Cystic Fibrosis Research News

Title:
RISK FACTORS FOR PSEUDOMONAS AERUGINOSA AIRWAY INFECTION AND LUNG FUNCTION DECLINE IN CHILDREN WITH CYSTIC FIBROSIS

Lay Title:
Lung infection by *Pseudomonas aeruginosa* in children with cystic fibrosis: risk factors and impact on lung function

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What was your research question?
What are the risk factors of acquiring *Pseudomonas aeruginosa* lung infection in people with cystic fibrosis (pwCF)? Are they different from those associated with *Pseudomonas aeruginosa* chronic infection? How does *Pseudomonas aeruginosa* infection impact on lung function?

Why is this important?
Lung disease in pwCF is characterised by recurrent infections by *Pseudomonas aeruginosa*. Initial acquisition of his bacterium often evolves to chronic infection within a variable period. These infections lead to structural lung damage and decreased survival. Risk factors for *Pseudomonas aeruginosa* infection and its impact on lung function in pwCF remain uncertain. A thorough understanding of the interindividual variability of *Pseudomonas aeruginosa* infection will allow the identification of pwCF at risk of developing early acquisition and/or chronic infection and will help to optimise CF care.

What did you do?

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We analysed a large cohort of 1,231 children with CF included in the French CF gene modifier study. Age at initial acquisition of *Pseudomonas aeruginosa*, chronic infection, and duration from acquisition to chronicity were studied. We looked whether clinical and genetic characteristics could be risk factors for *Pseudomonas aeruginosa* infection. We also evaluated the impact of initial acquisition and chronic infection on lung function decline.

What did you find?

We observed that *Pseudomonas aeruginosa* initial infection occurred early in childhood, with a median age of 5.1 years. One-quarter of the children with CF were chronically colonised by the age of 14.7 years, within 6.3 years after initial acquisition. Chronic infection occurred later in the most recent birth cohorts. CF-related diabetes and liver disease were identified as risk factors for *Pseudomonas aeruginosa* infection, while gender, *CFTR* variants, and CF centre size were not. We confirmed the association of several modifier genes (*TNF, DCTN4*, *SLC9A3*, and *CAV2*) with *Pseudomonas aeruginosa* infection. We also observed that the decline in lung function increased after *Pseudomonas aeruginosa* initial infection, and even more so after chronic infection.

What does this mean and reasons for caution?

This work is based on clinical data collected from paper and electronic patient records. Thus, some information may be missing from these sources, especially in older pwCF. However, if information was missing, it would have preferentially lead to estimate an older age at infection, contrary to what we observed. This suggests that missing information might not have biased our analysis.

What's next?

This study identified several risk factors for *Pseudomonas aeruginosa* infection, which will help to identify children with CF at risk of developing early acquisition and/or chronic infection. Moreover, we showed that *Pseudomonas aeruginosa* infection was a major determinant of lung disease severity in pwCF, underlying that preservation of lung function requires intensive monitoring of airway infections from an early stage.

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