



Cystic Fibrosis Research News

Title:

Poor recovery from a pulmonary exacerbation does not lead to accelerated FEV₁ decline

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What was your research question?

We wanted to understand whether poor recovery from a pulmonary exacerbation (treated with intravenous antibiotics) is more likely to occur before or after a fast decline in lung function.

Why is this important?

Pulmonary exacerbations are important events in the lives of people with CF, both because they interfere with patients' well-being and because most patients who have an exacerbation lose lung function that they will never recover. Although exacerbations are common, little is known about the long-term impacts of these events. Several studies have shown that not all patients treated for pulmonary exacerbations completely recover to previous baseline lung function levels, but whether these patients are at risk for further deterioration in lung function has not been studied. Additionally, it may be that patients who experience a deterioration in lung function may be more likely to not completely recover after an exacerbation. Understanding this relationship would help in optimizing treatment strategies to prevent loss of lung function and pulmonary exacerbations.

What did you do?

Using data from the US CF Foundation Patient Registry, we randomly selected one pulmonary exacerbation for 13,954 patients ages 6 years and above who met the study criteria and recorded changes in lung function that occurred around the time of the

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exacerbation, and in the year before and after the exacerbation. We then used a specific statistical analysis technique (“multi-state Markov regression model”) to determine which was more likely to occur first: a fast decline in lung function (defined in this paper as a decline in FEV₁ >5% predicted in a year), or a pulmonary exacerbation that resulted in a poor recovery (defined in this paper as a loss in FEV₁ of >10% from before the 6 months before the exacerbation to the 3 months after).

What did you find?

A poor recovery after a pulmonary exacerbation was more likely to occur in patients who were adults, undernourished, on Medicaid/state insurance (a marker of low socioeconomic status), had infections with *Pseudomonas aeruginosa*, had low baseline lung function, and/or had CF-related diabetes. We found that patients who had a fast decline in lung function before the pulmonary exacerbation studied were more likely to experience a poor recovery in lung function than patients who did not have a fast decline in function. Additionally, patients who experienced poor recovery in lung function were less likely to have a fast decline in lung function in the year after the pulmonary exacerbation studied.

What does this mean and reasons for caution?

Our results suggest that preventing or treating faster declines in lung function may have the added benefit of preventing pulmonary exacerbations. Our results are observational, so we cannot say if the fast decline in lung function causes the pulmonary exacerbations, or if interventions that limit progression of lung disease will also reduce the occurrence of pulmonary exacerbations that result in poor recovery of lung function.

What's next?

Results from this study will be used to further explore the relationship between lung function decline and pulmonary exacerbations, in order to optimize treatment of both.

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