Lessons Learned Regarding Delivery of Aerosolized Medicines in Patients With COVID-19

Original article: Ari A, Scott JB. Lessons learned about aerosol drug delivery in the era of COVID-19. Respiratory Care NetWork. Available at: https://www.chestnet.org/Topic-Collections/COVID-19/COVID-in-Focus/Lessons-Learned-About-Aerosol-Drug-Delivery-in-the-Era-of-COVID-19. Published July 30, 2021. Accessed September 30, 2021.

Over the course of the COVID-19 pandemic, multiple lessons have been learned regarding the delivery of aerosolized medicines

Lesson 1	The risk of device contamination and viral transmission is not the same across all devices	**Contamination may be less with a mesh nebulizer** *versus* a jet nebulizer	**Mesh nebulizer** • Medication reservoir is separate from the patient interface • Electric/battery powered • Small residual volume **Jet nebulizer** • Open reservoir that is placed below the circuit → presents a risk of contamination via infected condensate • Gas powered → may increase exhaled aerosol dispersion • Large residual volume → may be hospitable to pathogens
Lesson 2	An aerosol device should be selected based on the patient's clinical status	Use a **mesh nebulizer** or a valved T-piece with a jet nebulizer in patients receiving HFNC therapy, NIV, or MV, to **keep the ventilator circuit intact**	
Lesson 3	Aerosol delivery via a HFNC should be considered	Use a **mesh nebulizer** placed prior to the humidifier	
Lesson 4	In COVID-19 patients, device and interface selection are of equal importance	Use a mouthpiece for aerosol delivery in spontaneously breathing patients	
Lesson 5	Adopt good infection control and prevention measures to reduce exhaled aerosol dispersion to the environment	• Attach a filter to the expiratory outlet of nebulizers and ventilators • Place a surgical mask over a HFNC to decrease dispersion of aerosols	

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COVID-19, coronavirus disease 2019; HFNC, high-flow nasal cannula; MV, mechanical ventilation; NIV, non-invasive ventilation.

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Spontaneous breathing	HFNC	Mechanical ventilation	Tracheostomy
Use aerosol drug delivery only if necessary	Use a HFNC for aerosol delivery before severe hypoxemic respiratory failure develops	To keep the ventilator circuit intact and to prevent viral transmission, **do not use a pMDI**	To prevent viral transmission, do not use a pMDI placed directly to the tracheostomy tube
Use an inhaler in patients who can optimally use one	**Use a mesh nebulizer** placed before the humidifier and with the reservoir cap kept closed	**Use a mesh nebulizer** placed before the humidifier and with the reservoir cap kept closed	**Use a mesh nebulizer** or a jet nebulizer with a valved T-piece, attached to the high-flow oxygen delivery system
Use a nebulizer with a **filter placed on the expiratory port** in patients who cannot optimally use an inhaler or who require drugs not available in an inhaler	Ensure that the prongs of the HFNC fit well and are not loose	Use a jet nebulizer with a valved T-piece if a mesh nebulizer is not available	Do not deliver aerosol therapy via the tracheostomy mask
Use a mouthpiece (not a facemask)	Place a surgical mask over the HFNC prior to aerosol delivery	Add a HEPA filter to the ventilator's exhalation arm and ensure the ventilator circuit remains intact	Deliver aerosol using an unassisted instead of an assisted technique unless a filter has been placed on the expiratory port of the manual resuscitation bag

For all patients during aerosol drug delivery

Isolate patients, administer aerosols in a negative-pressure room, wear appropriate PPE, and observe aseptic technique when preparing, cleaning, and maintaining all devices

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COVID-19, coronavirus disease 2019; HEPA, high-efficiency particulate air; HFNC, high-flow nasal cannula; pMDI, pressurized metered-dose inhaler; PPE, personal protective equipment.

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