



Critical Care Therapy and Respiratory Care Section

Category:	Clinical
Section:	Diagnostics
Title:	Sputum Induction/Oral Wash
Policy #:	5A
Revised:	06/01

1.0 DESCRIPTION

Sputum induction is a non-invasive procedure using an ultrasonic nebulizer to induce a sputum specimen for microbiological staining for diagnosis of a variety of organisms, including Mycobacterium tuberculosis and Pneumocystis carinii pneumonia (PCP). Sputum induction is an alternative to bronchoalveolar lavage (an invasive procedure) to obtain a rapid diagnosis, which is essential to expedite therapy of the involved patient.

2.0 PURPOSE/INDICATIONS

- 2.1 To obtain sputum by hypertonic ultrasonic nebulizer (USN) sputum induction when non-invasive diagnosis is desired.
- 2.2 To confirm diagnosis on patients who are planning to undergo diagnostic bronchoscopy.
- 2.3 To assess efficacy of drug treatment in patients who have been diagnosed and treated for a period of time by obtaining an induced sputum specimen.

3.0 PRECAUTIONS

- 3.1 Use of an ultrasonic nebulizer may produce bronchospasm in patients with hyperreactive airways. Patients should be monitored for signs of intolerance and respiratory distress.
- 3.2 Caution should be taken if pharyngeal suctioning is required to obtain a sputum specimen, particularly thrombocytopenic patients. **NOTE:** The patient's platelet count should be checked prior to sputum induction.
- 3.3 In infants, caution should be used when using an ultrasonic nebulizer for sputum induction due to the high output of mist which may result in fluid overload if used for a prolonged period of time.

- 3.4 Swelling of dried, retained secretions may occur and restrict airflow. Continuous monitoring for signs of intolerance is necessary.
- 3.5 Vomiting may be precipitated by excessive coughing in susceptible patients.
- 3.6 Universal precautions must be followed when performing procedure, handling and transporting specimen. OSHA regulated and approved Hepa-filter mask must be worn during induction.
- 3.7 Sputum inductions should be performed in a negative flow room to minimize risk of potentially pathogenic aerosol droplet contamination.
NOTE: Patients who are suspected of tuberculosis must be induced in a negative flow room and a hospital approved Hepa-filtered mask must be used during the patient's transport.

4.0 ADVERSE REACTION INTERVENTIONS

- 4.1 If bronchospasm occurs, stop the USN treatment and contact the patient's physician. Recommend to the physician, and obtain an order for bronchodilator therapy given.

5.0 EQUIPMENT AND MATERIALS

- 5.1 Gather the following equipment and materials before going to the patient's bedside:
 - 5.1.1 Ultrasonic Nebulizer
 - 5.1.2 Prefilled 0.9% NaCl USN cup (150 ml)
 - 5.1.3 Three 15 ml vials of 10% NaCl (end product=3%)
 - 5.1.4 Aerosol mask of appropriate size
 - 5.1.5 Large bore tubing (corrugated aerosol tubing)
 - 5.1.6 Sterile specimen cup
 - 5.1.7 Two clean drinking cups for the gargle and rinse when clearing the patient's mouth prior to USN treatment
 - 5.1.8 Gloves and NIOSH approved HEPA mask; goggles if suctioning is required. Please refer to section on Universal Precautions and Personal Protective Equipment.
 - 5.1.9 Patient label

- 5.1.10 Plastic specimen (zip lock) bag
- 5.1.11 MIS Microbiology transmittal request form
- 5.1.12 Pulse oximeter with appropriate size probe
- 5.2 Additional equipment needed for pediatric patients:
 - 5.2.1 100% oxygen setup
 - 5.2.2 Suction setup, including appropriate size catheter and Yankaur
 - 5.2.3 Pediatric intubation box and resuscitation bag when procedure is done on 10D

6.0 PROCEDURE A - FOR NON-PCP SPECIMEN COLLECTION

- 6.1 Explain the induced sputum procedure thoroughly to the patient. Fill the USN couplant chamber with tap water to the fill line (approximately 100 ml).
- 6.2 Add three 15 ml 10% vials of NaCl to the cup of 0.9% NaCl USN solution (this yields a 3% NaCl solution).
- 6.3 Pour about 50ml of the 3% mixture into one of the clean drinking cups.
- 6.4 Have the patient gargle vigorously at least three times; using the same cup for expectorated solution. This process is most important to remove oral contaminants such as Candida. **NOTE:** Small children are usually not able to cooperate with this process and it is usually omitted.
- 6.5 Instruct the patient to breathe normally through the mouth and take occasional deep breaths.
- 6.6 Explain to the patient that coughing is normal and a desired effect of the procedure, which will increase mucous production.
- 6.7 Explain that this procedure can take between 20 to 45 minutes. The patient should remain on the USN for 20 minutes prior to coughing, if tolerated.
- 6.8 Instruct the patient to hold the sputum collection container upright and loosen the lid.
- 6.9 Instruct the patient to cough forcefully and expectorate into the specimen cup.

- 6.10 Begin USN treatment and adjust the output control so that a "cloud" is formed, assuring that the patient is not overwhelmed.
- 6.11 Place the aerosol mask over the patient's face. Cooperative patients may elect to hold the mask up to their face. **NOTE:** Not all pediatric patients tolerate wearing a mask. With small children, the face mask may need to be removed from the aerosol tubing, and the mist directed towards the child's face.
- 6.12 Regardless of appearance, specimens should be processed if the therapist feels that the patient's effort and cough were adequate.
- 6.13 Label the specimen with the patient's ID label and include date and time of collection.
- 6.14 Obtain a lab transmittal slip for the specimen. This slip is generated at the time the order is placed.
- 6.15 Place the specimen and the lab transmittal slip in a clear plastic specimen bag. It is highly recommended that the therapists walk the specimen to the Microbiological Section of the Clinical Pathology Lab (located on the second floor, C Wing). This ensures proper handling of the specimen.
- 6.16 All attempts should be made to collect the sputum in the AM, before the patient has breakfast. The lab prefers to have all specimens prior to 3:00 PM. If a sputum specimen is obtained after 3:00 PM, call the Microbiology Lab to alert them.

7.0 PROCEDURE B - FOR *Pneumocystis carinii* SPECIMEN COLLECTION

7.1 Scheduling Induction

- 7.1.1 The following information must be obtained from the requesting service and documented on the "PCP Sputum Induction Information" card:
 - 7.1.1.1 Patient name and medical record number
 - 7.1.1.2 Referring service (floor/institute)
 - 7.1.1.3 Contact person/number for test results
 - 7.1.1.4 Patient age
 - 7.1.1.5 HIV status
 - 7.1.1.6 Whether or not a bronchoscopy should be scheduled if sputum is negative for PCP (If so, the therapist scheduling the sputum is responsible for notifying the bronchoscopy attending.)
 - 7.1.1.7 Type of specimen to be obtained

7.1.2 Arrange a mutually convenient time with the 10D charge nurse, floor nurse, and availability of a negative flow isolation room to perform procedure.

7.2 Equipment Preparation

7.2.1 Refer to Procedure A, 6.1 through 6.11.

7.3 Specimen Preparation

7.3.1 Add sterile water to equal approximately the same amount of the collected specimen.

7.3.2 Place a patient identification label on specimen container.

7.3.3 Generate a computerized lab transmittal for microbiological analysis of induced sputum for *Pneumocystis carinii*. **NOTE:** Analysis can also be done for routine culture, Gram stain, acid fast barillii, fungal, etc. on same specimen, but *Pneumocystis carinii* analysis will be priority over the other requests and it requires 2 ml of sample.

8.0 PEDIATRIC CONSIDERATIONS

8.1 Nasotracheal or oropharyngeal suction may be required in pediatric patients. Attempt oropharyngeal suctioning first; if unsuccessful, gently perform nasotracheal suctioning if patient's platelet count is adequate.

8.2 If the above is indicated, explain the procedure to the patient, parent or guardian to ease child anxiety.

8.3 Follow the Section's "Suctioning Policy and Procedure," utilizing a 40cc Leukens specimen trap to collect the aspirate.

8.4 Assess the patient's respiratory rate, breath sounds, heart rate, and oxygen saturation before and after suctioning.

8.5 Supplemental oxygen should be supplied during the suctioning procedure.

8.6 Pediatric patients are required to be NPO for at least four hours prior to induction to reduce risk of vomiting and aspiration.

9.0 POST PROCEDURE

- 9.1 Following the induction, assess the patient's breathing for wheezing or any complications from procedure.
- 9.2 Empty the water from the USN cup and discard all disposable items in the medical waste container, located within the patient's room.
- 9.3 Clean/disinfect ultrasonic nebulizer cup and parts with hospital approved disinfectant.

10.0 DOCUMENTATION

- 10.1 Documentation should be completed in the MIS, the outpatient progress note and the Productivity Utilization Report. Documentation in the MIS and in the progress note should include the following:
 - 10.1.1 Date and time of procedure
 - 10.1.2 Length of procedure
 - 10.1.3 Mode of therapy
 - 10.1.4 Medication administered (if applicable)
 - 10.1.5 Patient tolerance
 - 10.1.6 Pre and post heart rates
 - 10.1.7 Pre and post breath sounds
 - 10.1.8 Cough effort

Addendum - Oral Wash Procedure

1.0 DESCRIPTION

- 1.1 Definition: *Pneumocystis carinii* pneumonia (P. carinii) is an opportunistic pathogen which causes significant mortality in immunocompromised patients. The organism has a predilection for the lungs and thus typically manifests itself as pneumonia. The organism is traditionally obtained invasively through the collection of lavage from a patient's lung during a bronchoscopy procedure. It is also obtained through a sputum induction procedure after the patient is allowed to breathe a highly dense aerosol solution of hypertonic saline solution. Both of these procedures are time consuming and may cause extreme patient discomfort. Nucleic acid amplification technology offers the potential to detect pneumocystis through obtained specimens such as oral washes.

2.0 EQUIPMENT AND MATERIALS

- 2.1 One “sputocol” specimen cup
- 2.2 One normal saline solution (NSS) cup (120 ml)
- 2.3 One oral wash label
- 2.4 One patient label
- 2.5 One specimen bag

3.0 PROCEDURE

- 3.1 Scheduling of Oral Washes
 - 3.1.1 Oral washes will be obtained from the patient prior to each sputum induction procedure.
 - 3.1.2 Oral washes will be obtained from the patient prior to each bronchoscopy performed.
 - 3.1.3 The therapist will obtain the necessary consents prior to the gargle being obtained. **(NOTE: A witness will be necessary to complete the consent.)**
- 3.2 Specimen Collection
 - 3.2.1 Explain oral wash procedure to patient.

- 3.2.2 Instruct patient to gargle 50 ml of NSS for 5-10 seconds and then expel solution into the “sputocol” specimen cup. If necessary, 25 ml of NSS may be used for pediatric patients.
- 3.2.3 Place patient and “**Oral Wash**” labels on specimen cup.
- 3.2.4 Oral wash specimen should be hand delivered with the sputum sample to the Microbiology Section of the Clinical Pathology Lab. **(NOTE: The lab does not require a transmittal to run the oral wash specimens.)**

SIGNATURE: _____
Assistant Section Chief, CCTRCS, CCMD

DATE: _____

SIGNATURE: _____
Section Chief, CCTRCS, CCMD

DATE: _____

SIGNATURE: _____
Medical Director, CCTRCS, CCMD

DATE: _____

(Orig. 1/87)
(Rev. 12/91, 2/94, 10/95, 6/00, 6/01)