Effect on Airflow of Bronchodilator Therapy Delivered via Vibrating Mesh versus Jet Nebulizers in Acute Asthmatics in an Emergency Department

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Objectives

To determine whether treatment with Vibrating Mesh Nebulizer (VMN) compared to Jet Nebulizer (JN) in an acute asthma exacerbation provides a more rapid improvement in airflow.

Methods

- Prospective, pilot, single blind, parallel, single center RCT.
- Patients with severe asthma exacerbations, defined as peak expiratory flow rate (PEFR) <50% of predicted.
- Randomized to receive bronchodilator therapy with either a VMN (Aerogen Solo with Ultra, Aerogen Ltd., Galway, Ireland) or a JN using our ED adult asthma protocol.
- The primary outcome was the difference in improvement of mean PEFR% between the two groups.
- The secondary outcome was the difference in improvement of mean forced expiratory volume-in one second percent predicted (FEV1%) between the two groups (VMN and JN).

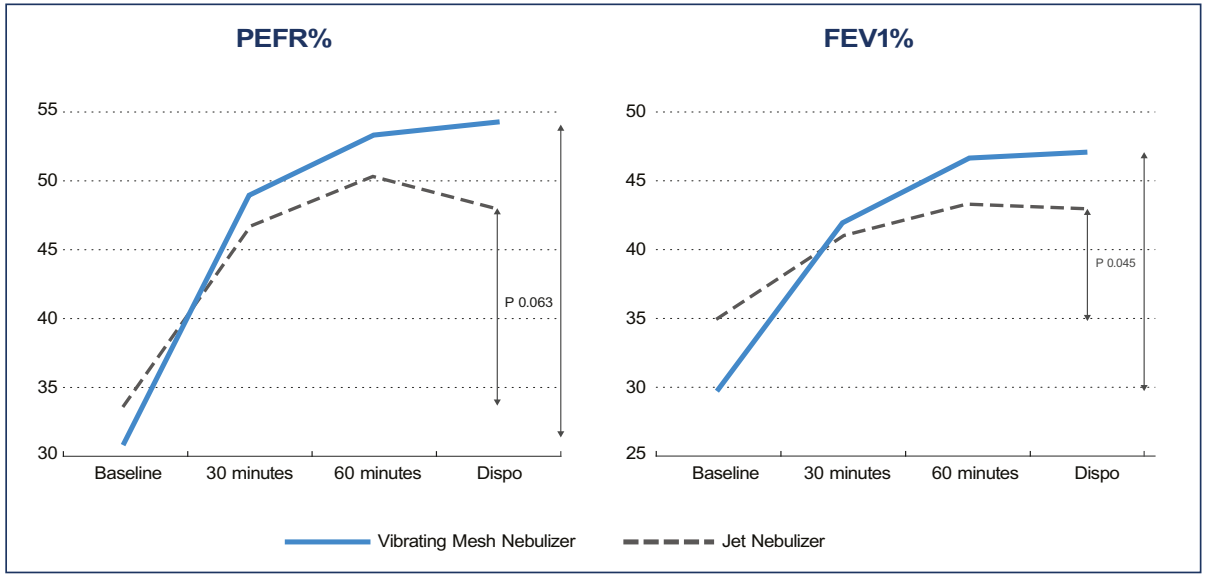
Results

- A total of 31 patients was recruited (16 JN and 15 VMN).
- Mean PEFR% change from baseline to disposition for the JN group was 33.8 to 48.1 compared to 31.0 to 54.3 in the VMN group, an improvement of 14.4 and 23.3 respectively with difference of 8.9 (p =0.063).
- Mean FEV1% change from baseline to disposition for the JN group was 35.1 to 43.1 compared to 29.9 to 47.1 in the VMN group, an absolute improvement of 8.0 and 17.1 respectively with a difference of -9.1 (p =0.045).

	Age		Sex		Smoker		Race and Ethnicty				Median Heart Rate			
	Range	Median	Male	Female	Smoker	Non Smoker	AA	H	W	Asian	Baseline	30 mins	60 mins	Disposition
JN	20-52	32	63%	37%	50%	50%	44%	13%	44%	0%	100.5	104	100	98
VMN	24-25	44	47%	53%	53%	47%	27%	13%	47%	13%	93	91	90	88

Baseline demographic data for the JN and VMN groups

AA - African American H - Hispanic W - White JN - Jet Nebulizer VMN - Vibrating Mesh Nebulizer



Mean % change from baseline to disposition for the JN and VMN groups

Conclusions

Although the sample size is small in this pilot study, there is a more rapid improvement in airflow through the time of disposition in the VMN group when compared to the JN group.

This suggests that there may be a clinical benefit of improved aerosol delivery with the more recently introduced VMN versus the traditional JN technology in asthma exacerbation.

References: 1: Tufts Medical Center, Department of Pulmonary, Critical Care and Sleep; 2: Tufts Medical Center, Department of Emergency Medicine
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