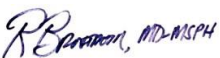


Tuberculosis Policies and Procedures

State of Hawaii Department of Health
Communicable Disease and PHN Division
Tuberculosis Control Branch

TITLE: Sputum Induction for <i>Mycobacterium tuberculosis</i> Complex (MTC) Testing		
CHAPTER 2: Clinical	CONTACT PERSON/S: A. Goodbody	NUMBER: TB 2.004
APPROVED BY:  Richard Brostrom, MD-MSPH Chief, TB Branch	Date Initiated: 04/14/2014 Date Revised: 12/18/2014 Date Approved: 12/29/2014	
Applies to: All Hawaii TB programs		

Purpose

Sputum induction is a procedure that uses a compressor/nebulizer to deliver aerosolized sterile water or hypertonic saline (i.e. 3%, 7%, or 10% - whatever can be obtained through the pharmacy) to help a patient cough up sputum more easily. The nebulized water or hypertonic saline solution irritates the airway, increases secretions, promotes coughing, and produces a high quality sputum specimen to test for *Mycobacterium tuberculosis* complex (MTC) to diagnose tuberculosis (TB).

This policy describes the process of sputum induction and is intended to be used in conjunction with the Sputum Collection Guidelines and Infection Control Policy and Procedure. Sputum induction is performed when ordered by a physician. The procedure must be supervised by a trained nurse to ensure optimal results and adherence to infection control precautions, because the process results in greater likelihood that droplet nuclei containing *Mycobacterium tuberculosis* are expelled into the air.

Introduction

Induced sputum significantly outperforms sputum obtained spontaneously in terms of culture yield and drug susceptibility testing in smear-negative pulmonary TB disease (KC Chang et. al. 2008). Sputum induction may also be used for patients who are unable to produce an adequate sputum specimen of at least 5 ml, including children and patients with extrapulmonary tuberculosis (TB) disease.

The procedure is performed in an Airborne Infection Isolation (AII) room under negative pressure with at least 12 air exchanges with outside air per hour. If an AII room is not available, the sputum collection may be done outdoors in a well-ventilated area.

RELATED FORMS

Form TB-4 Activity and Appointment

[TB-4](#)

Form TB-9 MTC Test Results

[TB-9](#)

RELATED SUPPORT DOCUMENTS

SD-1 Definitions

[SD-1](#)

SD-4 DLS Requisitions

[SD-4](#)

Elements for Safe Sputum Induction

1. Because sputum induction is a cough-inducing procedure, patients with asthma or other chronic obstructive airway diseases may consider pre-treatment with their fast-acting bronchodilator if available. Albuterol or levalbuterol are examples. This will stabilize and open up the airways. Patients who are taking Advair, Symbicort, Dulera, or Spiriva may not need pre-treatment with an inhaled fast-acting bronchodilator.
2. The nurse must:
 - a. Ensure that the negative pressure system and the ultraviolet germicidal irradiation light in the All room are functioning.
 - b. Wear a properly fitted N-95 mask and stay out of the All room during the sputum induction.
 - c. Wear gloves when handling specimens. Remove gloves and wash hands after handling specimens and at completion of procedure.
 - d. Supervise and observe collection of the induced sputum to ensure that the patient is correctly performing the procedure.
 - e. Assemble and organize equipment and supplies:
 - i. Plug in Compressor to electrical outlet in All room.
 - ii. Attach one end of disposable nebulizer tubing to the compressor air-outlet connector.
 - iii. Assemble nebulizer by attaching the other end of tubing to bottom of the medication cup.
 - iv. Add approximately 10 ml of sterile hypertonic saline into the medication cup.
 - v. Attach mask OR assemble mouthpiece, t-piece, and corrugated tubing and attach to medication cup.

Sputum Induction Procedure

1. Explain the procedure to the patient and instruct how to turn the compressor on and off. Reassure the patient that the nebulizer tubing kit is new, and used only once.
2. Give the patient a cup of water to rinse mouth, facial tissues to cover cough, and sputum collection cup labeled "Induced Sputum".
3. Watch carefully for signs of respiratory distress and ensure that patient does not leave the room until coughing has stopped.
4. Instructions for the patient:
 - a. Remain seated during the procedure and remain in the room until coughing stops.
 - b. Begin sputum induction *after* nurse has exited the sputum room.
 - c. Turn the compressor on and hold the mask next to the face or place the mouthpiece between teeth, close lips around mouthpiece, and keep mouthpiece in mouth during inhalations and exhalations.
 - d. Inhale the aerosol by taking deep, slow breaths. If patient gets light-headed during procedure, instruct patient to stop. Turn power switch off during long interruptions.
 - e. Encourage to cough intermittently and deeply from the chest. Remove mask or mouthpiece only when coughing and expectorating into sputum collection cup. Collect

- 5-10 ml of sputum. Induced sputum usually appears clear and watery. It may take up to 20 minutes of inhaling hypertonic mist to collect an adequate specimen amount.
- f. If no cough is induced after inhaling mist for 20 minutes, stop induction process.
 - g. Encourage patient to cough spontaneously and vigorously to produce sputum sample.
 - h. Have the patient rest, if necessary, following the procedure. Assess patient's breathing. Encourage patient to take inhaled fast-acting bronchodilator if wheezing; this is a rare occurrence.
 - i. Patient may don surgical mask before leaving room (if appropriate).
5. After procedure is completed, display signage "Do Not Enter" room and record the time when the room may be re-entered (i.e., 1 hour after patient vacates the room).

End of Procedure Care of Room and Nebulizer

1. Wait the required time for room to clear of infectious airborne particles or wear properly-fitted N-95 respirator if you must enter the room sooner.
2. Unplug compressor unit and wipe with Super Sani-Cloth or 1:10 bleach dilution after each patient use.
 - a. Do not spray any fluid into air vents.
 - b. Disposable tubing, cups, and tissues may be disposed of in regular trash containers. Only items contaminated with bloody sputum must be disposed in –biohazard bags.
 - c. Wipe counter surfaces with Super Sani-Cloth or 1:10 bleach solution.
 - d. Nebulizer filter maintenance:
 - i. The compressor has an inlet air filter to remove airborne contaminants. The filter must be replaced every 6 months or sooner if filter turns completely gray in color.
 - ii. The nursing supervisor is responsible to ensure that filters are changed appropriately and to obtain service to the compressor as needed.

Documentation

1. Document on the DLS lab requisition slip that sputum was induced. (*see link to Source Document 4. DLS requisitions on page 2*)
2. Document on Form TB-9 MTC Test Results that sputum was induced. (*see link to Form TB-9 on page 1*)
3. Document on TB-4 Activity and Appointment Form if patient was unable to produce a sputum specimen. (*see link to Form TB-9 on page 1*)

References

Centers for Disease Control and Prevention. Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings, 2005. MMWR 2005; 54(No. RR-17):51-52.

Centers for Disease Control and Prevention. Core Curriculum on Tuberculosis: What the Clinician Should Know, 6th Ed. 2013:83-85

Chang KC, Chang CC, Yew WW, Tam CM. Supervised and induced sputum among patients with smear-negative pulmonary tuberculosis. Eur Respir J 2008; 31: 1085-1090.

DeVilbiss® Pulmo-Aide® Compressor/Nebulizer Instruction Guide

<http://www.nationaljewish.org/programs/tests/sputum-induction>

Francis J. Curry National Tuberculosis Center, Institutional Consultation Services. Conducting Sputum Induction Safely. 1999: [pages 21-25]