

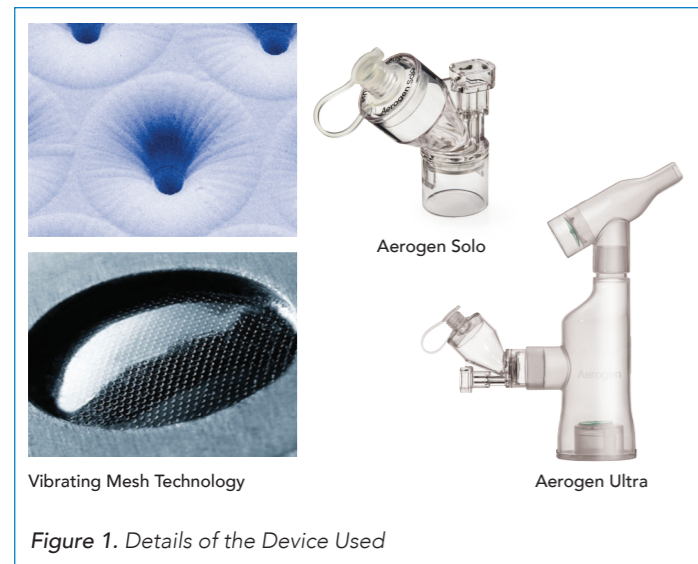
AEROSOL DOSE MATTERS IN THE EMERGENCY DEPARTMENT: A COMPARISON OF IMPACT OF BRONCHODILATOR ADMINISTRATION WITH TWO NEBULIZER SYSTEMS

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1 Introduction

Clinical outcome studies comparing aerosol devices in patients in respiratory distress in the Emergency Department (ED) are limited. The vibrating mesh nebulizer (VMN) with adapter (Aerogen Ultra, Aerogen Ltd., Ireland) provides > 4-fold drug delivery to lungs compared to jet nebulizer (JN). Aim of the study was to determine whether the improved lung delivery of bronchodilators would have an effect on admission rates, ED discharge rates and total salbutamol dose in patients receiving aerosol treatments in the ED.



2 Methods

The Aerogen Ultra was implemented for 30 days during the evaluation period for all patients receiving inhaled bronchodilator therapy.

- » All age groups were treated.
- » The time period was prospectively identified. A report was built from available EMR data.
- » A retrospective data extraction was performed from the CERNER EMR comparing all ED patients receiving aerosol bronchodilator treatments with the standard of practice JN (September 2015) to an equivalent period after implementation of the Aerogen Ultra (October 2015).
- » A total of 1594 patient encounters were reviewed (879 JN and 715 VMN).

3 Results

Patient data was extracted from Sept (879 JN) and Oct (715 VMN). In Oct treated population experienced a reduction in admissions from the ED associated with an increase in discharges to home compared to Sept., Patients receiving bronchodilators with the VMN with adapter were 1.5 times more likely to be discharged than the JN group (OR=1.5, $p < .001$), respectively). The JN group was 1.7 times more likely to be admitted than the VMN group (OR=1.77, $p < .001$). The VMN group used less total drug ($p < .05$) with a 75% reduction of salbutamol dose administered (20 mg to 5 mg).

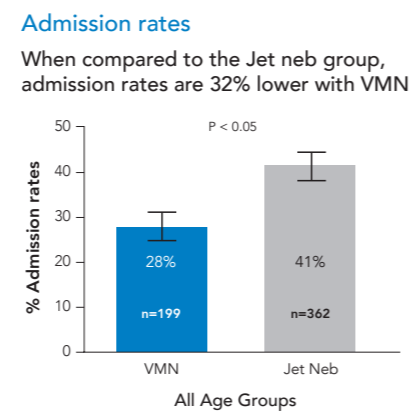


Figure 2. Admission Rates

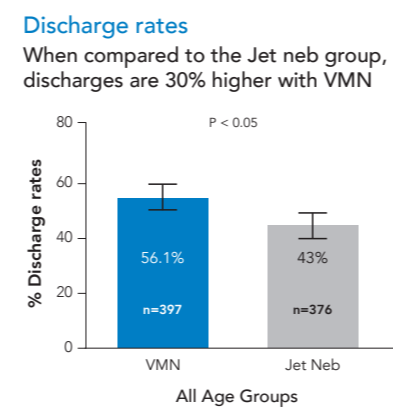


Figure 3. Discharge Rates

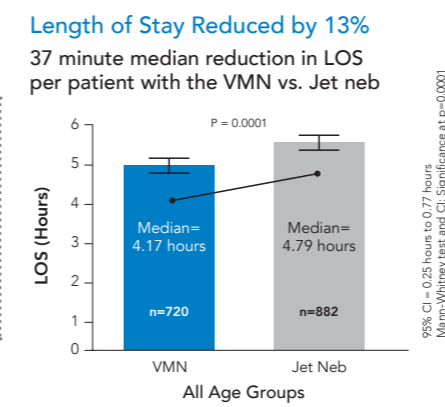


Figure 4. Length of Stay

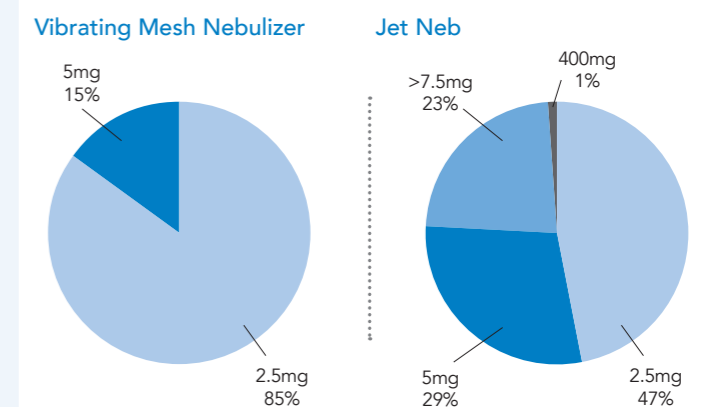


Figure 5. Salbutamol Dose, lower with VMN, $p < 0.001$

Demographics of the Groups

	Group	
	JN (N=879)	VMN (N=715)
Gender (%)		
Female	51.8	54.0
Male	48.2	46.0
Age (Mean (SD))	42.23 (25.75)	36.86 (25.04)
Pre Heart Rate (Mean (SD))	102.43 (26.60)	100.37 (25.60)
Pre Respiratory Rate (Mean (SD))	19.25 (6.30)	22.88 (6.51)
Post Heart Rate (Mean (SD))	89.69 (25.75)	109.17 (29.89)
Post Respiratory Rate (Mean (SD))	18.76 (5.87)	22.23 (5.72)

Table 1. Demographics of the groups

Frequencies and Percentages for Patient Disposition by Intervention Group Stratified by Age

	Group							
	JN (N=879)				VMN (N=715)			
	n	%	95% CI LL	95% CI UL	n	%	95% CI LL	95% CI UL
Ages 0 to 2 years								
Admit - ER	7	14.9	4.3	25.5	6	13.0	2.9	23.2 NS
Discharge	35	74.5	61.5	87.4	34	73.9	60.7	87.1 NS
OBS - ER	5	10.6	1.5	19.8	6	13.0	2.9	23.2 NS
Ages 3 to 18 years								
Admit - ER	20	12.7	7.4	17.9	20	12.1	7.1	17.2 NS
Discharge	121	76.6	69.9	83.3	136	82.4	76.6	88.3 NS
OBS - ER	17	10.8	5.9	15.6	9	5.5	2.0	9.0 NS
Ages 19 to 50 years								
Admit - ER	86	29.7	24.4	34.9	50	19.8	14.8	24.7 $p < .05$
Discharge	164	56.6	50.8	62.3	162	64.0	58.1	70.0 NS
OBS - ER	40	13.8	9.8	17.8	41	16.2	11.6	20.8 NS
Ages 51 or more years								
Admit - ER	248	65.6	60.8	70.4	122	50.2	43.9	56.5 $p < .05$
Discharge	56	14.8	11.2	18.4	65	26.7	21.1	32.4 $p < .05$
OBS - ER	74	19.6	15.6	23.6	56	23.0	17.7	28.4 NS

Table 2. Frequencies and Percentages by Age

4 Conclusions

The VMN with adapter was associated with fewer admissions to the hospital from the ED with a substantial reduction in salbutamol dose required than the JN. The device type was a strong predictor of discharge, disposition and total amount of drug, regardless of age or diagnosis. Randomized controlled studies are needed to corroborate these findings.

References

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Disclosures: Ms. Dailey is a Medical Science Liaison for Aerogen Ltd. Aerogen Ltd provided the devices for the project.

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