European Cystic Fibrosis Society

Journal of Cystic Fibrosis
The Official Journal of the European Cystic Fibrosis Society

Cystic Fibrosis Research News

Title:

The 1-min sit-to-stand test in cystic fibrosis 1 – insights into cardiorespiratory responses

Authors:

Thomas Radtke[1], Helge Hebestreit[2], Milo A. Puhan[1], Susi Kriemler[1]

Affiliations:

[1]Epidemiology, Biostatistics and Prevention Institute, University of Zürich, Zurich, Switzerland
[2]Paediatric Department, Julius-Maximilians University Würzburg, Wuerzburg, Germany

What was your research question?

Our aim was to characterize the stress for the heart, muscles and lungs during a 1-min sit-to-stand (STS) test compared to a maximal cycle ergometer test in adults with cystic fibrosis (CF). The cycle ergometer test is a progressive exercise test that usually lasts between 8-12 minutes. Furthermore, we were interested to study the additional value of the STS power index as a measure of functional exercise capacity. The STS power index (in Watt) is computed by a formula and accounts for differences in body size between persons (i.e., differences in the distance of the center of gravity during STS motion when using the same seat height for all persons).

Why is this important?

Regular exercise testing is recommended in CF. Several exercise tests are available to measure the endurance capacity or muscle function. Many patients with CF have impaired muscle function (i.e., reduced muscle mass and muscle strength) and they could benefit from regular testing and muscle training. Most muscle function tests require special equipment and trained personnel. The 1-min STS measures the ability of a person to stand up and sit down as often as possible during one minute and the number of repetitions is counted. It is a simple and easily applicable muscle function test, but it is also important to know the stress that the tests elicits for the heart and the lungs in people with CF.

What did you do?

Fifteen adult patients with CF performed a 1-min STS test and a maximal exercise test on a cycle ergometer. During both tests, the patients wore a face mask and we measured their oxygen uptake, carbon dioxide production and ventilation. We also measured the patient's heart beat with a chest belt and the oxygen in their blood (saturation) with a sensor (pulse

oximeter) at the finger tip. The patient's rated their perceived exertion and breathlessness before and after the two tests.

What did you find?

We found a strong relation in the stress for the heart and the lungs between the 1-min STS test and the cycle ergometer test, but it was lower in the 1-min STS. The 1-min STS is able to detect oxygen desaturation, defined as a drop in oxygen saturation below 90%, in most patients who showed low saturation during the cycle ergometry test. The STS power index showed strong relations with the maximal cycle ergometry test, but it was not superior to STS repetitions.

What does this mean and reasons for caution?

The 1-min STS test is an easily applicable, cheap and valid muscle function test in CF and can be used to screen for oxygen desaturation during exercise. The stress for the heart and the lungs is lower than during a maximal cycle ergometer test. The test has the major advantage that it can be performed everywhere and does not require special equipment. Moreover, the chair can be easily disinfected which drastically reduces the acquisition and transmission of pathogens. Our study was based on a small group of patients, which limits the generalizability of our findings to all people with CF.

What's next?

Further studies should test the usefulness in daily practice of the 1-min STS test in children. It would be interesting to learn whether and how strong the 1-min STS test has a relation with patients' physical activity levels and other muscle function tests in patients of different ages and disease severity.

Original manuscript citation in Pubmed

https://www.ncbi.nlm.nih.gov/pubmed/?term=The+1-min+sit-to-stand+test+in+cystic+fibrosis+1+%E2%80%93+insights+into+cardiorespiratory+responses