

UTMB RESPIRATORY CARE SERVICES PROCEDURE – Inhalation Injury Aerosol Treatment Protocol (Small Volume Nebulizer and Aerogen Nebulizer)	Policy 7.3.20 Page 1 of 6
Formulated: 05/07	Effective: 05/30/07 Reviewed: 08/15/23

Inhalation Injury Aerosol Treatment Protocol

Purpose	To standardize the delivery of inhalation injury aerosol drug therapy via nebulizer.
Policy	Respiratory Care Services will provide equipment and therapy for the aerosolization of pharmacological agents to maintain airway patency and provide clearance of retained secretions. Accountability/Training <ul style="list-style-type: none"> • All Respiratory Care Services clinical personnel. • Training must be equivalent with the minimal technician entry level in the Respiratory Care Service with understanding of age specific requirement of the patient population being treated.
Physician's Order	The written physician's order must specify inhalation injury protocol: Dosage and Administration: <ul style="list-style-type: none"> • Nebulize 10,000 units of heparin and 3 cc's of normal saline every 4 hours times seven days. Alternating with 3-5 cc's of mucomyst (acetylcysteine) every 4 hours (This will result in the patient receiving nebulizations treatments every 2 hours for 7 days). • Heparin is to be administered by the RN with the RT maintaining the aerosol nebulizer equipment
Indications	Nebulization of Heparin and mucomyst (acetylcysteine) is indicated as an adjunctive therapy for patients with abnormal, viscid, or inspissated mucous secretion following inhalation injury.
Goals	<ul style="list-style-type: none"> • Heparin: Aid in the inhibition of fibrin cast formation and reduction of free radical ions. Heparin has been shown to decrease the respiratory rate necessary to maintain normocarbida owing to a reduction in fibrin cast formation and resultant reduction of airway obstruction. • Acetylcysteine / mucomyst: has shown to aid in reducing accumulation of airway secretions, with concomitant improvement in pulmonary function, gas exchange and prevent of recurrent respiratory infection and airway damage.
Contra-indications	Adverse side effects of medications: <ul style="list-style-type: none"> • Heparin: <ul style="list-style-type: none"> • Preexisting bleeding tendency • Threatened abortions • Subacute bacteria endocarditis • Suspected intracranial hemorrhage • Inaccessible ulcerative lesions • Heparin sensitivity

Continued next page

UTMB RESPIRATORY CARE SERVICES PROCEDURE – Inhalation Injury Aerosol Treatment Protocol (Small Volume Nebulizer and Aerogen Nebulizer)	Policy 7.3.20 Page 2 of 6
Formulated: 05/07	Effective: 05/30/07 Reviewed: 08/15/23

- Shock
- **Acetylcysteine/mucomyst:**
 - Mucomyst: is contraindicated in those patients who are sensitive to it.

Equipment

- Small volume Nebulizer Kit (includes small volume nebulizer with T-piece, vinyl tubing and flex tubing).
- Aerogen Nebulizer with Controller
- Mouthpiece, tracheostomy mask, T-piece, face tent, or aerosol mask.
- Appropriate flow meter.

Procedure

Step	Action
1	Verify physician's order for Inhalation Protocol.
2	Wash hands and identify patient using two identifiers.
3	Explain purpose of therapy and procedure to the patient and family as applicable.
4	Monitor patient's respiratory rate, pulse and breath sounds prior to beginning treatment.
5	Select appropriate nebulizer (i.e. small volume neb or Aerogen).
6	If using small volume nebulizer: <ul style="list-style-type: none"> • Assemble nebulizer and connect to wall oxygen source. • Connect nebulizer to the appropriate delivery appliance (mouthpiece, mask, trach collar, etc.) • Instill proper medication into nebulizer cup. • Position patient in semi-Fowler's sitting position as tolerated.
7	Begin treatment running nebulizer at 5-7 liters per minute. <ul style="list-style-type: none"> • If using a mouthpiece, have patient place mouthpiece on top of tongue, holding it gently between the teeth with lips sealed around it. If patient is alert but unable to make a seal, use lip seal and/or nose clips. • If an aerosol mask is necessary, gently extend patient's head and bring mask down over nose, then lower over mouth.

UTMB RESPIRATORY CARE SERVICES PROCEDURE – Inhalation Injury Aerosol Treatment Protocol (Small Volume Nebulizer and Aerogen Nebulizer)	Policy 7.3.20 Page 3 of 6
Formulated: 05/07	Effective: 05/30/07 Reviewed: 08/15/23

	<ul style="list-style-type: none"> • If patient is trached, attach adapter to the trach collar.
8	<p>To reduce the incidence of pneumonia and other respiratory tract infections; discard remaining contents of solution in nebulizer, rinse nebulizer with sterile water and dry.</p> <p>* NOTE: In lieu of using sterile water to rinse nebulizers after each treatment it is recommended that we follow Epidemiology recommendations, which recommends using a single use alcohol swab to wipe out each nebulizer in-between treatments please allow SVN to dry before putting away. Place equipment in plastic bag.</p>
9	<p>When administering therapy to a patient on mechanical ventilation, use an Aerogen nebulizer.</p>
10	<p>Insert the aerogen nebulizer cup into the T piece adapter by pushing the neb unit firmly onto the T piece. Place the aerogen neb and T piece into breathing circuit on the dry side of the humidifier chamber. Connect the Aerogen controller to the nebulizer unit using nebulizer cable. Connect Aerogen power adapter to the Aerogen controller and plug the adapter into the wall power source.</p>
11	<p>Open the plug on the Aerogen nebulizer unit. Use a prefilled ampule or syringe to add medication into the filler port of the nebulizer. Close the plug.</p>
12	<p>Press and release the On /Off power button. The 30 minute indicator LED illuminates to indicate 30 minute nebulization cycle is in progress. To stop the nebulizer at any time, push the on/Off power button again.</p>
13	<p>Following the end of therapy instill 1cc of normal saline into the medication cup to clean the mesh screen of the Aerogen nebulizer.</p>
14	<p>Monitor patient's respiratory rate, pulse and breath sounds during and following the completion of treatment and document in Epic per RCS Policy #7.1.1.</p>

Undesirable Side Effects

Heparin:

- Decreased clotting times
- Severe asthma

UTMB RESPIRATORY CARE SERVICES PROCEDURE – Inhalation Injury Aerosol Treatment Protocol (Small Volume Nebulizer and Aerogen Nebulizer)	Policy 7.3.20 Page 4 of 6
Formulated: 05/07	Effective: 05/30/07 Reviewed: 08/15/23

- Giant urticaria
- Rhinitis
- Lacrimation
- Fever
- Drug re-concentration.

Mucomyst:

- Airway obstruction resulting from the swelling of dried, retained secretions that result in partially plugged airways.
- Bronchospasm from the aerosol droplets and certain medications, i.e., mucomyst.
- Drug re-concentration.

Assessment of Outcome

The effectiveness of small volume aerosol treatment will be judged on how well it accomplishes the stated clinical goals. Observation of the following should be noted in Epic, this includes, but is not limited to:

- Sputum - color, amount, consistency.
- Auscultation - comparison of pre- and post-treatment breath sounds; breath sounds improved.
- Arterial blood gas measurement and/or pulse oximetry.
- Work of breathing - evaluating the ventilatory pattern, use of accessory muscles; decreased WOB.
- Color – presence of cyanosis.
- Patient's subjective response ("breathing easier").
- FEV₁/FVC and/or peak flow improvement. (If ordered, measured before and after treatment), and
- SpO₂

Patient Teaching

Step	Action
1	Explain to the patient why he/she is receiving aerosol treatment. Relate it to the disease or injury state.
2	Instruct proper body alignment for maximal breathing efficiency.
3	Proper cough instruction or cough assistance.
4	Instruct patient to breathe through the mouth or trach and to breathe slowly and deeply - a slight inspiratory pause is ideal.

UTMB RESPIRATORY CARE SERVICES PROCEDURE – Inhalation Injury Aerosol Treatment Protocol (Small Volume Nebulizer and Aerogen Nebulizer)	Policy 7.3.20 Page 5 of 6
Formulated: 05/07	Effective: 05/30/07 Reviewed: 08/15/23

5	Instruct patient to breathe diaphragmatically to assure that the maximum distribution and deposition of aerosol will occur in the basilar areas of the lung.
6	Alert patient to possible onset of strong cough.
7	As a result of the educational aspects of this therapy, the patient should be able to verbalize and demonstrate understanding of this therapy.

Infection Control

Follow procedures outlined in Healthcare Epidemiology Policies and Procedures #2.24; Respiratory Care Services
<http://www.utmb.edu/policy/hcepidem/search/02-24.pdf>

References

- AARC Clinical Practice Guidelines: Delivery of Aerosols to the Upper Airway, Respiratory Care, 1995 39(8): 803-807.
- AARC Clinical Practice Guidelines: Selection of a device for delivery of aerosol to the lung parenchyma. Respiratory Care, 1996; 41:647-653.
- AARC Clinical Practice Guidelines: Selection of aerosol delivery device. Respiratory Care, 1992; 37:891-897.
- AARC Clinical Practice Guidelines: Selection of an aerosol delivery device for neonatal and pediatric patients. Respiratory Care, 1995; 40:1325-1335.
- AARC Clinical Practice Guidelines: Assessing Response to Bronchodilator Therapy at Point of Care, Respiratory Care, 1995; 40(12): 1300-1307.
- Dean Hess (Editor), et al Respiratory Care -- Principles and Practice W B Saunders; 1st edition (October 2001)
- Kendrick AH, Smith EC, Wilson RS. Selecting and using nebuliser equipment. Thorax. 1997; 52 Suppl 2:S92-101.
- Hess D; Aerosol therapy, In: Dantzker DR, MacIntyre NR, Bakow ED, Eds. Comprehensive Respiratory Care. Philadelphia: WB Saunders; 1995.
- Op't Holt TB; Aerosol generators and humidifiers. In: Barnes TA, Ed. Core Textbook of Respiratory Care Practice. 2 edition, St. Louis: Mosby-Year Book; 1994.
-

UTMB RESPIRATORY CARE SERVICES PROCEDURE – Inhalation Injury Aerosol Treatment Protocol (Small Volume Nebulizer and Aerogen Nebulizer)	Policy 7.3.20 Page 6 of 6
Formulated: 05/07	Effective: 05/30/07 Reviewed: 08/15/23