European Cystic Fibrosis Society

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Cystic Fibrosis Research News

Title:
HOMA indices as screening test for cystic fibrosis related diabetes.

Lay Title:
Can a new blood test be used to screen for CF-related diabetes ?

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What was your research question?
Can results from homeostasis model assessment (HOMA) which is a type of fasting blood test be used to exclude cystic fibrosis related diabetes (CFRD)? Can the use of HOMA prevent people with cystic fibrosis (CF) (pwCF) having to take an oral glucose tolerance test (OGTT)?

Why is this important?
CFRD is the most frequent additional condition in pwCF. It has both short- and long-term side effects. The symptoms of CFRD are not obvious and doctors rely on the OGTT to diagnose CFRD. They regularly do this test in pwCF from the age of 10 years . However, many pwCF do not tolerate or accept OGTT very well which contributes to low adherence.

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What did you do?

We used data from a group of 228 pwCF (111 children and 117 adults) followed between 2009 and 2011 who underwent OGTT when they joined this study and yearly for the following three years.

At each time point, we calculated HOMA-%β and HOMA-IR (which show insulin secretion and insulin resistance respectively) based on fasting insulin and glucose levels in the blood. A level of HOMA-%β under 100 indicates not enough insulin is being produced while a value for HOMA-IR over 1 indicates insulin resistance. We calculated how levels of HOMA-%β below 100 and HOMA-IR over 1 can correctly detect CFRD (ie sensitivity), and also looked at how likely they were to correctly report a person does not have CFRD (specificity) and their predictive positive and negative values of having CFRD.

What did you find?

In children, a value for HOMA-%β below 100 can detect what could be CFRD in 88% of children taking the test, but which is really CFRD in 45%. Furthermore, having HOMA-%β below 100 eliminates CFRD in 98% of children and predicts CFRD in 11%. Results obtained for adults were similar.

The HOMA-IR levels over 1 did not have either better sensitivity or specificity in children and adults. Finally, combining the two measures HOMA-%β below 100 and HOMA-IR over 1 did not increase sensitivity nor specificity.

What does this mean and reasons for caution?

Our results suggest that HOMA-%β could be an interesting first-line screening approach to exclude CFRD and thus avoid unnecessary OGTT when the value is 100 or over. However, OGTT will be still needed when HOMA-%β is under 100 because it does not support the diagnosis of CFRD.

A HOMA-IR level alone with a cut-off set to 1 and the combination of the measures of HOMA-%β under 100 and HOMA-IR over1 cannot exclude CFRD.

Our results may also have been affected by the low number of people taking part with newly diagnosed CFRD in both age groups.

What's next?

This screening strategy with HOMA-%β needs to be confirmed by repeating our analysis on a larger number of people with a higher number of pwCF with newly diagnosed CFRD.

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For HOMA-IR, further studies also needed to determine the optimal cut-off value to define insulin resistance in pwCF.

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