Study Protocol

Official Title: Intrapulmonary Percussive Ventilation for Sputum Induction in Adults With Cystic Fibrosis

ClinicalTrials.gov ID (NCT number): NCT06311292

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Scientific Background

Since the introduction of CFTR modulator therapies, most patients with Cystic Fibrosis (CF) have been unable to produce an adequate sputum sample for clinical monitoring. COVID-19 also presented a safety concern for staff and patients that may become exposed during sputum induction performed in the clinic rooms due to lack of negative pressure rooms and especially for patients who were unvaccinated. These issues led to lack of microbiology data for clinical care. QI project 3771 conducted through UPMC utilized this method: Patient medical record reviews identified those whose sputum cultures were absent in 2020 and/or 2021. These patients were contacted two weeks before their CF clinic appointment to explain the technique and mailed instructions, an oscillating positive expiratory pressure device (vPEP, DR Burton), hypertonic saline (HS) and collection supplies. Patients were educated that despite a reduction in sputum production, they would likely provide enough for bacterial sampling. Patients were instructed to hold hypertonic saline (HS) for 3 days prior to CF clinic visit, do all their normal morning airway clearance and drug aerosol therapies to include: Albuterol, 7% HS & rhDNAse along with their HFCC vest the morning of the visit. They were asked to deliver the 7% HS through the vPEP device set at the highest resistance, collect sputum in cup, keep at room temperature, and bring to clinic visit. The initial QI project 3771 showed that 12/19 patients produced sputum using the flutter device. It is proposed that additional investigation with different collection methods targeting the 7 patients that were unable to produce with the vPEP be conducted.

Study Objectives

The purpose of this project is to identify a superior sputum collection method for those patients unable to produce a sputum.

Study Design & Methods

Patient uses the Volara System during clinic visit in an attempt to produce sputum.

Patients coming to CF care clinic visits are routinely asked to provide a sputum sample for clinical care purposed. The increased use of newly approved modulator therapy for this patient population has resulted in a reduction in the number of patients able to spontaneously produce a sputum sample in clinic for their routine clinical care cultures. The process of collecting a clinical sputum sample will be enhanced for those enrolled in the study and unable to produce a sample.

1. Clinical research coordinator (RC) will phone patients 1-2 weeks before their scheduled CF clinical care visit to offer participation.
2. Subjects will be instructed to hold hypertonic saline (HS) for 3 days prior to CF clinic visit but do all their normal morning airway clearance and drug aerosol therapies to include: Albuterol and rhDNAse along with their HFCC vest or other device used for their daily airway clearance the morning of the visit.
3. Patients will come to their scheduled CF care center visit.
4. Clinical research coordinator or listed co-investigator will approach patient at CF care center visit for consent process and signature prior to any study procedures being completed.
5. Utilizing an individual patient circuit, the RC will set up a hypertonic saline treatment via the Volara System during the subject's clinical care visit.
6. The Volara System device will be set on medium for a total of 10 minutes. Four cycles of 2.5 minutes each will alternate between CPAP (continuous positive airway pressure) and CHFO

(continuous high frequency oscillation).
7. Subject will be asked to collect any sputum produced during the treatment in a specimen cup or to cough deeply after the treatment for sputum collection attempt.
8. RC will send specimen cup/sputum sample to the lab for processing per clinical care.

Of the above, the only research activities are consenting, withholding hypertonic saline for 3 days prior to clinic visit and using the Volara System for the standard of care sputum collection. All other activities described above are standard of care.

Sputum collection is standard of care in this patient population. The use of the Volara System for mobilizing mucus in clinic is for research purposes. Almost all our patients with CF use a device for mobilizing mucus as part of their daily airway clearance therapy; most use a high frequency chest wall oscillating vest, some use handheld oscillating devices, and some have used a device like the Volara that provides intrapulmonary percussive ventilation. We are not using the Volara device outside its intended use for this study.

Eligibility Criteria

inclusion criteria:
1. 18 years or older
2. Currently prescribed hypertonic saline treatment as part of routine airway clearance therapy.
3. No sputum culture results in last one year or those who have been unable to produce sputum from VPEP method used in QI project 3771

exclusion criteria:
1. < 18 years old
2. Sputum culture results in last one year

Statistical Considerations

We will describe the patient population (age, sex) using descriptive statistics We will describe the % of patients with adequate sputum cultures We will describe the organisms identified by the microbiology lab There is no hypothesis testing planned