Cystic Fibrosis Research News

Title:
Nasal lavage microbiome, but not nasal swab microbiome, correlates with sinonasal inflammation in children with cystic fibrosis

Lay Title:
Nasal lavage as a promising tool to monitor upper airway health

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What was your research question?
We compared two methods that determine the bacterial composition (microbiome) and inflammatory status of the upper airways of young people with CF (PwCF).

Why is this important?
Chronic rhinosinusitis is a common condition in PwCF. The cause and development are not yet well understood. However, PwCF often have simultaneous colonisation of the upper and lower airways with problematic bacteria. In the past, caregivers relied on collecting sputum to monitor respiratory health, but as treatment methods have improved, sputum has become less available. So, alternative methods to monitor airway health have to be examined.

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What did you do?

We assessed the bacterial composition of the upper airway in paediatric PwCF (aged 7-19 years). We compared two methods of collecting samples from the nose: nasal swabs (using cotton swabs) and nasal lavage (rinsing the nose with a salty fluid (saline). Additionally, we measured inflammatory markers in lavage samples to investigate the relationship between bacterial composition and inflammation in the upper airways.

What did you find?

The results indicated that there was no significant difference in the overall composition of the colonizing bacteria between the two sampling methods. Swab samples had fewer different types of bacteria and a less even distribution of the present bacterial species than nasal lavage samples. The bacterial composition found with the nasal lavage correlated better with the inflammation status than the bacteria found via nasal swabs. *Staphylococcus* species were more prevalent in swab samples. Also, in lavage the amount of bacteria as well as a detection of Moraxella bacteria were associated with increased inflammation. In contrast we did not see an inflammatory response to bacteria commonly associated with CF, *Pseudomonas aeruginosa* or *Staphylococcus aureus* in participating pwCF.

What does this mean and reasons for caution?

Our results suggest that the bacterial composition that triggers inflammation in the upper airway are not well represented by the bacteria detected with swabs, despite having close similarities to the nasal lavage method. Nasal lavage might therefore be a more effective method for monitoring sinonasal infections and inflammation in children with CF compared to nasal swabs. The study involved a small group of 36 participants, mainly due to recruitment challenges during the COVID-19 pandemic. Also, we didn't specifically explore how symptoms from the nose or sinuses related to bacterial composition and inflammation.

What's next?

Further research is needed to determine how infection and inflammation of the upper airways changes during and after antibiotic or anti-inflammatory therapy, as well as with CFTR-modulator therapy. Additionally, it should be investigated whether the bacterial and inflammatory status of nasal lavage can predict the situation in the lower airways.

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