Cystic Fibrosis Research News

Title:

Lower exhaled nitric oxide in infants with Cystic Fibrosis compared to healthy controls

Authors:

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What was your research question?

Exhaled nitric oxide (FENO) is a biomarker and can be measured in exhaled air during normal breathing. Lower FENO values have been linked to adverse health effects with studies showing that FENO is reduced in older patients with Cystic Fibrosis (CF). However, FENO values in early CF disease remain unclear. The aim of the study was to assess FENO in infants with CF.

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Why is this important?

Various underlying causes of reduced FENO in CF have been proposed including chronic inflammation and/or bacterial infection, or the genetic mutations that lead to dysfunction in the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) protein that cause the disorder. Measuring FENO shortly after birth (before the onset of chronic inflammation and infections) will enable better understanding of the mechanisms of reduced FENO levels in CF.

What did you do?

We included 34 infants with CF and 68 healthy controls in this study. Infants were between 4 and 10 weeks old and various measurements were performed prior to their first infection as follows: lung function was performed during regular quiet sleep and FENO was measured during normal breathing.

What did you find?

FENO values were lower in infants with CF compared to healthy controls. Furthermore, in infants with CF who had genetic mutations that caused minimal function of the CFTR protein, FENO values were even lower compared to those who had genetic mutations that caused the CFTR protein to have some function.
Our results suggest that (i) FENO is reduced in early CF disease and is at least partly independent of chronic bacterial infections and (ii) reduced FENO levels are likely to be associated with the underlying genetic dysfunction of CFTR.

What does this mean and reasons for caution?

Lower FENO shortly after birth might predict early lung damage that is at least partly independent of chronic infection or inflammation. FENO could be used to monitor treatment response to CFTR modulators in infants, as it has been shown that FENO can normalize during or after these treatments. Especially the latter could be of clinical relevance as more and more CFTR modulator drugs, that improve CFTR function in some patients, are currently in development. FENO measurements are fast and easy and might thus be a promising diagnostic tool to assess treatment response in early CF disease.
It has to be considered, that when performing FENO measurements in infants, and thus using a face mask covering nose and mouth, a possible contamination of FENO (production in the lungs) with nasal NO (production in the nasal cavities) is possible, leading to false

results. However, we believe that this contribution is negligible as nasal cavities are not fully developed in infants.

What's next?

While the initial results of our study seem promising, further studies are needed to confirm our findings including those with a higher number of subjects or repeated measurements over a certain time period. Interventional clinical trials are needed before FENO could be used in daily clinical practice.

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