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Title: Aerosol deposition in asthmatic subjects breathing helium-oxygen vs. air

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Body: Introduction Helium-oxygen (He/O_2) mixtures are known to facilitate breathing due to their low density compared to air, and therefore, may be valuable to treat obstructive lung diseases such as asthma. Objectives The objective is to study the effect of air vs. He/O_2 on the aerosol deposition of a nebulized radiolabel in stable, moderate asthmatic subjects. Methods 16 evaluable male subjects (6 asthmatics, 10 healthy volunteers) were studied. Each subject performed two inhalations which differed by a single controlled parameter (particle size, ventilation, or carrier gas). 2 of the asthmatics inhaled aerosols with either air or He/O_2 (78%He/22%O_2), and aerosol deposition was imaged with 3D-SPECT. To characterize the sites of aerosol deposition, the 3D Central to Peripheral ratios, C/P, were calculated for right and left lungs. Results The effect of He/O_2 on aerosol deposition was very visible for one of the asthmatic subjects (A06) with a large decrease in central deposition (Right C/P=4.91 and Left C/P=5.58 for air, vs. 1.32 and 1.37 for He/O_2) when He/O_2 was used to drive the nebuliser, but the other asthmatic did not respond to the change in carrier gas (Right C/P=3.87 and Left C/P=6.66 for air, vs. 3.87 and 7.53 for He/O_2).

Conclusion These results suggest that He/O_2 can reduce aerosol deposition in central airways and increase deposition in peripheral airways in some asthmatic patients, but this response is not consistent among all patients.