

Cystic Fibrosis Research News

Title:

Polymicrobial infections and antibiotic treatment patterns for cystic fibrosis pulmonary exacerbations

Lay Title:

Bacterial infections and the antibiotics prescribed for children with cystic fibrosis-related pulmonary exacerbations

Authors:

Anna V. Faino^a, Lucas R. Hoffman^b, Ronald L. Gibson^b, Matthew P. Kronman^c, David P. Nichols^b, Margaret Rosenfeld^b, Jonathan D. Cogen^b

Affiliations:

^a Core for Biostatistics, Epidemiology and Analytics in Research, Seattle Children's Research Institute, USA

^b Division of Pulmonary and Sleep Medicine, Department of Pediatrics, University of Washington, USA

^c Division of Infectious Diseases, Department of Pediatrics, Seattle Children's Hospital, University of Washington, USA

What was your research question?

This study focused on pulmonary exacerbations in children with cystic fibrosis (CF) and asked 1) how many children had more than one type of bacterial infection, and 2) were certain clinical and demographic factors associated with complete antibiotic coverage of the bacteria identified?

Why is this important?

No data currently exist to guide antibiotic selection to treat exacerbations among people with CF that have multiple bacteria isolated from their respiratory samples. With a lack of antibiotic selection guidance, some children with CF receive complete antibiotic coverage for all bacteria identified, while other children receive only partial antibiotic coverage, and there are hospital- and provider-level differences in care.

What did you do?

We used the CF Foundation Patient Registry-Pediatric Health Information System linked dataset, and looked at children aged 1–21 years with an in-hospital treated pulmonary

Cystic Fibrosis Research News

exacerbation from 2006 to 2019 withing 40+ U.S. paediatric hospitals. We identified all bacteria found in respiratory cultures (i.e. culture positive) in the 12 months prior to an exacerbation. We then determined if the antibiotics prescribed to treat an exacerbation were likely to target each of the bacteria reported (i.e., complete antibiotic coverage). Finally, we determined if any clinical and demographic factors such as patient age, race, ethnicity and U.S. census region (Midwest, West, Northeast, South) were associated with children receiving complete antibiotic coverage in our dataset.

What did you find?

We found that a total of 4,923 children had nearly 28,000 pulmonary exacerbations from 2006-2019, of which 20,214 had more than one bacterial infection identified by culture. Of the pulmonary exacerbations with multiple bacterial infections, 68% had complete antibiotic coverage for each bacteria cultured. The remaining children received antibiotics that were unlikely to target all bacteria (i.e. partial antibiotic coverage). When we looked at demographic and clinical factors that might be associated with complete antibiotic coverage, we found that prior complete antibiotic coverage was associated with future complete antibiotic coverage. The opposite was also true: prior partial coverage was associated with future partial coverage.

What does this mean and reasons for caution?

Most children with CF that were hospitalized for a pulmonary exacerbation had more than one bacterium identified by culture, and the majority of these children were prescribed complete antibiotic coverage. Current antibiotic treatment was associated with past antibiotic treatment, though we cannot conclude the reasons why this occurred since this study was looking backwards in time. This study included data between 2006-2019 and prior to the FDA approval of ETI, and thus, these results may not apply to the post-modulator era.

What's next?

Further studies are needed to compare clinical outcomes of these multiple-infection pulmonary exacerbations treated with different antibiotic coverages to optimize and standardize a CF-specific antibiotic selection recommendation among clinicians.

Original manuscript citation in PubMed

<https://pubmed.ncbi.nlm.nih.gov/36849332/>