

Cystic Fibrosis Research News

Title:

AIRWAY INFECTIONS AS A RISK FACTOR FOR PSEUDOMONAS AERUGINOSA ACQUISITION AND CHRONIC COLONISATION IN CHILDREN WITH CYSTIC FIBROSIS

Lay Title:

Airway infection increases *P. aeruginosa* acquisition

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What was your research question?

Do lung infections with other typical CF pathogens increase the risk of *Pseudomonas aeruginosa* infection in children with CF? Does prior infection with these pathogens lead to earlier acquisition of *Pseudomonas aeruginosa* and chronic infection?

Why is this important?

People with CF (pwCF) often experience recurrent lung infections caused by various bacterial and fungal species, which evolve over time. *Pseudomonas aeruginosa* infection is particularly harmful; initial acquisition often progressing to chronic colonization, resulting in lung damage and decreased survival. While certain demographic, clinical, and genetic risk factors for *Pseudomonas aeruginosa* infection are already known, they only partially explain early onset of infection. Understanding the individual variability in *Pseudomonas aeruginosa* infection could help to identify pwCF at risk of early acquisition or chronic infection, ultimately optimizing CF care.

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What did you do?

We analyzed a large cohort of 1,231 children with CF from the French CF gene modifier study. Our primary objective was to investigate whether the initial acquisition or chronic infection with specific bacterial and fungal species could contribute to earlier *Pseudomonas aeruginosa* infections. We examined rates of initial acquisition and chronic infection for several typical CF pathogens, including methicillin-susceptible and methicillin-resistant *Staphylococcus aureus* (MSSA and MRSA respectively), *Stenotrophomonas maltophilia*, *Haemophilus influenzae*, *Achromobacter xylosoxidans*, and *Aspergillus* species.

What did you find?

We observed that by the age of 2 years, 65.5% of children with CF had acquired at least one bacterial or fungal lung infection, and 27.9% had experienced at least one chronic infection. MSSA was the most common and earliest pathogen identified. The risk of both initial acquisition and chronic infection by *Pseudomonas aeruginosa* increased with prior acquisition of other typical CF pathogens. Each additional prior infection by other typical CF pathogens raised the risk of *Pseudomonas aeruginosa* infection by 16%.

What does this mean and reasons for caution?

This study provides a detailed epidemiological analysis of pathogen occurrence in the airways of children with CF, highlighting the influence of the microbial community on *Pseudomonas aeruginosa* infections. Prior infection with a typical CF pathogen was found to significantly increase the risk of *Pseudomonas aeruginosa* infection, surpassing the influence of genetic and demographic factors. However, it is important to note that not all potential risk factors for infection were thoroughly investigated. Future studies should examine antibiotic exposure, as well as the impact of environmental factors like geography, climate, and pollution, to establish a conclusive association.

What's next?

This study emphasizes the substantial influence of prior infections as major determinant of *Pseudomonas aeruginosa* infection in children with CF, highlighting the need for early and vigilant monitoring of airway infections to preserve lung function. As CFTR modulators improve lung disease outcomes, incidence of bacterial and fungal infections is expected to evolve. Conducted during the emergence of CFTR-targeted therapies, this study lays the groundwork for understanding future patterns of lung infections in CF.



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