Incidence of Bronchiectasis Related Exacerbation **Rates after Long-Term Treatment with** High Frequency Chest Wall Oscillation (HFCWO) Chet Sievert Jr. BS¹ and Caroline Beaner, CRT¹

¹Electromed, Inc., New Prague, MN, USA

INTRODUCTION

Researchers and clinicians continue to pursue effective airway clearance therapies for patients with noncystic fibrosis bronchiectasis (BE) to reduce associated exacerbations. High frequency chest wall oscillation (HFCWO) has been proven to reduce mucus viscosity, shear mucus from the lung wall and propel mucus toward larger airways.^{1,2} HFCWO therapy has become an airway clearance treatment mainstay for patients with cystic fibrosis which has demonstrated significant improvements in both clinical outcomes and quality of life. Other HFCWO therapy studies with BE patients have reported significant improvement in clinical outcomes and a subsequent decrease in associated healthcare costs.^{3,4,5,6}

RESULTS



METHODS

» Study design: comparative, observational, retrospective case review comparing exacerbation rates of 1 year before (pre) to 2¹/₂ years after (post) HFCWO therapy, using each patient as their own control.

# Patients Hospitalized	12	7	42%
# Emergency Department Visits	4	1	75%
<pre># Patients Requiring Antibiotics</pre>	29	18	38%

» A total of thirty-nine patients were enrolled in the study.

- » Exacerbations, in all categories, were significantly reduced; 42% decrease in hospitalizations (p=0.007); 75% decrease in emergency department visits (p=0.0002); and a 38% decrease in antibiotic prescriptions (p=0.0005).
- » Sixty-eight percent of study participants reported a substantial improvement in their QoL and a reduction in the severity of their exacerbations.

30

- » Exacerbations, BE related only, were defined as reoccurring symptoms resulting in hospitalizations, emergency department (ED) visits and antibiotic prescriptions.
- » Exacerbations were determined by review of the patient's medical records and by patient phone interview.
- » Those patients with radiographically confirmed BE and compliant with their HFCWO treatment regimen were eligible. Quality of life (QoL) was verbally reported by the patient.
- » P-values were calculated by paired t-test. The 2¹/₂ year data were adjusted for comparison to the 1 year data.
- » The SmartVest[®] HFCWO Airway Clearance System (Electromed, New Prague, USA) was used by all patients.



REFERENCES

1. Chang HK, Weber ME and King M. Mucus Transport by High Frequency Nonsymetrical Oscillatory Airflow. Journal of Applied Physiology 1988; 65(3) 1203-1209.

2. Majaesic C, Montgomery M, Jones R and King M. Reduction in sputum viscosity using high frequency chest compressions compared to conventional chest physiotherapy. Pediatric Pulmonology 1996; Suppl 13: A358.

3. Sievert CE, Beaner CA and Sievert CP. Using High Frequency Chest Wall Oscillation in a Bronchiectasis Patient Population: An Outcomes-Based Case Review. Respiratory Therapy Journal 2016 (11, No 4), 34-38.

4. Nicolini A, Cardini F, Landucci N, Lanata S, Ferrari-Bravo M and Barlascini C. Effectiveness of Treatment with High-Frequency Chest Wall Oscillation in Patients with Bronchiectasis. Pulmonary Medicine 2013, 13:21

5. Sievert CE and Beaner CA. Cost Effectiveness of Using High Frequency Chest Wall Oscillation (HFCWO) in Patients with Non-Cystic Fibrosis Bronchiectasis. *Respiratory* Therapy Journal 2017, (12, No 1), 45-49.

6. Weycker D, Hansen, GL and Seifer MD. Outcomes with High-Frequency Chest Wall Oscillation Amongst Patients with Non-CF Bronchiectasis or COPD. Abstract, American Thoracic Society Conference, 2017.

CONCLUSION

The significant reduction in BE related exacerbations demonstrates the considerable potential of HFCWO therapy in this population. As a corollary, the possibility of substantially improving a patient's QoL would also be a meaningful advancement in BE care. More broadly, secondary benefits of reducing BE related respiratory infections may have the potential to deter contributions to antibiotic resistance which may have even greater societal benefits. These encouraging results warrant wider HFCWO clinical use in conjunction with further investigation using a larger sample size.