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Title: Distribution of airway closure using single photon emission computerised tomography in the obese

Dr. Sriram 27565 Mahadev smahadev@med.usyd.edu.au MD [1], Dr. Cheryl 27566 Salome cms@woolcock.org.au [1] and Dr. Gregory 27567 King gregory.king@sydney.edu.au MD [1]. [1] Airway Physiology and Imaging, The Woolcock Institute of Medical Research, Glebe, NSW, Australia, 2037 .

Body: Low functional residual volume (FRC) in obesity may increase airway closure above FRC. Scintigraphic studies in obese patients with low expiratory reserve volume, showed reduced basal ventilation potentially due to airway closure (AC). We used single photon emission computerised tomography (SPECT-CT) to identify regional distribution of AC then related this to physiological measures of AC. Hypothesis (1)degree of AC occurring above FRC would correlate with area of closure seen on SPECT-CT (2) the obese would have more AC particularly basally. Methods: Obese subjects (OS n=5) and non-obese subjects (NOS n=7) had lung volumes (plethysmography), and single breath nitrogen washout to measure closing capacity (CC). CC/FRC > 1 indicated AC above FRC. SPECT-CT: 400mL of Technegas administered at FRC, inspiration to TLC. Areas of reduced Technegas deposition were defined as AC, and overall volume of AC, and volume of AC seen in upper, middle and bottom third of lung, expressed as a proportion of corresponding lung volume on CT (closure%). Results: OS and NOS were well matched for age. OS had higher CC/FRC than NOS (not statistically significant: OS 93.6 ± 18.5 %, NOS 69.07± 26.8 % p=0.11). There was no correlation between CC/FRC and overall closure% (r=0.22 p=0.5). OS did not have greater overall closure% than NOS. (NOS 19.5 ± 4.2 %, OS 19.52 ± 11.3 % p=1). NOS had greater closure% in the upper third.(NOS 36.77 ± 8.3 %, OS 17.62 ± 13.1% p=0.03) Conclusion: Surprisingly there were no differences in basal AC on imaging in the obese despite occurence of AC above FRC. The reason is not known. Apparent AC in NOS compared to OS in upper zones may represent altered ventilation in the OS.