

NEBULIZATION:

Definition: The principle of nebulizer therapy is to liquefy and remove retained secretions from the respiratory tract. A nebulizer is a device that produces a stable aerosol of fluid and/or drug particles.

Or

Nebulization is the process of medication administration via inhalation. It utilizes a nebulizer which transports medications to the lungs by means of mist inhalation.

Purposes:

1. To relieve respiratory insufficiency due to broncho-spasm.
2. To correct the underlying respiratory disorders responsible for bronchospasm.
3. To liquefy and remove retained thick secretions from the lower respiratory tract.
4. To reduce inflammatory and allergic responses in the upper respiratory tract.
5. To correct humidity deficit resulting from inspired air by passing the upper airway during the use of mechanical ventilation in critically ill and post **surgical patients.**

Types

1. Metered-dose Nebulizer
2. Jet Nebulizer
3. Ultrasonic Nebulizer

Nebulizer Therapy: Metered-dose Nebulizer

Equipment:

1. Metered dose Nebulizer
2. Physician's order
3. Medication (if applicable)

4. Sputum cup/disposable

General Instructions: Monitor the heart rate before and after the treatment, for patients using bronchodilator drugs as it may produce tachycardia and palpitations.

Procedure:

1. Check the physician's order and nursing care plan to obtain specific instructions and/or information.
2. Identify the patient to perform the right procedure on the right patient.
3. Explain the procedure to the patient to allay fears and gain patient's confidence and cooperation and check the patient identification wristband against physician's written orders. Encourage the patient to participate in the procedure as possible to promote patient education.
4. Ensure privacy to avoid unnecessary embarrassment to the patient during the procedure.
5. Wash and dry hands to prevent cross infection.
6. Assist the patient to a comfortable sitting or semi fowler's position. The diaphragmatic excursion and lung compliance is greater in this position. This ensures maximal distribution and deposition of aerosolized particles to the basilar area of the lung.
7. Shake the inhaler well to ensure the mixing of medication.
8. Instruct patient to remove the cap from the mouthpiece to educate the patient to facilitate ready access to medication.
9. Instruct the patient to hold the canister with the index finger on top and the thumb on the bottom of the canister to ensure effective and safe handling of equipment.
10. Instruct the patient to place the mouthpiece in the mouth and to inhale slowly while depressing the top of the canister with the index finger. Breath carries the particles of the medications as far down into the lungs as possible.

11. Instruct the patient to take a deep breath and exhale to achieve optimum lung expansion and medicinal effect.
12. Instruct the patient to hold the breath as long as possible before exhaling to achieve optimum penetration of the drug into the lower respiratory tract of the prescribed medication.
13. Release the index finger from the canister and remove the inhaler from the mouth to prevent overdose of the drug inhaled.
14. Repeat the procedure until the prescribed dose is administered to allow for effective perfusion of medication.
15. Settle patient in a comfortable position to assist in effective perfusion of medication.
16. Replace canister cap after wiping dry and disposing off contaminated tissues. Contaminated equipment may cause nosocomial infection.
17. Wash and dry hands to prevent cross infection.
18. Document the procedure in the appropriate charts. Evaluate the effects of the procedure and report abnormal findings.

Nebulizer Therapy: Jet Medication Nebulizer

Definition: The jet medication nebulizer utilizes a high velocity gas flow to generate particles from the prescribed solution. Either Oxygen or compressed air powers the nebulizer.

General Instructions: Safety and hazards of oxygen administration should be observed. Recording of peak flow meter reading to be maintained pre and post procedure if indicated.

Equipment:

1. Oxygen cylinder/wall oxygen outlet with flow meter
2. A clean tray with: oxygen nipple adapter to fit to the connection tubing.
Nebulizer kit consisting of:

- a. Face mask/mouth piece
- b. Nebulizer jar and nebulizer cap
- c. Oxygen supply tubing
3. Physician's written order.
4. Prescribed nebulizer solution.
5. 0.9% NaCl ampoules as diluent if prescribed.
6. 5 ml syringe with needle.
7. Disposable sputum cup.
8. Box of disposable tissues or gauze pieces.

Procedure:

1. Check the physician's order and nursing care plan to obtain specific instructions and/or information
2. Identify the patient to perform the right procedure on the right patient.
3. Explain the procedure to the patient to allay fears and gain patient's confidence and cooperation and check the patient identification wristband against physician's written orders. Encourage the patient to participate in the procedure as possible to promote patient education.
4. Ensure privacy to avoid unnecessary embarrassment to the patient during the procedure.
5. Wash and dry hands to prevent cross infection.
6. Unscrew the nebulizer jar and instill the prescribed dose of solution (dilute with prescribed solution).
7. Rescrew cap on nebulizer jar to prevent any leakage of the medication.

8. Connect one end of the oxygen tubing to the nebulizer and attach the other end of the supply tubing to the Oxygen flow meter to ensure effective functioning of the system.

9. Place the patient in a comfortable sitting or semi Fowler's position to ensure maximal distribution and deposition of aerosolized particles to basilar areas of lung.

10. Adjust the oxygen to a flow rate of 6-8 litres per minute or until a fine mist appears to ensure adequate and effective flow of aerosol.

11. Place the mask snugly over the patient's face to cover the nose, mouth and chin and adjust the elastic strap around the patient's head to ensure an airtight seal between the mask and the patient's face for effective nebulization.

12. Instruct the patient to take a deep breath, repeat hold breath briefly, then exhale until all the medication is nebulized to encourage optimal dispersion of the medication into the lower respiratory tract.

13. Observe expansion of the patient's chest during therapy to ensure that medication is deposited below the level of oropharynx by taking deep breaths. Do not leave patient unattended to allay fear and anxiety.

14. Observe the patient throughout the procedure and give constant reassurance to determine the patient's comfort and also to observe for any side effects of the medication

15. Turn off the oxygen when all the solution has vaporized and remove the face mask. Medication usually will be nebulized within 10-15min. at a gas flow rate of 5-6 min.

16. Encourage the patient to Cough after several deep breaths. The deep lung inflation will encourage forceful coughing and facilitates the expectoration of secretions.

17. Assist the patient to a comfortable position and wipe off the moisture from the face with face towel or disposable the moisture tissues. Change jacket/ gown if necessary to maintain patient's comfort, hygiene and dignity.

18. Dismantle the nebulizer kit and decontaminate in hot soapy water. Dry and store in dry plastic bag between treatments to prevent spread of nosocomial infections.

19. Wash and dry hands to prevent cross infection.

20. Document the procedure in the appropriate charts. Evaluate the effects of the procedure and report abnormal findings.

Nebulizer Therapy: Ultrasonic Nebulizer

Definition: The ultrasonic nebulizer utilizes fluid contained in a chamber, which is rapidly vibrated, causing the fluid to break into small particles. It works on the principle that high frequency sound waves can break up water into aerosol particles by means of a transducer.

Equipment:

1. Ultrasonic nebulizer with manufacturer's instructions
2. Circuit set up (according to manufacturer's instructions)
- 3 Disposable aerosol mask
4. Sterile water
5. Physician's written order
- 6 Prescribed solution
7. Disposable sputum cup
8. Box of disposable tissues or gauze pieces

Procedure:

- Check the physician's order and nursing care plan to obtain specific instructions and/or information.
- Identify the patient to perform the right procedure on the right patient

- Explain the procedure to the patient to allay fears and gain patient's confidence and cooperation and check the patient identification wristband against physician's written orders. Encourage the patient to participate in the procedure as possible to promote patient education.
- Ensure privacy to avoid unnecessary embarrassment to the patient during the procedure.
- Wash and dry hands to prevent cross infection
- Fill the ultrasonic chamber with the prescribed solution to the appropriate level with sterile water. Transducer needs a constant water level for effective functioning.
- Assemble circuit according to manufacturer's instructions and plug the cord into an electrical outlet.
- Turn on the machine and adjust the setting until the desired amount of mist is obtained to facilitate deeper penetration of particles into the tracheo-branchial tree.
- Position the patient in a comfortable sitting or semi Fowler s position to ensure maximal distribution and deposition of aerosolized particles to basilar area of the lung.
- Place the mask snugly over the patient's face to cover the nose. Instruct the patient to breathe in slowly through his mouth and to exhale and repeat several times to allow for maximal particle deposition in the lower respiratory tract.
- Observe the patient for any adverse reaction to the treatment. Patient may develop bronchospasm due to the inhalation of aerosol particles. The fluid may also cause dried retained secretions resulting in airway narrowing. Continuous aerosol therapy may lead to fluid overload in infants. Do not leave the patient unattended to allay fear and anxiety.
- Encourage the patient to periodically cough and expectorate any secretion loosened during the treatment to facilitate a clear airway and to prevent further lung consolidation.
- Turn off the machine and discontinue the procedure.
- Remove face mask and decontaminate in hot soapy water. Dry and store in dry plastic bag at patient's bed-side. Replace mask and tubing after 24 hours. Empty any residual water in containers and follow through with a

disinfectant. Dispatch couplant to CSSD for terminal sterilization to prevent contamination with microorganisms.

- Wash and dry hands to prevent cross infection
- Document the procedure in the appropriate charts and report abnormal findings.