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Cystic Fibrosis Research News

Title:

EFFECT OF POSTURE ON LUNG VENTILATION DISTRIBUTION AND ASSOCIATIONS WITH STRUCTURE IN CHILDREN WITH CYSTIC FIBROSIS

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What was your research question?

We investigated whether sitting or lying down changes how well air mixes in the lung during normal breathing using the multiple breath washout test in healthy children or children with cystic fibrosis. We also studied whether posture (sitting or lying down) impacts on the relationships between lung function (normally measured with the child seated) and lung structure (normally measured with the child lying down) in children with cystic fibrosis. Specifically, we studied whether lung function better reflects the structural lung damage on chest CT when both the tests are performed lying down.

Why is this important?

Changes in lung structure occur early in life in children with cystic fibrosis. Tests to directly measure lung damage, such as chest CT or MRI, require exposure to radiation or contrast agents, so these tests cannot be performed in children on a regular basis. The multiple breath washout test does not require radiation or contrast agents, so it is easier and safer to use in children. But, we need to understand how to perform this test so that it gives the most accurate measure of lung damage

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What did you do?

The multiple breath washout test was performed in 25 healthy children and 21 children with cystic fibrosis both seated and lying down. Children with cystic fibrosis also underwent a chest CT scan (lying down).

What did you find?

We found that lying down increased the amount of uneven gas mixing in the lung, indicated by an increase in a measure called lung clearance index. We found a larger increase in the lung clearance index in children with cystic fibrosis compared with healthy children. In children with cystic fibrosis, the measure of lung function more closely corresponded to the measure of lung structure (the CT scan) when both tests were performed lying down.

What does this mean and reasons for caution?

Our data show that the multiple breath washout test gives different results depending on whether the child is sitting up or lying down during the test. When the child is lying down, gas in the lung mixes unevenly. This could be caused by smaller lung volume, narrowing and closure of airways, and trapped air in the lung. Our results suggest that performing the multiple breath washout test lying down may give a more accurate estimate of structural lung damage than performing the same test sitting up.

What's next?

Further work is needed to confirm these findings in a larger population of individuals, including individuals with more severe cystic fibrosis lung disease.

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