

Comparison of Aerosol Drug Delivery With the Aerogen® Solo Versus a Jet Nebulizer or a Pressurized Metered-Dose Inhaler During Non-invasive Ventilation

Original article: AlQuaimi MM, Fink JB, Ari A. Efficiency of different aerosol devices and masks during noninvasive positive pressure ventilation in a simulated adult lung model. J Respir Med Lung Dis. 2017;2(3):1018.

Background



Administration of aerosolized therapy during non-invasive ventilation is common; however, there is a lack of data on the efficiency of different delivery systems and mask interfaces in this setting

Objective



The aim of this study was to evaluate the drug delivery efficiency of the Aerogen Solo versus a jet nebulizer and a pMDI in a simulated adult lung model using different non-invasive ventilation facemasks

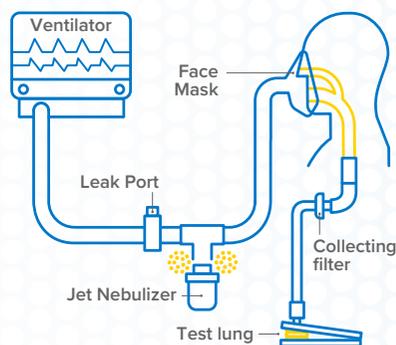
Materials and Methods

Design: Benchtop study

- Deposition of aerosolized albuterol delivered using the Aerogen Solo, a jet nebulizer, and a pMDI was compared using an *in vitro* lung model*
- Spectrophotometry was used to measure drug concentration from an absolute collecting filter attached to the bronchi of the manikin

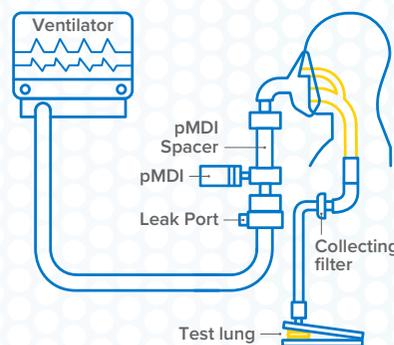
Jet nebulizer

Administration of albuterol 2.5 mg/3 mL until sputter (flow rate 8 L/min)



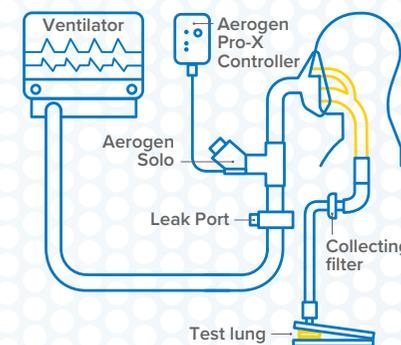
pMDI

Administration of four actuations of albuterol (108 µg emitted/puff)



Aerogen Solo

Administration of albuterol (2.5 mg/3 mL) until no more aerosol was produced



*Target tidal volume 450 mL, 15 breaths/min, inspiratory time 1 second, with pressure settings of IPAP/ EPAP 20/5 cmH₂O.
pMDI, pressurized metered-dose inhaler.

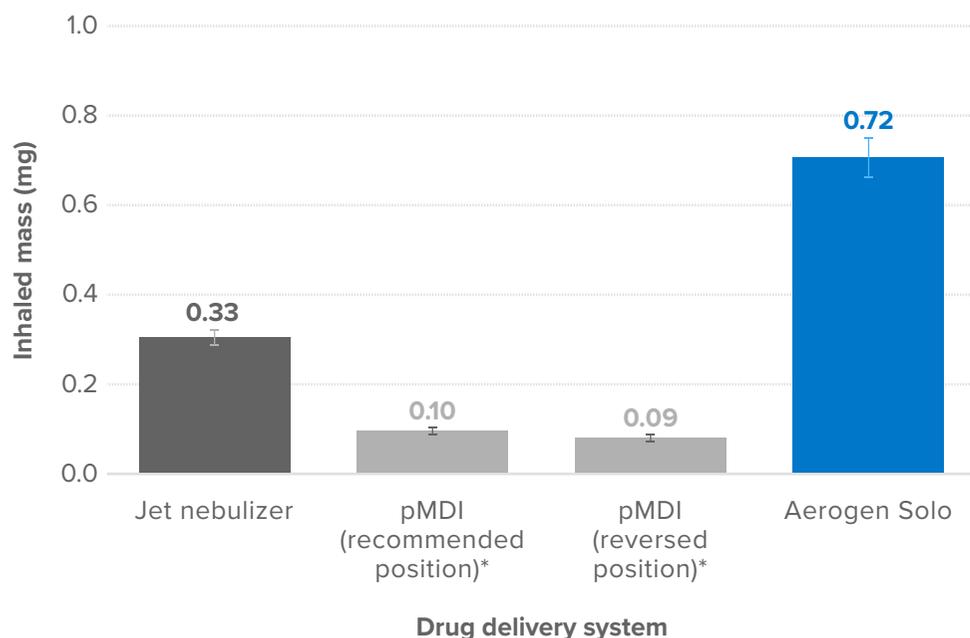
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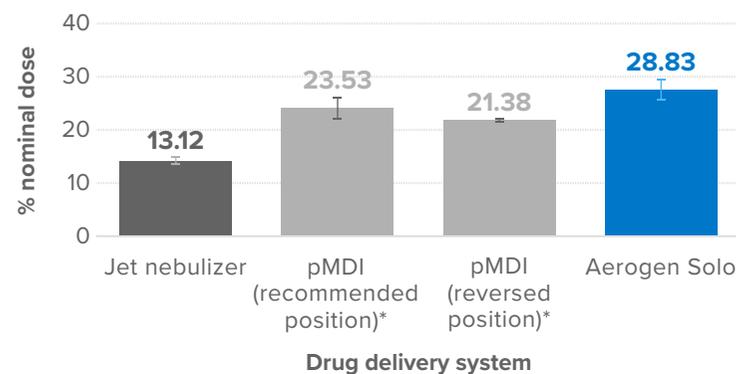


Drug delivery with the Aerogen Solo during non-invasive ventilation was ~7 times higher than with a pMDI and ~2 times higher than with a jet nebulizer

Inhaled mass in mg



Inhaled mass as % of nominal dose



Residual volume



This study also compared different vibrating mesh technologies and facemasks, the delivered dose was greatest with the Aerogen Solo combined with an oro-nasal mask

*The pMDI was connected to the ventilator circuit via a spacer, which was connected either as recommended (ie actuator in a distal position with aerosol emitted towards the patient) or in a reversed orientation. pMDI, pressurized metered-dose inhaler.

