews changes in practice profiles based on EPOS/EUFOREA 2023, incorporating relevant clinical data. We anticipate that this review will aid rhinologists in managing patients with severe and/or uncontrolled CRSwNP. Nevertheless, challenges remain—both clinical, such as the use in non-operated patients and optimal treatment intervals, and administrative, such as high costs and lack of insurance reimbursement. Further studies, such as multicenter surveys tailored to the Korean context, are needed to inform actual practice.

Ethics Statement

Not applicable

Availability of Data and Material

All data generated or analyzed during the study are included in this published article.

Conflicts of Interest

Gwanghui Ryu and Shin Hyuk Yoo who are on the editorial board of the *Journal of Rhinology* were not involved in the editorial evaluation or decision to publish this article. All remaining authors have declared no conflicts of interest.

Author Contributions

Conceptualization: Ji-Hun Mo, Chang-Hoon Kim. **Data curation:** Ki-Il Lee, Gwanghui Ryu, Shin Hyuk Yoo. **Formal analysis:** Ki-Il Lee. **Funding acquisition:** Ji-Hun Mo, Chang-Hoon Kim. **Investigation:** Ki-Il Lee, Gwanghui Ryu, Shin Hyuk Yoo. **Methodology:** Ki-Il Lee. **Project administration:** Ji-Hun Mo, Chang-Hoon Kim. **Resources:** Ji-Hun Mo, Chang-Hoon Kim. **Software:** Ki-Il Lee. **Supervision:** Ji-Hun Mo, Chang-Hoon Kim. **Validation:** Gwanghui Ryu, Shin Hyuk Yoo, Ji-Hun Mo, Chang-Hoon Kim. **Visualization:** Ki-Il Lee. **Writing—original draft:** Ki-Il Lee. **Writing—review & editing:** Ki-Il Lee, Gwanghui Ryu, Shin Hyuk Yoo, Hyung-Ju Cho, Ji-Hun Mo.

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