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Cystic Fibrosis Research News

Title:

Bioelectrical impedance in young patients with cystic fibrosis: validation of a specific equation and clinical relevance

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What was your research question?

Bioelectrical Impedance Analysis (BIA) determines body composition by sending a low, safe electrical current through the body, and measuring the opposition to the passage of this current, which corresponds to the impedance. The current passes freely through the fluids in muscle tissue, but has difficulty and experiences resistance passing through fat tissue. In the present study, we aimed to investigate, whether this is a reliable method for body composition assessment in young people with cystic fibrosis (CF). We also determined if there is a relationship between body composition and specific disease parameters in CF.

Why is this important?

BIA is a simple, safe and non-expensive method which allows the calculation of fat mass (FM) and fat free mass (FFM) based on specific mathematical equations. In CF, the use of a tailored equation is important, because the altered salt content in the sweat of individuals may modify the impedance. However, previous studies have led to conflicting results about the reliability of this method, which is probably due to the use of equations that are not

specific for people with CF. Importantly, a strong association seems to exist between low FFM and worsening pulmonary function tests.

What did you do?

We conducted a two-step prospective study. In the first phase, we performed a body composition assessment in 54 young people with CF (aged 5 to 21 years) by BIA and dual X-Ray absorptiometry (DXA), which is considered to be the reference method for body composition measurement. We developed an equation for body composition assessment by BIA, specific for young people with CF and subsequently, we compared the results of BIA and DXA. During the second phase, we studied the body composition of 40 young people with CF by BIA and we investigated the association between low FFM and lung function and diaphragmatic force, as assessed by Maximal inspiratory and expiratory pressures.

What did you find?

The results of body composition assessment by BIA using the equation developed, were similar to those obtained by DXA. The average difference of FFM measurement between the two methods was very close to zero. A total of 22.5% of study participants had a very low FFM (z-score ≤ –2) without FM depletion. Those young people had a worse pulmonary function and diaphragmatic impairment. They had also received a more prolonged antibiotic treatment during the year preceding the evaluation. Interestingly, 7 participants out of 9 with FFM depletion had a normal body mass index.

What does this mean and reasons for caution?

Our study shows that BIA can reliably measure body composition in people with CF . We have validated a CF specific equation which proved to be accurate for FFM and FM estimation in children, adolescents and young adults. We observed a FFM defect in a substantial proportion of our CF participants, which was not detected by routine nutritional assessment. Those individuals had a more severe respiratory disease, which underlines the importance of longitudinal body composition assessment. The limits of our study are related to the relatively small sample size and to the fact that the proposed equation has not been validated in older adults with CF.

What's next?

The proposed equation should be further evaluated in older people with CF, before its application on a larger scale. We believe that research should also be performed to assess body composition in infants with CF, in order to identify any defects in the very early stages of life.

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