SUPPLEMENTARY DATA

**The relationship between OSA severity, nocturnal hypoxemia and DN**

There was a stepwise association between OSA severity and DN. Compared to AHI tertile 1 (AHI < 4.8), tertiles 2 (4.8–11.89) (OR 2.79, 95%CI 1.40-5.55, p=0.004) and 3 (≥ 11.90) (OR 3.11, 95%CI 1.55-6.21, p=0.001) were associated with DN; this association lost significance following adjustment (OR 2.43, 95%CI 0.98-6.04, p=0.055 and OR 2.47, 95%CI 0.93-6.57, p=0.07 for AHI tertiles 2 and 3 respectively). Similar associations were found for DN and nadir nocturnal oxygen saturation (OR 0.96, 95%CI 0.93-0.99, p=0.004), which became borderline after adjustment as in model 3 (OR 0.96, 95%CI 0.93-1.00, p=0.05).

**The longitudinal impact of OSA on eGFR change**

In a linear regression model, baseline eGFR ($R^2$=0.02, adjusted $R^2$=0.01) was not a predictor of eGFR change (B=-0.06, p=0.053). Adding OSA to baseline eGFR in the model ($R^2$=0.08, adjusted $R^2$=0.07) showed that OSA was an independent predictor of eGFR change (B=-5.5, p=0.001). Further adjustment by adding age at diagnosis, diabetes duration, ethnicity, gender, BMI, MAP, antihypertensive agent use, HbA1c, insulin use, OAD use, total cholesterol, triglycerides, lipid lowering therapy, antiplatelet use and smoking to the model ($R^2$=0.17, adjusted $R^2$=0.09) showed that OSA remained an independent predictor of eGFR change (B=-3.8, p=0.04). The other independent predictors were diabetes duration and baseline eGFR. Replacing BMI with waist circumference ($R^2$=0.16, adjusted $R^2$=0.08), OSA remained independently associated with study end eGFR (B=-4.2, p=0.03).

**OSA impact on albuminuria and DN development**

DN status was available for 169 patients ((111 (65.7%) with and 58 (34.3%) without OSA) at study-end. Excluding 76 patients with DN at baseline, 93 (52 with vs. 41 without OSA) patients were analysed. Of these 93, 17 (18.3%) patients developed DN over the follow up period. More patients with OSA (n=12, 23.1%) progressed to DN compared to those without OSA (n=5, 12.2%), but this difference was not statistically significant (p=0.18).Albuminuria data was available in 163 (105 with and 58 without OSA) patients. After excluding 56 patients with albuminuria at baseline, 107 patients were available for the study-end analysis. More patients with OSA at baseline developed albuminuria during follow up, but this was not statistically significant (22.6% vs. 13.3%, p=0.23)

**CPAP treatment and the longitudinal analysis**

Although all patients with moderate to severe OSA were offered CPAP treatment; the uptake and compliance were poor. Out of 47 patients with moderate to severe OSA who have both baseline and study-end eGFR measurements, only 16 were CPAP-compliant, 1 was using CPAP but non-compliant and the reminder declined CPAP treatment. There were no significant differences between those compliant and non-compliant with CPAP apart from higher AHI in the CPAP-compliant group (Table E2-online supplement).Data regarding eGFR were available in 47 patients (31 non-compliant and 16 compliant with CPAP). eGFR declined by -1.4% ( -7.7% to 5.2%) vs. -5.3% (-16.5% to 2.7%) vs. -7.7% (-15.9% to -1.8%) vs. -10.0% (-17.2% to 2.3%) for no OSA vs. mild OSA vs. moderate to severe OSA CPAP-compliant vs. moderate to severe OSA non-compliant with CPAP respectively (p=0.01 for the trend). There were no significant differences when comparing the CPAP non-compliant group with those who were compliant or those with mild OSA.Of the 24 patients with no albuminuria at baseline and who had moderate to severe OSA (9 receiving CPAP and 15 not compliant with CPAP), 5 (33.3%) vs. 1 (11.1%) patients progressed to albuminuria over the follow-up period in the non-compliant vs. compliant group respectively (p=0.4).

SUPPLEMENTARY DATA

## Matched group analysis

**Supplementary Table 1.** Characteristics of the patients with and without OSA who were matched for key DN risk factors.

| | OSA – (n=59) | OSA + (n=71) | P value |
|---|---|---|---|
| Age (years) | 59.8 (8.6) | 62.2 (8.1) | 0.12 |
| Diabetes duration (years) | 12.0 (7.7) | 12.3 (7.7) | 0.84 |
| HBA1c (%) | 7.9 (1.4) | 8.1 (1.4) | 0.33 |
| Total Cholesterol (mmol/l) | 3.8 (0.8) | 3.7 (0.9) | 0.57 |
| Triglycerides (mmol/l) | 1.7 (0.9) | 1.8 (0.9) | 0.63 |
| MAP (mmHg) | 93.3 (11.3) | 96.1 (12.1) | 0.17 |
| BMI ($kg/m^2$) | 31.5 (7.5) | 31.1 (4.5) | 0.70 |
| Waist circumference (cm) | 106.3 (13.1) | 106.5 (9.3) | 0.96 |
| Insulin use | 39.0% | 50.7% | 0.20 |
| RAAS inhibitors | 71.2% | 71.8% | 0.94 |
| Lipid lowering therapy | 88.1% | 80.3% | 0.23 |
| Smoking (current or ex) | 45.8% | 33.8% | 0.16 |

SUPPLEMENTARY DATA

**Supplementary Table 2.** Participant characteristics in relation to CPAP status. Data presented as mean (SD). Categorical variables presented as number (% of CPAP status). RAAS: Renin-angiotensin-aldosterone system. Analysis performed using the Chi-square test for categorical variables, the independent t test for the scale variables.

| | CPAP non compliant (n=31) | CPAP compliant (n=16) | P value |
|---|---|---|---|
| Male | 25 (80.6%) | 10 (62.5%) | 0.3 |
| White Europeans | 19 (61.3%) | 21 (75.0%) | 0.4 |
| Age (years) | 62.3 (10.0) | 61.4 (7.5) | 0.7 |
| Diabetes Duration (years) | 15.1 (7.8) | 13.3 (8.5) | 0.5 |
| Body Mass Index ($kg/m^2$) | 35.6 (8.2) | 37.4 (8.8) | 0.5 |
| Waist circumference (cm) | 117.7 (14.1) | 117.1 (16.7) | 0.9 |
| Systolic blood pressure (mmHg) | 132.9 (20.6) | 130.8 (17.0) | 0.7 |
| Diastolic blood pressure (mmHg) | 77.2 (9.9) | 77.7 (6.6) | 0.9 |
| HbA1c (%) | 8.1 (1.4) | 7.7 (1.0) | 0.3 |
| Total cholesterol (mmol/L) | 3.6 (0.7) | 3.9 (1.1) | 0.3 |
| Triglycerides (mmol/L) | 2.1 (0.9) | 1.6 (0.8) | 0.06 |
| HDL (mmol/L) | 1.1 (0.2) | 1.3 (0.3) | 0.04 |
| AHI (events/hour) | 28.7 (16.8) | 41.5 (24.3) | 0.04 |
| Epworth sleepiness score | 10.8 (6.3) | 11.0 (4.5) | 0.9 |
| Smoking (current or ex-smoker) | 15 (48.4%) | 6 (37.5%) | 0.5 |
| Oral anti-diabetes treatment | 29 (93.5%) | 13 (81.3%) | 0.2 |
| Insulin | 19 (61.3%) | 7 (43.8%) | 0.3 |
| RAAS inhibitors | 24 (77.4%) | 14 (87.5%) | 0.4 |
| Diuretics | 13 (41.9%) | 7 (43.8%) | 0.9 |
| Anti-hypertensive agents | 28 (90.3%) | 15 (93.8%) | 1.0 |
| Lipid lowering treatment | 27 (87.1%) | 16 (100.0%) | 0.1 |
| Anti platelets | 26 (83.9%) | 10 (62.5%) | 0.1 |