



AN IN VITRO COMPARISON OF DOSIMETRIC NEBULIZERS

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RATIONALE:

Design differences among gas powered, small volume nebulizers affect drug disposition. Drug disposition is affected by dose delivered to the patient, loss of dose in the equipment, and dose exhaled to ambient air. The disposition affects drug availability and efficacy to the patient. Dosimetric nebulizers release aerosol only during inspiration which may offer healthcare providers and patients an advantage in aerosol therapy.

PURPOSE:

The purpose of this study was to compare the performance of two dosimetric nebulizers in vitro under normal adult breathing conditions.

METHOD:

The two nebulizer models evaluated were the AeroEclipse and the Circulaire II. Each nebulizer was filled with 3 ml of unit dose albuterol sulfate and powered by oxygen at 8 L/min. The nebulizers were connected to a filter (2-way nonconductive anesthesia filter, Hudson RCI, Temecula, California), connected to a breathing simulator with the following parameters: Vt = 600, RR = 12 bpm, I:E = 1:3. Inhaled drug mass from the nebulizers were measured at 1, 3 and 5 minutes. All drug amounts were analyzed via spectrophotometry (Beckman Instruments, Fullerton, California) at a wavelength of 276 nm and expressed as a percentage of total dose.

RESULTS:

The percentages below are expressed as a percent of the delivered dose at the times indicated. There were differences seen with nebulizer models studied as noted by the repeated measures ANOVA, F(2,16)= 64.906, p= 0.000. The Bonferroni adjusted probabilities for inhaled drug mass with nebulizers and their conditions found that the Circulaire II delivered more drug overall than the AeroEclipse (p=0.000). Circulaire II statistically delivered more drug at three and five minutes (p=0.000).

N=5		Mean (%)	SD (%)	P value	%Chg
AeroEclipse	1 Min	1.99	0.45		
Circulaire II	1 Min	2.02	0.23	.16	1.4
AeroEclipse	3 Min	4.74	0.61		
Circulaire II	3 Min	6.27	0.70	.000	32.0
AeroEclipse	5 Min	7.15	0.48		
Circulaire II	5 Min	10.92	0.76	.000	53.0



CONCLUSION:

The Circulaire II generated a larger delivered drug dose at all time intervals tested.