

4.2.1 Inhaled Pentamidine

Only individuals who have been trained on the safe handling and administration of pentamidine may perform this procedure.

Purpose

The Registered Nurse or respiratory therapist trained on the safe handling and administration of pentamidine may administer aerosolized pentamidine to the patient for the prevention of pneumocystis jiroveci (formerly carinii) pneumonia (PJP or PCP). PJP can be severe or fatal if not promptly treated. It can affect the lungs as well as other parts of the body, including the skin and internal organs.

Overview

Pentamidine is an antiprotozoal agent used to help prevent the growth of PJP, a microorganism often found in the lungs of patients who are immunosuppressed. When pentamidine is delivered as an aerosol, it has limited absorption from the respiratory tract into the systemic circulation and therefore has fewer systemic side effects than when given intravenously.

Inhaled pentamidine is administered via the Respigard II Nebulizer, which utilizes a series of one-way valves and a filter to minimize the release of aerosol droplets into the air. Aerosolized pentamidine may be potentially toxic, necessitating use of this special nebulization system. The standard dose of administration is 300 mg of lyophilized pentamidine isethionate dissolved in sterile water and aerosolized until the nebulizer runs dry. Inhaled pentamidine is given on a monthly basis.

Precautions

Adequate ventilation is required. Some specialized childhood cancer programs conduct this procedure in a HEPA-filtered exhaust containment booth. This booth should be serviced and certified every 12 months. Centres without a containment booth should use a negative pressure room. If you do not have a negative pressure room, administer this procedure in a single room and use a portable HEPA filter.

Pediatric patients require a pre-treatment nursing assessment. Ensure age and cooperation level of patient are congruent with ability to receive inhaled pentamidine. The first dose of inhaled pentamidine should be administered at the specialized childhood cancer centre. It is important to know whether the patient tolerated the procedure and if a bronchodilator was required.

Do not administer pentamidine to pregnant patients, unless clearly indicated. If overexposed to pentamidine, staff may experience irritation of the conjunctivae or respiratory system, or respiratory or skin allergies. For this reason, staff must administer pentamidine using all appropriate precautions (e.g., containment booth and HEPA filtration system, personal protective equipment) to minimize exposure. Only centres with proper equipment and trained personnel should administer inhaled pentamidine.

Please refer to your institutional policies and guidelines regarding safe handling.



Equipment and Materials

- Oxygen flowmeter with nipple adapter
- Negative pressure room or HEPA filter machine with private room
- Respirgard II Nebulizer system with mouthpiece and nose clips or appropriate size mask
- Pentamidine (300 mg) prepared by pharmacy.
 - **Note:** If patient under 5 years of age, please consult with the specialized childhood cancer program on dosage.
- Particulate N95 mask for staff staying in room with the patient
- Stethoscope
- Bronchodilator with nebulizer or aero-chamber
- Plugs (optional – should be considered for younger children to ensure mouth breathing during the procedure)
- Personal protective equipment (PPE): Nitrile gloves rated for use with hazardous agents, N95 respirator that you have been fit-tested with, chemo gown and indirect vented chemical splash goggles
- A current Safety Data Sheet (SDS) for pentamidine

Pentamidine Aerosolization with the Respirgard II Nebulizer System

	Procedure	Rationale
1.	Obtain a medical order for pentamidine inhalation treatment and a bronchodilator if the patient requires one.	Risk of bronchospasm or cough. Patients who exhibit signs of cough or bronchospasm may benefit from inhaled bronchodilator prior to pentamidine treatment.
2.	Explain procedure to patient, including the use of PPE and procedure that will be followed if the patient starts coughing. If using HEPA filter, place running filter machine in room 1 hour before starting the treatment.	Pentamidine should be administered under close supervision. HEPA filter must be running in room pre-treatment. Private room, with door closed.
3.	Obtain a careful respiratory history (e.g., asthma, smoker). Assess and record patient's pulse, respiratory rate and work of breathing.	Bronchodilator and aerochamber or nebulizer should be readily available.
4.	Wash hands. Put on personal protective equipment. Enter room. Door must remain closed.	Staff using an N95 mask must be fit-tested. Staff administering pentamidine must wear PPE.
5.	Assemble the Respirgard II Nebulizer, connect extension tubing to oxygen flow meter or cylinder. Add the pentamidine solution to the medication chamber on the nebulizer.	

	Procedure	Rationale
6.	<p>Use a facemask or mouth piece and nose clips as per nursing assessment.</p> <p>Ask the patient to put on nose plugs (if using) and to place the mouthpiece in their mouth. Start flow meter. Use 5–8 LPM on flowmeter or 5–8 LPM on cylinder. Adjust flow to meet patient’s needs.</p> <p>Encourage the patient to breathe normally.</p>	<p>Watch for a good seal around the mouthpiece, air expansion and normal breathing.</p>
7.	<p>Observe and assess respiratory rate, coughing, signs of increased work of breathing and bronchospasm during administration.</p> <p>Monitor for any signs of respiratory distress and administer bronchodilators as indicated.</p> <p>Turn off the flow meter and contact physician immediately if the patient develops wheezing or bronchospasm.</p>	<p>Common side effects include cough, bronchospasm, metallic taste, burning sensation in back of throat and fatigue.</p> <p>Some patients may require additional bronchodilators.</p>
8.	<p>Instruct the patient to raise their hand when requesting a break. Stop the flow meter before the patient removes the mouthpiece from their mouth. Do not restart the flow meter until patient has mouthpiece back in their mouth.</p>	<p>Treatment will take approximately 15 minutes.</p>
9.	<p>At the end of the procedure, stop the flow meter before the patient removes the mouthpiece from their mouth. Instruct patient to rinse mouth and wash hands prior to leaving the room.</p> <p>Keep the HEPA filter running with the door closed for 60 minutes post-treatment.</p> <p>Discard the nebulizer system, PPE and medication syringe in the cytotoxic waste bin.</p>	
10.	<p>Assess pulse and respiratory rate.</p>	<p>Observe for respiratory distress.</p>
11.	<p>Document treatment and observations in the patient’s medical records chart.</p>	
12.	<p>Housekeeping staff may clean the room 1.5 hours after the last procedure.</p>	<p>Staff should not enter the room without PPE until 60 minutes after the treatment is completed.</p>



	Procedure	Rationale
		Housekeeping must wear gloves when cleaning but do not need to wear respiratory protection. Use wet method when cleaning to avoid creating dust.

First Aid Measures

For eye or mucous membrane splashes or contact with pentamidine, immediately flush contaminated area with running water for at least 15 minutes. Obtain medical attention.

For skin contact with pentamidine, remove highly contaminated clothing and flush contaminated skin with running water for 15 minutes. Obtain medical attention.

For accidental inhalation of pentamidine, leave the area and obtain medical attention.

Report and document all exposures as per hospital policy.

This guidance document was developed by Ms. Patti Bambury, Grand River Hospital, Ursula DeBono, Windsor Regional Hospital, Ms. Denise Reniers, Children’s Hospital, London Health Sciences Centre and Mr. John Wiernikowski, McMaster Children’s Hospital, Hamilton Health Sciences. Reviewed in consultation with Ms. Christina McCauley, POGO/The Hospital for Sick Children and Ms. Diana Masse and Ms. Mary Jo De Courcy, Children’s Hospital, London Health Sciences Centre based on the sources below.

References

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2. British Occupational Hygiene Society. Pentamidine. Control of Substances Hazardous to Health (COSHH) Guidance 2006 Jun; Guidance note 0306.
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Record of Updates

Version Number	Date of Effect	Summary of Revisions
1	2/4/2022	<ul style="list-style-type: none">Original version posted.