

FINAL REPORT

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GRANT: 2019 CFWA Golf Classic Scholarship

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PROJECT TITLE: Does the MetaNeb®, a new airway clearance device, change lung function in adults with cystic fibrosis when they are well and when they are hospitalised for a lung infection?

Research summary and overview:

Cystic fibrosis (CF) is an inherited lung disease that causes excessive airway secretions, damaging airways and leading to chronic infection. Clearing the airways is a vital component of their care and is believed to reduce lung infections and slow disease progression.

Although there are a range of techniques used to clear airway secretions, there is no evidence to support one over others. Therefore, the choice of technique is based largely on patient/therapist preference. This project evaluated the effects of a reasonably new airway clearance device called the MetaNeb® which is a machine that delivers positive airway pressure and pulsed flow during inspiration and expiration which could assist in secretion clearance. Specifically, we completed two studies evaluating the effect of the MetaNeb® on lung function, secretion clearance and symptoms. The first study compared the effects of a single MetaNeb® session to huff and cough on several measures including those obtained from functional magnetic resonance imaging (fMRI) in 8 adults with CF who were well. The second study compared the effect of twice-daily treatment with MetaNeb® to twice daily treatment using usual airway clearance techniques (ACTs), on several different new and standard measures in 30 adults who were hospitalised for a lung infection.

Outcomes of the research

These two studies showed that the current measures readily available to researchers (and clinicians, if needed) such as lung function and secretion clearance are likely not responsive to the effects of ACTs in adults with CF. Further research investigating new measures, such as imaging modalities including fMRI, are warranted. However, we note that collecting data using fMRI pose challenges including accurate interpretation of the images. The second study in this body of work showed measures of evenness of lung oxygenation, may be responsive to the effects of ACTs and hence, future studies evaluating the effects of ACTs should incorporate this measure. The findings from this study in adults with CF and lung infections also suggest that if the MetaNeb® is available for use, clinicians should consider using it as an alternative to usual ACTs, as it is as effective as usual ACTs, may even be more effective for use in this population, and is not causing any harm. These findings are particularly relevant to those adults with CF who are not eligible for or are unable to tolerate highly effective modulators therapy such as Trikafta® and may continue to have high secretion load, especially during a lung infection.

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