

# Do Patients With Chronic Rhinosinusitis Exhibit Elevated Rates of Covid-19 Infection?

Alan D. Workman, MD, MTR ; Neil Bhattacharyya, MD, MA, FACS

Patients with chronic rhinosinusitis (CRS) may have concerns regarding their potential for an increased likelihood of contracting Covid-19, given baseline inflammatory disease and utilization of topical or oral immunosuppressive therapies for disease treatment. In the present study, we utilize matched cohort sampling of over 12,000 CRS patients and 12,000 controls seen between June of 2020 and January of 2021, examining rates of Covid-19 testing and positivity during that time period. We found no difference in Covid-19 contraction between CRS patients and matched non-CRS patients, despite an almost twofold significant increase in testing among those with CRS. This suggests that CRS patients are likely not inherently more vulnerable to Covid-19 infection at a rate above that of the general population.

**Key Words:** Covid-19, coronavirus, chronic rhinosinusitis, viral infection, epidemiology, otolaryngology.

**Level of Evidence:** 4

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## INTRODUCTION

Since the onset of the Covid-19 pandemic, many groups at increased risk for Covid-19 infection or more severe forms of infection have been identified.<sup>1,2</sup> Otolaryngology patients may have specific infection-related concerns as many manifest significant upper airway afflictions. In particular, patients with chronic rhinosinusitis (CRS) often ask if they are more susceptible to contracting Covid-19 given their underlying inflammatory mucosal disease and potential utilization of topical steroid sprays or rinses.<sup>3</sup> We sought to explore if CRS patients were in fact more likely to contract Covid-19 when compared to a matched control group without CRS.

## MATERIALS AND METHODS

Utilizing the clinical data repository in the Partners Healthcare System, we identified a case group of adult patients with a clinical diagnosis of CRS (ICD-10 code J32.x or J33.x) given by an otolaryngologist from June 1, 2020 through January 31, 2021. This time interval corresponds to an 8-month block during which there was highly active coronavirus infection transmission in Massachusetts, but before the onset of Covid-19 vaccine utilization. For each CRS patient, a control patient was identified and matched according to sex, age (within 5 years), race, and comorbidity score. For the case and control cohorts we then tabulated the frequency of Covid-19 polymerase chain

reaction testing as well as positive test results for Covid-19 within the study period. The rate of Covid-19 infection was compared between the CRS and control cohorts with chi-square with statistical significance set at  $P < .05$ .

## RESULTS

Overall, 12,282 individual CRS patients (55.4% female; mean age, 53.0 years) were identified and successfully matched 1:1 to control patients (55.4% female; mean age, 53.1 years). The number of patients receiving one or more Covid-19 tests during the study period were 3,381 (27.5%) and 1,880 (15.3%) for the CRS and control cohorts, respectively ( $P < .001$ ). The overall Covid-19 contraction rate was 1.4% (95% confidence interval, 1.2–1.6) among CRS patients versus 1.4% (1.2–1.6%) among control patients ( $P = .999$ ).

## DISCUSSION

In a large sample of over 12,000 adult CRS patients, we did not find significantly different rates of Covid-19 contraction when compared to age, sex, race, and comorbidity matched controls. This finding should be generally reassuring to patients with CRS and their healthcare providers. At the present time, it is not uncommon to encounter patients who are concerned that their underlying CRS might make them more susceptible to coronavirus infection compared to the average patient. Patients with CRS are commonly treated with topical nasal steroid sprays, topical nasal steroid irrigations, and oral steroids. CRS patients are often concerned that these forms of steroid treatment may predispose them to coronavirus infection due to a local immunosuppressive effect.<sup>4</sup> Prior studies have demonstrated a small but significant increased risk of viral upper respiratory infection with the use of inhaled corticosteroids in reactive airway disease.<sup>5</sup> Conversely, we previously found

From the Department of Otolaryngology (A.D.W., N.B.), Harvard Medical School, Boston, Massachusetts, U.S.A.; Department of Otolaryngology (A.D.W., N.B.), Massachusetts Eye & Ear, Boston, Massachusetts, U.S.A.

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Send correspondence to Alan D. Workman, Massachusetts Eye and Ear, 243 Charles Street, Boston, MA 02114. E-mail: alan\_workman@meei.harvard.edu

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that oral corticosteroids prescribed for the treatment of CRS during the coronavirus pandemic did not contribute to increased rates of Covid-19 contraction among those receiving steroids.<sup>6</sup>

These data continue to be important for reference and patient counseling, even after the onset of Covid-19 vaccinations. Unfortunately, Covid-19 vaccine penetration rates are not uniformly high throughout the United States and therefore there likely remains a significant population of CRS patients who may be unvaccinated, and who may still be concerned about the potential for increased susceptibility to coronavirus infection given their disease.

Interestingly, we did find that the Covid-19 testing rate among CRS patients was almost double that of the control population (27.5% vs. 15.3%). There are several potential explanations for this increased rate of testing. First, there could be a general increased concern for Covid-19 susceptibility among CRS patients. In addition to this, CRS patients commonly manifest many symptoms such as dysosmia, rhinorrhea, cough, and other upper respiratory tract-related symptoms that may overlap with those of Covid-19 infection, thus prompting additional testing. Importantly, despite this increased testing rate, the actual Covid-19 contraction rate was indistinguishable between groups.

Our study possesses several limitations. First, although the overall rates of coronavirus infection in CRS and control patients were low, we did not examine relative disease severity among those who did indeed contract Covid-19. Second, it is possible that CRS patients were in general more cautious about potential Covid-19 exposures, thus lessening their opportunity for Covid-19 contraction. This would tend to lower the susceptibility rate among CRS patients. However, this would be countered by the fact that the CRS cohort had higher rates of Covid-19 testing.

## CONCLUSION

Utilizing a case-control methodology with a large sample size, we did not find an increased rate of Covid-19 infection among CRS patients versus controls. These data would suggest that there is nothing inherent about the upper airway inflammatory environment in CRS that would make these patients more susceptible to Covid-19 infection.

## Author Contributions

Alan D. Workman: data interpretation, preparation of manuscript, revision of manuscript. Neil Bhattacharyya: study conception and design, data analysis, data interpretation, preparation of manuscript, revision of manuscript.

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