



## ARTICLE

Airway Clearance Techniques in Bronchiectasis: Analysis from the United States Bronchiectasis and Non-TB Mycobacteria Research Registry; found in CHEST 2020; 158(4):1376-1384.

## CLINICAL QUESTION

Does the use of airway clearance techniques (ACTs) in patients with non-CF bronchiectasis lead to improvements in exacerbation frequency or lung function?

## SUMMARY

Bronchiectasis is a disease of the airway becoming inflamed, irreversibly dilated, and impacted with mucus. Impaired mucociliary clearance may be a source of recurrent infections and worsening of the disease process, so a variety of ways have been developed to help accentuate mucus removal from the bronchial airway. There is little known about the benefits of Airway Clearance Techniques (ACTs) in patients with Non-CF bronchiectasis. ACTs would ideally lead to less symptoms, decreased bronchiectasis exacerbations, increased lung function, and an improvement in quality of life. This study used an adult patient data registry to evaluate the effects of mechanical ACTs on lung function and exacerbations at one year follow up. A goal of the study was to describe patient differences in those who use ACTs and those who do not.

### **Subjects:**

The United States Bronchiectasis Research Registry (BRR) is a Non-Cystic Fibrosis (CF) bronchiectasis patient database from 16 tertiary clinical sites across the US, which is supported by the COPD Foundation. The database consists of those > 18 years old with a CT scan-established diagnosis of bronchiectasis. This study included patients in the database who were seen clinically between 2008-2019, and all patients had a productive cough. Patients in pulmonary rehabilitation or using agents like hypertonic saline or nebulized mucomyst were excluded. The modalities approved as ACTs for this study comprised instrumental techniques such as Aerobika, Acapella, Flutter, Lung flute, and high frequency chest wall oscillation devices. Other techniques permitted in the study were manual chest percussion, postural drainage, and active cycle breathing. There was no data on education, technique use, and frequency of the method determined as an ACT.

### **Study Design:**

The study evaluated patients in the database for a one year period for each individual patient. This year started with the baseline assessment of the patients' demographics, history of exacerbations, lung function, and defining the use of ACTs. The patients were reassessed at one year from the baseline to compare use of ACTs, lung function and exacerbations. Those patients who were using ACTs at baseline and then also at follow up were defined as "continuous" users. Those patients who were either using at baseline or at follow up, but not at both, were defined as "intermittent" users of ACTs. Finally, those who were never using any of the ACTs methods were described as non-users or "no use". Of special note,



there was no data on the three groups regarding the time in between the baseline and the one year follow up period. Thus, the study had two points in time that were being analyzed. The statistical analysis methods used were means with standard deviations to describe the demographic data. The differences between the ACT groups were compared with chi-square tests. Mean changes in lung function variables utilized repeated measure analysis of variance. Multinomial logistic regression models were used to assess the association between the number of exacerbations in the ACT groups at baseline and follow up. Odds ratios (OR) with confidence intervals (CI) were calculated. The significance level was set at 0.05, and statistical analyses were performed with SAS software.

**Results:**

There were 905 patients in the study population, and 59% were using Airway Clearance Techniques (ACTs) at baseline when enrolled into the study. Most of these patients were white (91%) females (78%) over the age of 60 with many (69%) having experienced an exacerbation within the previous 2 years. There were 41% of the patients who had isolated *Pseudomonas* prior to the study, and 32% had Non-Tuberculous Mycobacteria (NTM) at baseline. Interestingly, the patients using ACTs continuously were more likely to have had *Pseudomonas* (47% vs 36%;  $P = 0.21$ ) and an exacerbation (81% vs 59%;  $P < 0.0001$ ) in the prior 2 yrs, compared to those who did not use ACTs. There was no significant change in FEV1 (-0.03ml vs -0.01ml;  $P = 0.899$ ) when comparing those who continuously used ACTs to those who did not use any ACT. Patients using ACTs at baseline and follow up ("continuously") were found to have higher odds (OR 3.10 with CI of 1.98-4.87) of experiencing an acute bronchiectasis exacerbation during the observation as compared to those not using ACTs. Fifty-eight percent of patients who used ACTs at baseline did not use at the 1 year follow up.

**OPINION**

Most national committees and international guidelines have recommended Airway Clearance Techniques (ACTs) for non-CF bronchiectasis patients who are plagued with chronic cough and/or recurrent exacerbations. There is little data to support such recommendations, and this review of the US Bronchiectasis and NTM Research Registry does not demonstrate an improvement in lung function nor exacerbation frequency. However, there are many uncontrolled variables such as device, modality and technique used as the ACTs in this review. Patients with more severe illness and exacerbations were more likely to continuously use ACTs. The most significant finding was that 58% of patients who were enrolled as using ACT at baseline were not using any method at the 1 year assessment. This demonstrates the significant treatment fatigue with ACTs, and the need for providers to continue to educate/encourage patients on the importance of adherence if benefits are going to be observed.