# Demographic and Clinical Risk Factors for Chronic Rhinosinusitis and Endoscopic Sinus Surgery Following Rituximab Therapy

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## INTRODUCTION

Immunosuppressive therapies are associated with increased susceptibility to upper airway infections and may contribute to the development or exacerbation of chronic rhinosinusitis (CRS). [1]

Rituximab, an anti-CD20 monoclonal antibody, is widely used in the treatment of hematologic malignancies and autoimmune diseases. While immunosuppressive medications have been linked to CRS, the specific clinical factors associated with CRS development following rituximab therapy remain poorly defined. As use of rituximab expands, identifying patients at higher risk for CRS is essential to improving outcomes in this potentially more complex and treatment-resistant population.

### OBJECTIVE

To evaluate predictors of CRS and the need for endoscopic sinus surgery (ESS) in patients with a history of rituximab use.

## METHODS

A retrospective cohort study of patients treated at multiple Mayo Clinic sites (MN, FL, AZ, and WI) was conducted.

Patients were included if they had a documented history of rituximab use and a subsequent diagnosis of CRS between January 1, 2019, and January 1, 2025.

Patients were excluded if they had a CRS diagnosis prior to the initiation of rituximab therapy.

Data collected included patient demographics, indication for rituximab therapy, duration of treatment, time from last rituximab dose to CRS diagnosis, and whether endoscopic sinus surgery (ESS) was performed.



## RESULTS

A total of 1,105 patients met inclusion criteria (mean age: 60.7 ± 16.1 years; M:F ratio = 1.1:1).

The most common indications for rituximab were:

- Non-Hodgkin lymphoma: 46.2%
- Chronic lymphocytic leukemia: 14.9%
- Rheumatoid arthritis: 11.0%

The mean duration of rituximab therapy was 29.1 ± 42.7 months, with an average delay of 30.5 ± 36.2 months between rituximab discontinuation and CRS diagnosis.

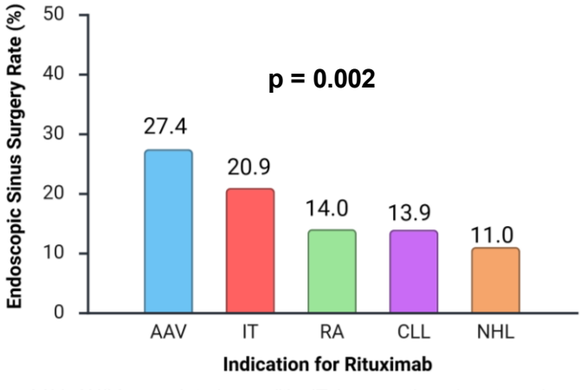
ESS was performed in 149 patients (13.5%), with a mean time to surgery of 40.2 ± 47.9 months after rituximab cessation.

**Fig. 1** shows ESS rates by rituximab indication.

Patients who underwent ESS had significantly longer rituximab exposure than non-surgical patients (38.4 vs 27.7 months, p = 0.008; **Fig. 2**).

### FIGURE 1

**Variation in Sinus Surgery Rates by Indication for Rituximab**




AAV, ANCA associated vasculitis; IT, immune thrombocytopenia; RA, rheumatoid arthritis; CLL, chronic lymphocytic leukemia; NHL, non-Hodgkin lymphoma.

## DISCUSSION

CRS following rituximab therapy is an emerging complication in immunosuppressed patients, particularly those treated for hematologic malignancies. In our multicenter cohort, longer rituximab exposure was associated with higher ESS rates, suggesting a possible dose-dependent risk for recalcitrant disease.

These findings are consistent with prior research suggesting that B-cell depletion impairs mucosal immunity through reductions in local immunoglobulin production. [2] In addition, neutrophil-driven inflammation, which tends to persist despite immunosuppressive therapy, may further contribute to tissue damage and chronicity. [3]

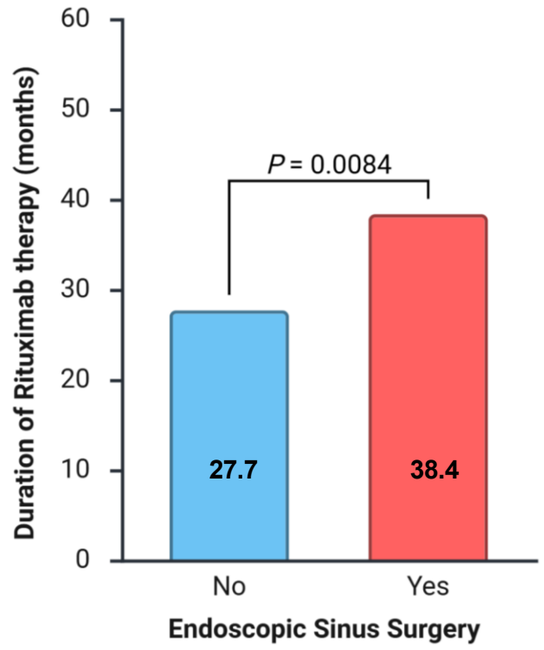
The delayed onset of CRS after rituximab cessation highlights the possibility of prolonged mucosal vulnerability. Rituximab's unique mechanism of action may contribute to a distinct CRS phenotype characterized by treatment resistance and increased surgical burden. Further research is needed to better define the underlying inflammatory and microbiologic features of this population to guide management.

## CONCLUSIONS

- CRS development and the need for ESS after rituximab therapy are influenced by treatment duration and underlying disease.
- Longer rituximab courses are significantly associated with surgical intervention, highlighting the need for close rhinologic monitoring in patients receiving prolonged therapy.

### FIGURE 2

**Patients Undergoing ESS Received Rituximab for a Longer Duration**




## REFERENCES

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