

FINAL REPORT

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GRANT: FBM Lung Health Grant 2022

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PROJECT TITLE: Does the MetaNeb®, a new airway clearance device, change measures of lung oxygenation, secretion clearance and other measures of lung function in adults with CF when they are well?

Research summary and overview:

Cystic fibrosis (CF) is an inherited lung disease that causes excessive thick airway secretions (known as sputum or phlegm) which are difficult to clear. This leads to inflammation and chronic infection in the airways, resulting in destruction of the airway walls. Physiotherapy plays an important role in the management of CF by applying airway clearance techniques, which, reduces the amount of thick secretions in the lungs. This reduces lung infections and slows disease progression. Although there are a range of techniques used to clear airway secretions, there is no evidence to support one over others. The MetaNeb® (Hill-Rom) is a device that delivers positive airway pressure and pulsed flow during inspiration and expiration which could assist in secretion clearance. However, there are no published studies investigating its effects on lung function and secretion clearance in adults with CF. Measures of secretion clearance have been plagued with doubts in their accuracy and so new measures that are considered accurate are urgently needed. There is emerging evidence that using functional magnetic resonance imaging (fMRI) can assist in measuring effectiveness of secretion clearance and lung oxygenation, yet this technique has not been widely used in adults with CF. The aim of this study was to determine whether in adults with CF who are well, a single treatment session using the MetaNeb® produced greater change in measures of lung oxygenation using fMRI, secretion clearance and other measures of lung function compared to normal huff and cough. We hypothesised that the treatment session that included the use of the MetaNeb® will produce greater changes in these measures, when compared with the treatment session that comprised huff and cough alone.

Outcomes of the research

Eight participants completed data collection for this study. Overall, in adults with CF who were well, there were no differences between the single MetaNeb® treatment session and huff and cough only in measures of lung function or secretion clearance. Further research investigating new measures, such as imaging modalities including fMRI, are warranted. The data regarding secretion clearance and lung oxygenation obtained using fMRI are currently still undergoing analyses due to issues with changes to the investigating team and delays in gaining the software needed to analyse the images. This will be completed shortly, and the data will then be published in a peer-reviewed journal.

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