European Cystic Fibrosis Society

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

Cystic Fibrosis Research News

Title:

BLOOD FLOW REGULATION AND OXIDATIVE STRESS DURING SUBMAXIMAL CYCLING EXERCISE IN PATIENTS WITH CYSTIC FIBROSIS

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What was your research question?

The body's ability to adjust blood flow during exercise is important and may be affected by systemic oxidative stress, where the body produces excess free radicals. We wanted to know if the blood flow and oxidative stress responses during exercise were different between people with CF and a healthy group of individuals.

Why is this important?

Exercise capacity is a predictor of mortality and hospitalization in CF and several factors other than lung function can negatively affect it. It is very important to preserve exercise capacity in people with CF, but in order to do this, we need to understand the key players that may be affecting it. Maintaining high blood flow to the muscles during exercise helps to achieve a higher exercise capacity. We know that people with CF have poor vascular health and they produce a lot of free radicals (high oxidative stress); both of which could have a negative impact on exercise capacity.

What did you do?

14 young people with CF (~14 years old) and 14 healthy control participants performed exercise on a stationary bicycle at a moderate difficulty level. As they were cycling, we measured blood flow in their arm using ultrasound to represent a marker of blood flow

regulation. We also took a blood sample before and during exercise to test their oxidative stress levels.

What did you find?

During the early stage of exercise, blood flow patterns were similar between groups. However, as exercise intensity increased, people with CF showed an abnormal blood flow response compared to controls. The blood flow levelled off throughout exercise in those with CF, whereas it continued to increase in healthy controls. We also saw that the oxidative stress response during exercise was much higher in people with CF compared to the healthy controls. Interestingly, people with CF that had a better blood flow response also had the lowest oxidative stress during exercise, and these same individuals were more likely to have a higher exercise capacity.

What does this mean and reasons for caution?

Our findings suggest that people with CF 1) don't adjust blood flow appropriately during exercise, and 2) have a higher oxidative stress response during exercise. Our data also suggest a link between the blood flow and oxidative stress response to exercise and exercise capacity. It is important to recognize that this study was done in a young CF population that still had relatively healthy lungs. We are unsure if we would see similar results in older people with CF or in those with more severe CF-related disease.

What's next?

If we can increase blood flow and/or decrease the oxidative stress response to exercise, we may be able to improve exercise capacity in people with CF. Future studies should examine treatments that improve the blood flow and oxidative stress response to exercise and their impact on exercise capacity in people with CF.

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