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Title: In vitro comparison of emitted dose with 2 types of nebulizers during non invasive ventilation

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Body: Introduction: Non invasive ventilation (NIV) and inhaled therapy are important components of the medical management of COPD patients. Sometimes, both therapies need to be administered simultaneously. It has been shown that it is feasible and effective to deliver nebulized bronchodilatators during NIV. Objectives: Primary objective was to compare emitted dose (ED) of different types of nebulizers coupled with a single limb circuit bilevel ventilator. Secondary objective was to evaluate the impact of the position of nebulizers on the circuit. Material and methods: Amikacin (500mg in 4 mL) was nebulized by two vibrating mesh nebulizers (Aeroneb®Pro and Aeroneb® Solo, Aerogen, Ireland) and by a classical jet nebulizer (SideStream; Medic-Aid; UK). The nebulizers were connected to a single limb circuit ventilator (Trilogy® 100, Philips-Respironics, USA), either before (Position 1) or after (Position 2) the passive exhalation port (Whisper Swivel II® Philips-Respironics, USA). The bilevel ventilator was set in spontaneous mode and connected to a lung model to mimic a COPD patient breathing (RR of 16 breaths/minute, I/E ratio of 1:3 and VT of 400 mL). A filter was interposed between the lung model and the circuit. ED was measured by the residual gravimetric method. Results:

Emitted dose by nebulizer at each position

	Aeroneb®Pro	Aeroneb®Solo	Jet nebulizer	p
Position 1	98.7±4µg	113.1±10µg	76.8±8µg	0.004
Position 2	309±18µg	343.3±30µg	96.8±5µg	<0.0001
p	<0.0001	0.0001	<0.05	

Mean±SD

Conclusion: Associated with a single limb circuit bilevel ventilator, emitted dose of vibrating mesh nebulizers are greater than jet nebulizer. Moreover to place the nebulizer after the passive exhalation port is optimal for

all the devices.