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Cystic Fibrosis Research News

Title:

Blood Biomarkers to Predict Short-term Pulmonary Exacerbation Risk in Children and Adolescents with CF: A Pilot Study

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What was your research question?

The aim of this study was to see whether the levels of different proteins in the blood could be used to predict if children with cystic fibrosis (CF) are going to experience a pulmonary exacerbation.

Why is this important?

Pulmonary exacerbation are episodes of worse lung symptoms that often require hospital care and typically cause damage to the lungs. This damage is sometimes irreversible even after aggressive treatment with intravenous (directly into a vein) antibiotics. To date, there is no way of knowing when a pulmonary exacerbation will occur in children with cystic fibrosis. However, previous studies have shown that inflammation in the blood increases at the time of a pulmonary exacerbation and resolves with treatment. Having a blood test that can predict a pulmonary exacerbation can be used to monitor children with cystic fibrosis to ultimately prevent future attacks.

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What did you do?

Previously we looked at adults with cystic fibrosis and found 6 proteins in the blood whose levels were different between those who got pulmonary exacerbations and those who did not in short-term follow up. These 6 proteins could predict which adults would get pulmonary exacerbations. Therefore, we wanted to see if these 6 proteins could also predict pulmonary exacerbations in children aged 6-18 years. We analyzed blood samples collected at the start of the study and performed regular clinical assessments at day 0, 28, 84 and 168. We measured the quantity of the 6 proteins and routinely used clinical markers of inflammation at day 0 and 28.

What did you find?

Of the 67 children in the study, five children received intravenous antibiotics for the treatment of a pulmonary exacerbation within 84 days of the start of the study . The 6 proteins predicted pulmonary exacerbations with an 80% sensitivity (the portion of correctly identified individuals who got pulmonary exacerbations) and 73% specificity (the portion of correctly identified children who did not get pulmonary exacerbations). Overall, these 6 proteins were better at predicting pulmonary exacerbations than clinical information currently used by doctors.

What does this mean and reasons for caution?

This small study provides some evidence that inflammation in the blood may also be useful in predicting pulmonary exacerbations in children with cystic fibrosis. However, the number of children who got pulmonary exacerbations was small (5 out of 67 children) which means we do not know if these results will be repeated in a larger group of children. Also, since pulmonary exacerbations were identified based on the requirement for intravenous antibiotics, it is unknown if these results would also be observed in pulmonary exacerbations requiring oral antibiotics.

What's next?

Ideally the predictive performance of the 6 blood proteins should be confirmed with a larger group of children with cystic fibrosis. This will help determine if this blood test can be used by cystic fibrosis doctors to predict pulmonary exacerbations in children with cystic fibrosis.

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