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Title: Increased alveolar nitric oxide by trumpet model in patients with obstructive sleep apnoea

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Body: Background We assessed distal/alveolar inflammation in patients with suggestive symptoms of obstructive sleep apnoea (OSA) and measured exhaled alveolar concentration of nitric oxide (CANO) using 2-compartment model (2-CM) and the trumpet model (with correction for axial NO back-diffusion). Methods Ninety five patients suspected for OSA without advanced cardio-respiratory disease underwent pulmonary function test, overnight polysomnography, and exhaled NO measurement using 2-CM model and the trumpet model. Patients with apnoea-hypopnoea index (AHI)<5/hour served as controls. Serial measurements of exhaled NO after PSG were performed in 21 OSA patients and 8 control subjects. Results CANO was significantly higher in OSA patients (n=71; 4.07 ± 1.7 ppb) as compared with controls (n=24; 2.24 ± 1.06 ppb; $p < 0.0001$) whilst maximal bronchial NO flux and fractional concentration of exhaled NO did not significantly differ between the two groups. In patients with OSA, CANO was strongly associated to AHI ($r = 0.701$; $p < 0.0001$) and to recording time with $\text{SaO}_2 < 90\%$ (ST-90%; $r = 0.659$; $p < 0.0001$). The area under ROC curve for screening patients with OSA and significant nocturnal oxygen desaturation (TS-90%>1%) was 0.855 (0.777-0.933) ($p < 0.0001$). CANO at 4.49ppb could detect these patients with sensitivity of 46% and specificity of 94%. Increased CANO variation after PSG was significantly related to oxygen desaturation index (TS-90%). Conclusions Increased alveolar NO concentration was related to the severity of nocturnal oxygen desaturation in patients with OSA, linking the distal lung inflammation to intermittent hypoxia. CANO could be used to screen for severe OSA in suspected and symptomatic patients.