

Chronic Obstructive Pulmonary Disease Lung Microbiota Diversity May Be Mediated by Age or Inhaled Corticosteroid Use

Alexa A. Pragman,^a Hyeun Bum Kim,^b Cavan S. Reilly,^c Christine Wendt,^d Richard E. Isaacson^e

Department of Medicine, University of Minnesota, Minneapolis, Minnesota, USA^a; Department of Animal Resource and Science, Dankook University, Cheonan, Choongnam, Republic of Korea^b; Division of Biostatistics, School of Public Health, University of Minnesota, Minneapolis, Minnesota, USA^c; Department of Medicine, Minneapolis Veterans Affairs Medical Center, Minneapolis, Minnesota, USA^d; Department of Veterinary and Biomedical Sciences, University of Minnesota, St. Paul, Minnesota, USA^e

We read with great interest the paper by Garcia-Núñez et al. (1) published in the December 2014 issue of this journal, where the authors investigated the sputum microbiota of chronic obstructive pulmonary disease (COPD) patients. The authors found decreased microbial diversity in patients with advanced disease (approaching the very-severe-COPD category according to Global Initiative for Chronic Obstructive Lung Disease [GOLD] criteria) compared to that of patients with moderate and severe COPD. Garcia-Núñez et al. contrast that with our findings (2), which did not identify changes in microbial diversity related to COPD severity. We wish to point out that our study compared control patients to both moderate- and severe-COPD patients but included only 2 subjects with advanced disease as defined by Garcia-Núñez et al. Our subjects with COPD had a median forced expiratory volume in 1 s/forced vital capacity (FEV1% predicted) of 54%, while Garcia-Núñez et al. report an FEV1% predicted of 35%. Therefore, our findings are not amenable to direct comparison with those of Garcia-Núñez et al.

Although we did not identify severity-related changes in microbial diversity between moderate- and severe-COPD patients, we did demonstrate that increasing age was associated with increased microbial diversity in moderate- and severe-COPD patients. As this was a significant finding in our study, we wonder if Garcia-Núñez et al. have analyzed the relationship between subject age and microbial diversity in their samples. Furthermore, our study demonstrated changes in the lung microbiota related to inhaled corticosteroid use (2). Another recent study by Huang et al. (3) observed a trend toward greater diversity in samples from subjects using inhaled corticosteroids. In the study by Garcia-Núñez et al., more subjects with advanced disease (an FEV1% predicted of <35%) used inhaled corticosteroids than subjects with moderate to severe disease ($P = 0.082$). Although the study by

Huang et al. and the study by Garcia-Núñez et al. observed opposite changes in diversity related to inhaled corticosteroid use, we wonder if inhaled corticosteroid use may be partially responsible for the differences in diversity between the two groups.

Studies on the COPD lung microbiota are just beginning, and the work performed thus far has been challenging to interpret due to differences in technique and patient population. We hope that by taking into account already identified potential confounders (such as age and inhaled corticosteroid use), a more complete understanding of the COPD lung microbiota can emerge.

REFERENCES

1. Garcia-Núñez M, Millares L, Pomares X, Ferrari R, Perez-Brocal V, Gallego M, Espasa M, Moya A, Monso E. 2014. Severity-related changes of bronchial microbiome in chronic obstructive pulmonary disease. *J Clin Microbiol* 52:4217–4223. <http://dx.doi.org/10.1128/JCM.01967-14>.
2. Pragman AA, Kim HB, Reilly CS, Wendt C, Isaacson RE. 2012. The lung microbiome in moderate and severe chronic obstructive pulmonary disease. *PLoS One* 7:e47305. <http://dx.doi.org/10.1371/journal.pone.0047305>.
3. Huang YJ, Sethi S, Murphy T, Nariya S, Boushey HA, Lynch SV. 2014. Airway microbiome dynamics in exacerbations of chronic obstructive pulmonary disease. *J Clin Microbiol* 52:2813–2823. <http://dx.doi.org/10.1128/JCM.00035-14>.

Citation Pragman AA, Kim HB, Reilly CS, Wendt C, Isaacson RE. 2015. Chronic obstructive pulmonary disease lung microbiota diversity may be mediated by age or inhaled corticosteroid use. *J Clin Microbiol* 53:1050. doi:10.1128/JCM.03320-14.

Editor: G. V. Doern

Address correspondence to Alexa A. Pragman, alexa@umn.edu.

For the author reply, see doi:10.1128/JCM.03358-14.

Copyright © 2015, American Society for Microbiology. All Rights Reserved.
doi:10.1128/JCM.03320-14