Consensus statements regarding aerosol therapy in critically ill adult patients requiring respiratory support

Li J, Liu K, Lyu S, et al. Aerosol therapy in adult critically ill patients: a consensus statement regarding aerosol administration strategies during various modes of respiratory support. Ann Intensive Care. 2023;13(1):63.

There is currently **limited consensus** among clinicians and aerosol scientists regarding **aerosol delivery in critical care patients requiring respiratory support**

An **investigator-initiated project** was undertaken to provide practical **guidance on technical aspects of aerosol delivery in adult ICU patients** receiving respiratory support

As a first step, a working group undertook a **review of the literature**, with data from 120 papers* used to develop 53 preliminary recommendations

Preliminary recommendations were reviewed and **voted on by an international panel of experts**, comprising pulmonologists, intensivists, anaesthesiologists, physiotherapists, and respiratory care practitioners

Consensus was achieved using a modified Delphi method across three rounds of voting, followed by two online meetings to discuss final recommendations

Twenty recommendations were proposed, all with a perfect† or very good‡ level of consensus per a Likert scale ranging from 1 (strongly disagree) to 9 (strongly agree)

This visual summary provides an **abbreviated overview of some of the recommendations** regarding aerosol therapy during IMV, NIV, and HF therapy

*Included English-language, full-text papers describing in-vitro, animal and clinical studies published between January 1990 and September 2021 that were considered relevant for inclusion by the working group; †Defined as 100% of panellists scoring 7–9 for agreement (or 1–3 for disagreement); ‡Defined as ≥80% of panellists scoring 7–9 for agreement (or 1–3 for disagreement).
HF, high-flow; ICU, intensive care unit; IMV, invasive mechanical ventilation; NIV, non-invasive ventilation.

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Key recommendations regarding aerosol therapy in critical care patients receiving respiratory support

Invasive mechanical ventilation

Device selection

- **A VMN or pMDI with spacer is recommended**

Use of a nebuliser

- **When using a VMN or JN during bias flow, place the device in the inspiratory limb, towards the ventilator, away from the Y-piece**

Use of a pMDI plus spacer

- Use pMDIs with a spacer with a volume of >150 mL, placed in the inspiratory limb before the Y-piece
- Actuate at the beginning of inspiratory flow from the ventilator

Aerosol delivery during humidification

- Active heated humidifier → Do not turn off the humidifier
- HME → Remove or bypass the HME

Filter

- Place a filter on the expiratory limb to reduce fugitive aerosols and protect the expiratory sensors of the ventilator

Non-invasive ventilation

Aerosol delivery during NIV

- Aerosol delivery efficiency with an inline nebuliser is similar to or higher than a nebuliser with a mask or mouthpiece
- Do not interrupt or discontinue NIV to administer aerosol via a mask or mouthpiece

Use of a nebuliser

- **A VMN is preferred** over a JN
- When using a single-limb circuit, place the continuous nebuliser between the exhalation valve and the mask

Use of a pMDI plus spacer

- Use a pMDI with spacer, placed between the exhalation valve and the mask
- Actuate at the beginning of inspiration

Aerosol delivery during humidification

- Do not turn off the humidifier

High-flow therapy

Aerosol delivery during HF therapy

- Aerosol delivery efficiency with a nebuliser via HFNC is similar to a nebuliser with a mask or mouthpiece
- Do not discontinue HF therapy to administer a nebuliser with a mask or mouthpiece
- Avoid using a nebuliser with a mask or mouthpiece with concurrent HF therapy

Use of a nebuliser

- **A VMN is preferred** over a JN
- Place the device at the inlet of the humidifier

Use of a pMDI plus spacer

- When placed inline with HFNC, use a pMDI with spacer, placed close to the nasal cannula with the aerosol plume pointed towards the patient

Aerosol delivery during humidification

- Do not turn off the humidifier

To see the full list of recommendations regarding aerosol administration strategies during different modes of respiratory support, scan or click the QR code

Recommendations specific to the use of VMNs during respiratory support are shown in bold, italicised text.
HF, high-flow; HFNC, high-flow nasal cannula; HME, heat–moisture exchanger; JN, jet nebuliser; NIV, non-invasive ventilation; pMDI, pressurised metered-dose inhaler; VMN, vibrating mesh nebuliser.

Want to know more? Scan or click the QR code