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Improvement in Aerosol Delivery from a Standard Nebulizer System: The Use of a Holding Compartment

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Current submicronic nebulizer systems would require approximately 5 minutes of breathing using a 20mCi/mL reservoir dose to obtain sufficient counts for a pre-perfusion aerosol study. This breathing time for many patients is excessive. The purpose of the study was to evaluate a new nebulizer system using a holding compartment to improve efficiency of aerosol delivery.

Methods: 20 consecutive patients (pts) who were referred for evaluation of pulmonary emboli were studied using a pre-perfusion aerosol technique. Pulmonary count rates were determined on 10 pts using a standard nebulizer system and compared with 10 pts using a new nebulizer system with a small holding compartment strategically placed to hold DTPA particles generated during patient expiration, which are normally lost. Breathing time was 2.5 min. on the new system and 5 min. on the standard system. Semi-quantitative quality determinations between the two groups were made using the criteria of central deposition, peripheral penetration and overall quality.

Results: The count rate results are shown in the following table.

Nebulizer	Breathing Time	Average Count Rate	K cts/sec	std dev	(n)
Standard	5.0 min.	1.09	.400		10
New	2.5 min.	1.41	.436		10

Quality of Aerosol was identical for both groups.

Conclusion: Addition of a holding compartment to a standard nebulizer system improved efficiency by over 100% with no alteration in study quality. These results are extremely important especially in patients with limited capacity to undergo a ventilation study for the evaluation of pulmonary emboli.

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