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Title:

LONG-TERM IMPROVEMENT OF LUNG CLEARANCE INDEX IN PATIENTS WITH MILD CYSTIC FIBROSIS LUNG DISEASE - DOES HYPERTONIC SALINE PLAY A ROLE

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What was your research question?

In patients with CF and near normal lung function, sensitive tests are needed to detect and monitor lung disease. We used lung clearance index (LCI) measurements to find out whether the inhalation of hypertonic saline could stop the continuing loss of lung function in people with mild CF lung disease.

Why is this important?

Over the years, most people with CF experience a worsening of lung disease, which leads to a decline in lung function (FEV₁). Lung function can also be measured by a relatively new technique called multiple breath washout (MBW). The lung clearance index (LCI), measured by MBW, reflects changes in small airways and is an indicator of early lung disease. Researchers have shown that mildly affected patients often lose even more lung capacity

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with time than those with moderate or advanced disease. If lung health could be preserved, this would lead to a better quality of life and a longer survival of the patients.

What did you do?

Inhaled medications such as hypertonic saline (HS) can help to loosen sticky mucus in the lungs. We prescribed HS in an attempt to stop the loss of lung function in our patients. All participants received LCI measurements to monitor lung disease. The 34 mildly affected patients inhaled hypertonic saline twice daily in addition to their usual CF treatment. We evaluated the course of FEV₁ (forced expiratory volume for 1 second) and LCI over three to four years after starting HS inhalations.

What did you find?

During the three years before starting HS, the patients had experienced a worsening of FEV₁ by -3.9% of the predicted normal value. At baseline, most of the subjects had abnormal LCI values, and the mean LCI of 7.85 was higher than the upper limit of the normal value (which is 7.0). After about six months of HS inhalations, LCI had significantly improved by a mean of -0.57. Three years after starting HS, the mean LCI had further improved and was still better than at baseline. Considering FEV₁, an increase of +3.64 % predicted was observed after three years of HS.

What does this mean and reasons for caution?

LCI measurements are helpful to monitor lung disease in people with mostly normal standard lung function tests. After initiating a new treatment, LCI can detect changes in lung health. With this kind of monitoring and with hypertonic saline inhalations over three years, it was possible to improve LCI and FEV₁. Thus, the worsening of lung disease can be stopped, and the lung health of people with mild lung disease can be improved.

However, this was only a single centre experience. Since this was not a formal clinical trial, more research work is needed.



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What's next?

These promising results should motivate researchers to perform trials in larger patient groups to better evaluate the long-term benefit from hypertonic saline. For subgroups with normal FEV1, the course of lung disease could be monitored with LCI measurements. We continue to determine LCI and prescribe HS at our centre.

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