Title:
The association between Staphylococcus aureus and subsequent bronchiectasis in children with cystic fibrosis

Authors:
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What was your research question?
We aimed to study the effects of the bacteria Staphylococcus aureus on patients with cystic fibrosis (CF). Specifically, we wanted to find out if infections with this bacterium resulted in a more rapid progression of lung disease in young children with CF.

Why is this important?
In healthy individuals, Staphylococcus aureus can be cultured from the nose and skin, but will not be found in the lungs. In children with CF however, Staphylococcus aureus is present in the lungs, with a prevalence of 1 in 5 patients. Globally, Staphylococcus aureus is treated differently, as it is unclear if the bacteria really causes damage. Our study will clarify the effects that Staphylococcus aureus has on the lungs and guide doctors on how aggressively they should treat these infections, in an effort to minimise lung damage as well as medication side effects.
What did we do?
In an Australian study children with CF underwent a bronchoscopy every year for the first 4 years of life. During the bronchoscopy some fluid was flushed through the lungs and cultured for *Staphylococcus aureus*. When the children were 5 to 7 years old we performed a CT-scan of the lungs and lung function tests to determine the severity of lung disease. We analysed if children that were infected with *Staphylococcus aureus* before the age of 4 had worse lung disease when they approached 5-7 years.

What did you find?
In our analyses, we found that children who were infected with *Staphylococcus aureus* for the first time at the age of 3 years, sustained more lung damage, visible on CT-scans and performed more poorly on lung function tests when they reached 5-7 years. We wanted to exclude that *Staphylococcus aureus* is a benign bacterium in children who are exhibiting more severe disease progression. We adjusted for disease severity when comparing participants, of children with and without *Staphylococcus aureus*. To note, the relationships between *Staphylococcus aureus* and more severe lung disease remained the same in those adjusted analyses.

What does this mean and reasons for caution?
Our results suggest that when a *Staphylococcus aureus* infection is present at 3 years of age, there is a significant association with faster progression of lung disease, regardless of previous disease severity. It implies that doctors should try to prevent and treat *Staphylococcus aureus* lung infections in the young CF population. We found the association only for first time infections at 3 years of age, so it should be considered that this may have just been a chance finding. Secondly, there is a risk that we were not able to fully account for all lung damage that occurred prior to the first *Staphylococcus aureus* infection.

What’s next?
Our study shows that *Staphylococcus aureus* lung infections are common in children with CF, furthermore, these infections are associated with more advanced lung damage. To prove that *Staphylococcus aureus* directly causes lung damage, a placebo-controlled randomised clinical trial should be performed using CT-scans of the lungs as outcome measure.

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