

Should computed tomography be used in the evaluation of biologic therapies for severe chronic rhinosinusitis with nasal polyps?

Melania Bertolini^{1,2}, Diego Bagnasco^{3,4}, Frank Rikki Mauritz Canevari^{1,2}

¹ Department of Otolaryngology and Head and Neck Surgery, IRCSS AOU San Martino, Genoa, Italy; ² Department of Surgical Sciences Integrated Diagnostics (DISC), University of Genoa, Genoa, Italy; ³ Allergy and Respiratory Diseases, Department of Internal Medicine (DIMI), University of Genoa, Genoa, Italy; ⁴ IRCSS AOU San Martino, Genoa, Italy

Key words: computed tomography scan, chronic rhinosinusitis with nasal polyps, biologic therapy, safety

Dear Editor,

In this short manuscript we would like to focus attention on the role of computed tomography (CT) in patients who are eligible for biologic therapy for severe and uncontrolled chronic rhinosinusitis with nasal polyps (CRSwNP). CRS is a chronic inflammatory disease affecting more than 10% of the Western population and has historically been classified according to the presence or absence of polyps on nasal endoscopy and CT as CRSwNP or CRS without polyps (CRSsNP), respectively. Of note, the former is estimated to affect up to 4% of the adult population and is usually associated with comorbid asthma and non-steroidal anti-inflammatory drug (NSAID)-exacerbated respiratory disease and remains uncontrolled in more than 30% of cases despite repeated cycles of systemic corticosteroids and surgery ¹. Over the past decades, much knowledge has been gained about the pathophysiology and the environmental and genetic factors responsible for CRS, emphasising the crucial role of the endotype. The 2020 European position paper on rhinosinusitis and nasal polyps (EPOS 2020) revolutionised the classification of CRS based on whether the disease is primary or secondary, localised or diffuse, and related to type 2 or non-type 2 inflammation ². Type 2 inflammation, which is estimated to affect 80% of patients with severe uncontrolled CRSwNP, is reported to be widespread in Western countries and increasing in Asian countries. These patients have the highest disease burden with significantly lower physical and mental quality of life than population norms.

Systemic corticosteroid therapy and/or surgery remain first line treatments, although in patients with uncontrolled severe type 2 CRSwNP, biologic therapy has emerged as a promising alternative.

The latest EPOS/European Forum for Research and Education in Allergy and Airway Diseases (EUFOREA) 2023 eligibility and response criteria for biologic therapy focused on the presence of type 2 inflammation and severity of symptoms despite previous treatments ³. According to the EPOS/EUFOREA 2023 criteria, the right candidate for a biologic therapy is a patient with uncontrolled CRSwNP, despite adequate medical treatment and appropriate sinus surgery, and who fulfils 3 of 5 criteria (presence of type 2 inflammation, regular need for systemic corticosteroids, significant impact on quality of life, loss of smell and comorbid asthma).

To accurately diagnose and manage patients with type 2 CRSwNP, De Corso et al. published practical recommendations for clinical practice ⁴ and Canevari et al. proposed a diagnostic therapeutic assistance pathway (PDTA) ⁵ aiming to guide ENTs and other clinicians in all the different territorial realities. It is

Received: September 7, 2024

Accepted: March 18, 2025

Correspondence

Melania Bertolini

E-mail: melania.greta.bertolini@gmail.com

How to cite this article: Bertolini M, Bagnasco D, Canevari FRM. Should computed tomography be used in the evaluation of biologic therapies for severe chronic rhinosinusitis with nasal polyps? Acta Otorhinolaryngol Ital 2025;45:296-298. <https://doi.org/10.14639/0392-100X-N3197>

© Società Italiana di Otorinolaringoiatria e Chirurgia Cervico-Facciale



OPEN ACCESS

This is an open access article distributed in accordance with the CC-BY-NC-ND (Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International) license. The article can be used by giving appropriate credit and mentioning the license, but only for non-commercial purposes and only in the original version. For further information: <https://creativecommons.org/licenses/by-nc-nd/4.0/deed.en>

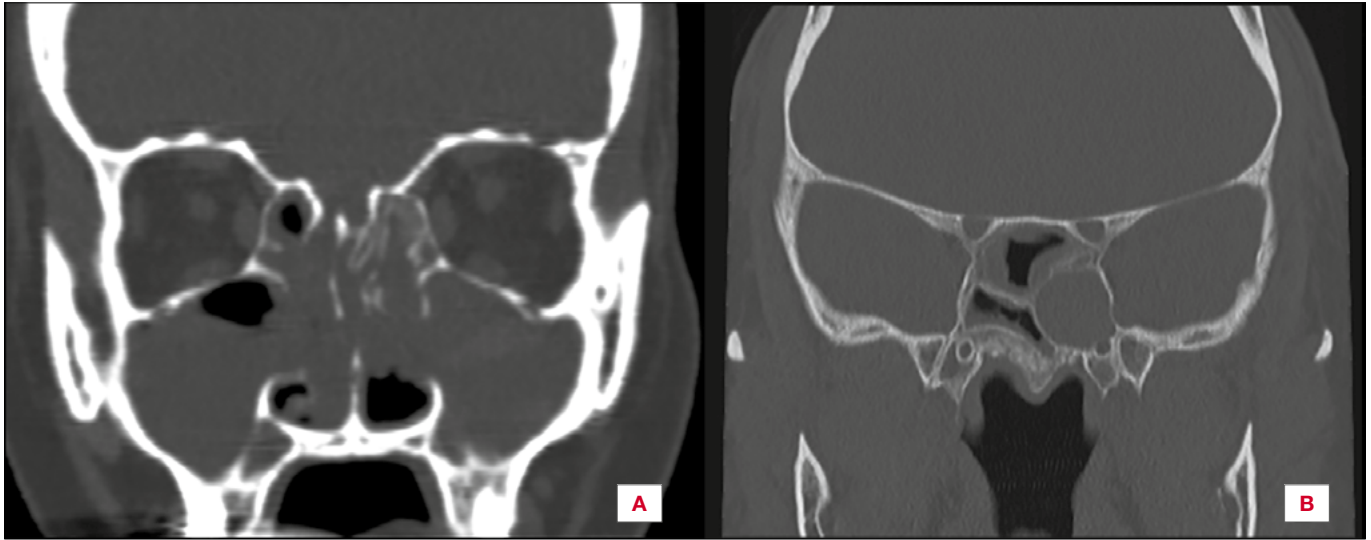


Figure 1. A) CT scan of a patient with CRSwNP at 3 years from the last endoscopic sinus surgery. CT shows bone discontinuation at the level of the right cribriform plate in the suspicion of CSF leakage or meningoencephalocele; B) CT scan shows a suspected left sphenoidal sinus mucocoele in a patient with CRSwNP on biologic therapy. The patient had already undergone 2 endoscopic sinus surgeries before biologic treatment.

emphasised that PDTAs represent multidisciplinary instruments, as their development and application involve several specialists and caregivers. Both authors suggested the use of radiological investigations before starting biological therapy.

In this regard, maxillofacial CT scan without contrast has been shown to be a reliable tool to assess the severity and control of disease using the Lund Mackay score and to evaluate the extent of the previous surgery using the Amsterdam Classification of Completeness of Endoscopic Sinus Surgery (ACCESS) score ⁶. In daily clinical practice, the diagnostic flowchart of a patient with CRS includes CT for diagnostic purposes, differential diagnosis, and surgical planning. However, there is still no consensus on the use of CT in patients who are eligible for biologic therapy or during follow-up. In fact, De Corso et al. reported that only 56% of ENTs use the Lund-Mackay score, even though high scores indicate a greater risk of future relapse, and only 37% use the ACCESS score. Notably, a moderate number of ENTs do not routinely require CT in the evaluation of surgical patients, even in the setting of recurrence. Radiological findings assess anatomical variants, extension of mucosal inflammation and bone rearrangement, as well as complications such as mucocoele or cerebrospinal fluid (CSF) leak, which are essential to be aware of before performing functional endoscopic sinus surgery (FESS).

We believe that CT is essential to confirm the indication for biological therapy. In fact, clinicians should first exclude the

presence of other diseases or iatrogenic complications. CSF leakage (Fig. 1A) is reported to occur in 0.09% to 0.56% of patients undergoing FESS and is associated with the extent of surgery ⁷. CSF leakage can be variably associated with ascending meningoencephalitis and pneumocephalus with a high risk of mortality. Although the incidence of occult and clinically-irrelevant CSF leaks after FESS is estimated to be 13%⁸ and the clinical course of these patients appears to be uneventful, surgical repair is necessary when clinical and radiological findings are present.

Mucocoele (Fig. 1B) is also an infrequent but significant adverse complication after FESS. This is a slow growing sinonasal pseudocyst that determines a dynamic reabsorption and deposition of bony tissue, causing displacement and compression of nearby structures, warranting endoscopic surgery ⁹. Inflammatory blockage of mucus drainage, obstruction of the secretory duct, cystic dilatation of the mucus glands and cystic degeneration of the polyps (primary mucocoele), together with intranasal trauma and previous surgery (secondary mucocoele), are considered causative factors for mucocoele. Moreover, these factors are usually shared by patients with CRSwNP. Without radiological evaluation, mucocoele cannot be diagnosed. In addition, secondary mucocoeles have an average latency of more than 12 months from the last surgery.

As mentioned, EPOS/EUFOREA 2023 outlined 5 criteria to define response to biologic treatment based on endoscopic findings, symptoms, smell, need for systemic corticoste-

roids/salvage surgery and comorbidities. Radiological findings, which are part of baseline assessment of a patient with CRS, are not considered in the assessment of safety before and during biologic therapies.

It is clear that patients with severe type 2 CRSwNP, who have a systemic inflammatory substrate that is recalcitrant to surgery, are predisposed to constant rearrangement of the sinus environment which could potentially lead to complications. In view of this, we would like to emphasise the need for CT in the follow-up of patients with severe uncontrolled CRSwNP. These patients have already undergone multiple surgeries and are predisposed to chronic mucosal sinus inflammation. In addition, radiological scores, such as the Lund Mackay and ACCESS scores, which are still not widely used by clinicians, may be considered as an outcome measure of the objective improvement rate in accordance with the aforementioned 5 criteria of EPOS/EUFOREA 2023. In addition, in the new era of radiomics, artificial intelligence may provide objective assessment^{10,11}.

In conclusion, we hope that CT will become a standard of care not only to assess disease severity, but also to evaluate safety before and during biological therapy.

Conflict of interest statement

The authors declare no conflict of interest.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author contributions

FRC: conceptualisation; MB, FRC: methodology; MB: investigation, resources, writing-original draft preparation; MB, DG, FRC: writing-review and editing.

All authors have read and agreed to the published version of the article.

Ethical consideration

Not applicable

References

- ¹ Bachert C, Zhang N, Cavaliere C, et al. Biologics for chronic rhinosinusitis with nasal polyps. *J Allergy Clin Immunol* 2020;145:725-739. <https://doi.org/10.1016/j.jaci.2020.01.020>
- ² Fokkens WJ, Lund VJ, Hopkins C, et al. European position paper on rhinosinusitis and nasal polyps 2020. *Rhinology* 2020;58(Suppl. S29):1-464. <https://doi.org/10.4193/Rhin20.600>
- ³ Fokkens WJ, Viskens AS, Backer V, et al. EPOS/EUFOREA update on indication and evaluation of biologics in chronic rhinosinusitis with nasal polyps 2023. *Rhinology* 2023;61:194-202. <https://doi.org/10.4193/Rhin22.489>
- ⁴ De Corso E, Pipolo C, Cantone E, et al. Practical recommendations for managing severe chronic rhinosinusitis with nasal polyps in the era of biologics. *Acta Otorhinolaryngol Ital* 2023;43:324-340. <https://doi.org/10.14639/0392-100X-N2422>
- ⁵ Canevari FR, Giorli A, Monti G, et al. Diagnostic therapeutic assistance pathway (PDTA) of type 2 chronic rhinosinusitis. *Front Allergy* 2023;4:1237131. <https://doi.org/10.3389/falgy.2023.1237131>
- ⁶ Poto R, Pelaia C, di Salvatore A, et al. Imaging of chronic rhinosinusitis with nasal polyps in the era of biological therapies. *Curr Opin Allergy Clin Immunol* 2024;24:243-250. <https://doi.org/10.1097/ACI.0000000000000964>
- ⁷ Koizumi M, Suzuki S, Matsui H, et al. Trends in complications after functional endoscopic sinus surgery in Japan: a comparison with a previous study (2007-2013 vs 2013-2017). *Auris Nasus Larynx* 2020;47:814-819. <https://doi.org/10.1016/j.anl.2020.04.003>
- ⁸ Bucher S, Kugler A, Probst E, et al. Occurrence of occult CSF leaks during standard FESS procedures. *Rhinology* 2018;56:166-171. <https://doi.org/10.4193/Rhin17.117>
- ⁹ Devars Du Mayne M, Moya-Plana A, Malinvaud D, et al. Sinus mucocoele: natural history and long-term recurrence rate. *Eur Ann Otorhinolaryngol Head Neck Dis* 2012;129:125-130. <https://doi.org/10.1016/j.anorl.2011.10.002>
- ¹⁰ Zou J, Lyu Y, Lin Y, et al. A multi-view fusion lightweight network for CRSwNPs prediction on CT images. *BMC Med Imaging* 2024;24:12. <https://doi.org/10.1186/s12880-024-01296-3>
- ¹¹ Rampinelli V, Paderno A, Conti C, et al. Artificial intelligence for automatic detection and segmentation of nasal polyposis: a pilot study. *Eur Arch Otorhinolaryngol* 2024;281:5815-5821. <https://doi.org/10.1007/s00405-024-08809-4>