Journal of
Clinical Medicine

MDPI

Table S1. Details of inclusion/exclusion criteria

Inclusion criteria	SAIL Study	CHAIN Study
Tobacco consumption	>30 packs/year	>10 packs/year
Age	55–75 years	>35 years
Informed consent	Yes	Yes
Diagnosis of COPD	Not a criterion	Postbronchodilator $FEV_1/FVC < 0.7$ after 400 μg of inhaled salbutamol
Exclusion criteria	None	Bronquiectasis not associated with COPD
Exclusion criteria for this analysis		Previous diagnosis of: • Obesity-hypoventilation syndrome • Neuromuscular disorder • Heart failure • Thoracic aorta aneurism • Interstitial lung disease • Resting Hypoxaemia

Chest CT scan

Measurements were made from axial CT images with the use of inspiratory acquisitions. The diameter of the main pulmonary artery (PAD) at the level of its bifurcation and the diameter of the ascending aorta (Ao) in its maximum dimension was measured using the same images (Figure E1).

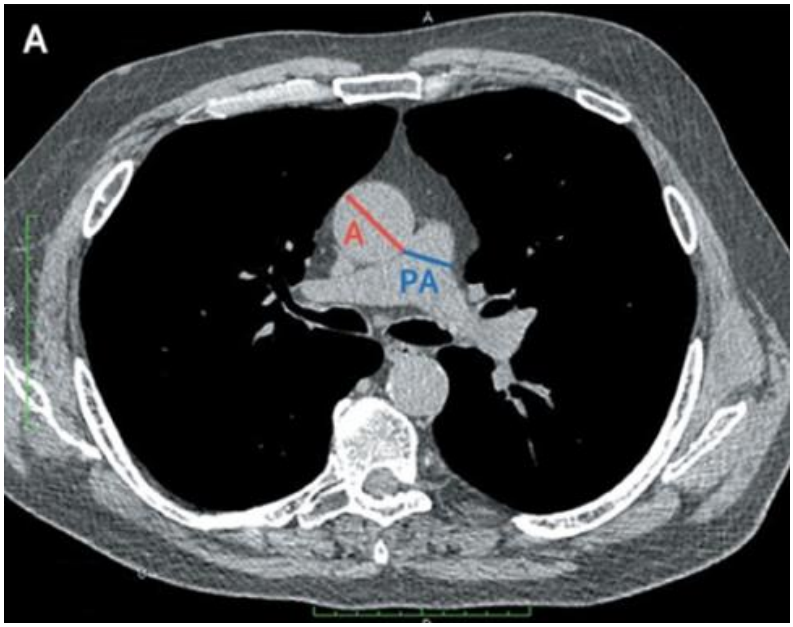

Figure S1. Measurement of the diameters of the main pulmonary artery (PAD) and aorta (AD). Figure shows trans axial chest computed tomographic at the level of the left and right main pulmonary arteries. The ratio of PAD and AD were measured at the level of the bifurcation of the main pulmonary artery.

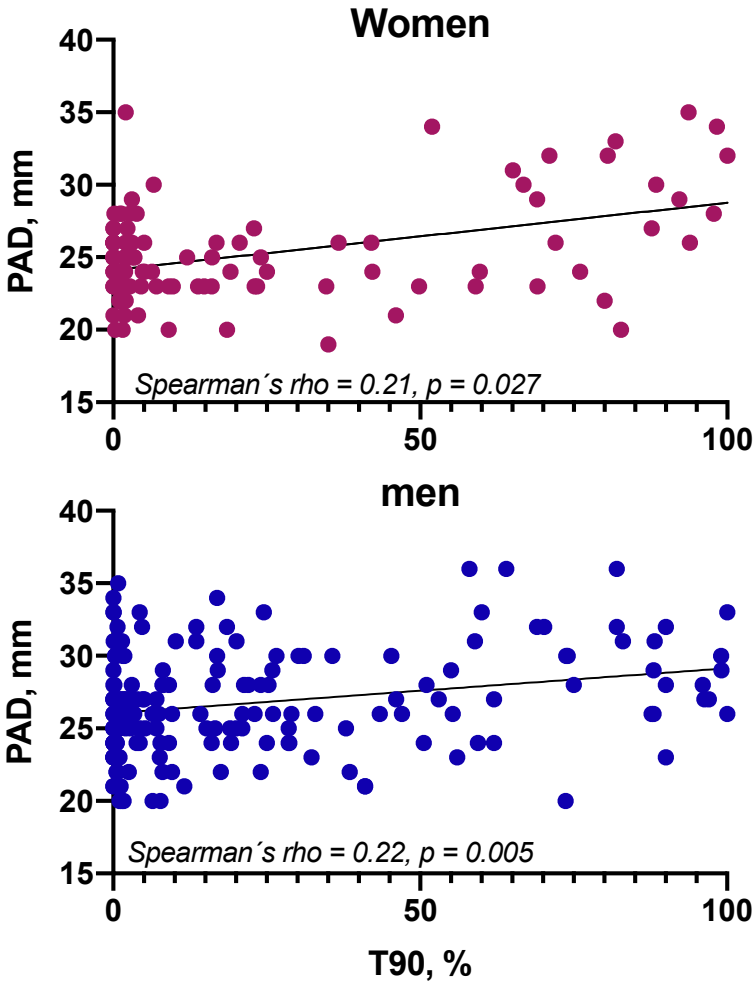

Figure S2. Relationship of percentage of time spend with SpO_2 < 90% during sleep recording (T90) with pulmonary artery diameter (PAD) in women (*upper panel*) and men (*lower panel*). Positive correlation was higher in men than women (Spearman's rank correlation coefficient).

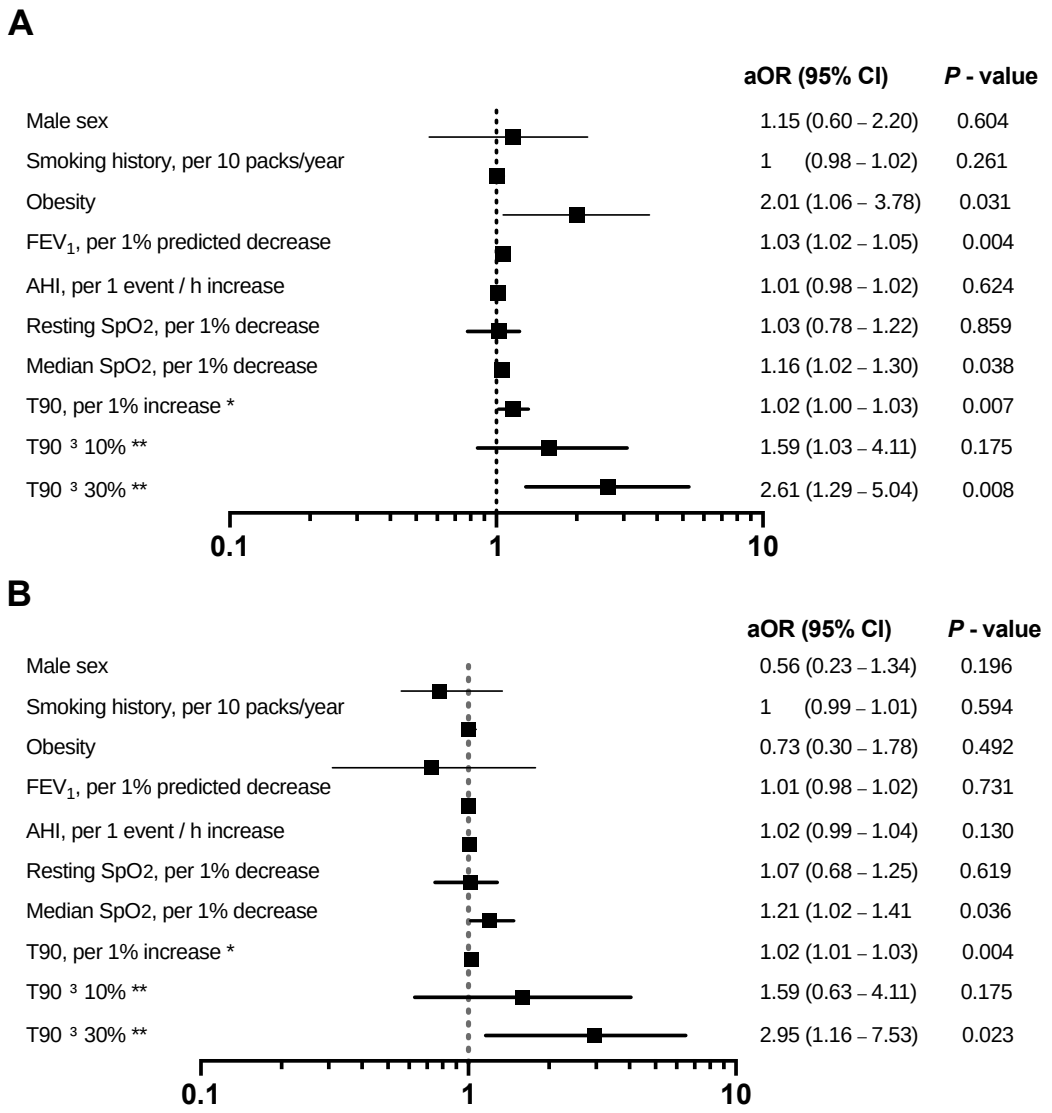

Figure S3. Forest plots of risk factors associated with pulmonary artery enlargement in participants without obstructive sleep apnoea as defined by the main pulmonary artery diameters (**A**) and by the PA:Aa ratio (**B**). Variables in the multivariate regression model included: age, gender, smoking status (current vs. ex-smoker), smoking history, obesity, FEV_1 % predicted, apnoea–hypopnoea index, resting O_2 saturation, T90 and centre site. Abbreviations: aOR = adjusted odds ratio; CI = confidence interval, FEV1 = forced expiratory volume in one second, AHI = apnoea–hypopnoea index; T90 = percentage of sleep recording time with oxygen saturation <90%. * OR estimates in the fully adjusted model instead of median O_2 saturation. ** OR estimates in the fully adjusted model instead of median O_2 saturation and T90.

Table S2 Characteristics of Participants in the SAIL and CHAIN cohorts *

Variable	SAIL Cohort (*n* = 210)	CHAIN Cohort (*n* = 74)	*p*-Value *
Male, *n*(%)	126 (60)	52 (70)	0.983
Age, years-mean (SD)	66 (6)	63 (10)	0.004
Smoking history			
Packs/year	45 (38–60)	40 (20–50)	0.001
Current smokers, *n*(%)	113 (54)	29 (39)	0.031
Body mass index, kg/m^2	28 (25–31)	27 (24–30)	0.563
Prevalent comorbidities, *n*(%)			
Hypertension	82 (39)	29 (39)	0.681
Diabetes	27 (13)	13 (18)	0.317
Hyperlipidemia	69 (33)	20 (27)	0.353
Coronary heart disease	17 (8)	11 (15)	0.093
Atrial fibrillation	13 (6)	6 (8)	0.570

COPD, *n* (%)	109 (52)	49 (66)	0.041
OSA, *n* (%)	127 (60)	38 (51)	0.174

Definition of abbreviations: SAIL = Sleep Apnoea in Lung Cancer Screening Study; CHAIN = COPD History Assessment in Spain; Post-BD FEV_1 = post-bronchodilator forced expiratory volume in the first second; COPD = chronic obstructive pulmonary disease; OSA = obstructive sleep apnoea as defined by an apnoea–hypopnoea index ≥ events·h $^{-1}$. Data are shown as median (interquartile range), mean (SD) or number (%). * *p*-value differences were assessed using t tests or Mann–Whitney test for continuous variables and Pearson's Chi tests for categorical variables.

Table S3. Characteristics of participants grouped by the presence of pulmonary artery enlargement as assessed by PA:Ao ratio *

Variable	All Subjects (*n* = 284)	PA:Ao Ratio ≤ 0.9 (*n* = 252)	PA:Ao Ratio > 0.9 (*n* = 32)	*p*-Value *
Male, *n*(%)	178 (63)	161 (64)	17 (50)	0.236
Age, years -mean (SD)	65 (7)	65 (7)	65 (6)	0.861
Smoking history				
Packs/year	42 (35–60)	42 (35–60)	43 (33–60)	0.623
Current smokers, *n*(%)	142 (50)	128 (51)	14 (44)	0.453
Body mass index, kg/m^2	28 (25–31)	28 (25–31)	28 (24–33)	0.681
Body mass index ≥ 30 kg/m^2, *n*(%)	91 (32)	78 (31)	13 (41)	0.283
FEV_1, % predicted -mean (SD)	84 (22)	85 (22)	77 (20)	0.031
COPD, *n*(%)	171 (60)	151 (54)	20 (63)	0.779
DL_{CO}, % predicted -mean (SD)	83 (23)	84 (22)	78 (25)	0.082
Epworth sleepiness scale	6 (4–8)	6 (4–8)	6 (3–9)	0.980
Apnoea–Hypopnoea index, events/h	11 (4–22)	10 (4–21)	13 (4–27)	0.319
OSA, *n*(%)	167 (59)	146 (58)	21 (66)	0.405
Oxygen desaturation index, events/h	10 (4–21)	10 (4–21)	13 (6–26)	0.127
Resting O_2 saturation, %	93 (92–94)	94 (92–95)	93 (92–94)	0.026
Median O_2 saturation, %	92 (90–94)	92 (91–94	90 (89–93)	<0.001
T90, %	6 (1–30)	5 (1–25)	27 (2–70)	0.009
T90 ≥ 10%, *n*(%)	119 (42)	100 (40)	19 (59)	0.033
T90 ≥ 30%, *n*(%)	71 (25)	55 (22)	16 (50)	0.001
% of lung with emphysema	3 (1–7)	3 (1–7)	3 (1–7)	0.995
Pulmonary artery diameter, mm	26 (24–28)	25 (23–27)	30 (28–34)	<0.001
Aorta artery diameter, mm	34 (31–37)	34 (32–38)	30 (29–33)	<0.001
PA:A ratio	0.76 (068–0.84)	0.75 (0.67–0.81)	0.98 (0.93–1.01)	<0.001

Definition of abbreviations: Post-BD FEV_1 = post-bronchodilator forced expiratory volume in the first second; COPD = chronic obstructive pulmonary disease; DLco = diffusing capacity of the lung for carbon monoxide; OSA = obstructive sleep apnoea as defined by an apnoea–hypopnoea index ≥ 15 events·h $^{-1}$ (events/hour); T90 = percentage of sleep recording time with oxygen saturation <90%; PA:Ao ratio = ratio of the diameter of the pulmonary artery to the diameter of the ascending aorta. Data presented as median (25th–75th percentiles), mean (SD), or number (%). * *p* value differences were assessed using t tests or Mann–Whitney test for continuous variables and Pearson's Chi tests for categorical variables.

Table S4. Association of patient profile of severity of COPD and OSA and pulmonary artery enlargement as assessed by pulmonary artery diameter or PA:Ao ratio.

Condition		Prevalence of Pulmonary Artery Enlargement (PAE)	
	Number (%)	PAE as defined by sex specific pulmonary artery diameter Number (%)	PAE as defined by the PA:Ao ratio Number (%)
COPD (*n*=171)			
GOLD 1	77 (45)	9 (12)	7 (9)
GOLD 2	75 (44)	26 (35)	11 (15)
GOLD 3–4	19 (11)	12 (63) *	2 (11)
OSA (*n*=167)			
Mild (AHI, 5–15)	57 (34)	14 (25)	6 (11)
Moderate (AHI, 15–30)	65 (39)	11 (17)	8 (12)
Severe (AHI > 30)	45 (27)	18 (42)	7 (16)

Definition of abbreviations: COPD = Chronic Obstructive Lung Disease; OSA = obstructive sleep apnoea as defined by an apnoea–hypopnoea index (AHI) ≥ 5 events·h $^{-1}$ (events/hour); PA:Ao ratio = ratio of the diameter of the pulmonary artery to the diameter of the ascending aorta.

Table S5. Univariate associations with pulmonary artery enlargement as defined by the diameter of main pulmonary artery.

	OR	95% CI	*p*-Value
Male sex	1.37	0.78–2.39	0.267
Age, per 1-year increase	1.02	0.98–1.06	0.272
Smoking history, per 10 packs/year	1.01	1.00–1.03	0.021
Current smoker	0.95	0.57–1.59	0.849
Body mass index, per increase of 1 kg/m^2	1.08	1.03–1.14	0.001
Obesity (body mass index ≥ 30 kg/m^2)	2.39	1.38–4.13	0.002
COPD	1.15	0.67–1.98	0.613
OSA	0.92	0.54–1.57	0.763
FEV_1 % predicted, per 1 % decrease	1.03	1.02–1.04	<0.001
DL_{CO} % predicted, per 1 % decrease	1.01	0.99–1.02	0.309
O_2 saturation at rest, per 1% decrease	1.21	1.06–1.35	0.007
Epworth sleepiness scale, per 1-point increase	1.07	0.99–1.15	0.083
Apnoea–Hypopnoea index, per 1 event/h increase	1.01	0.99–1.03	0.077
Oxygen desaturation index, 1 event/h increase	1.02	1.01–1.04	0.045
Median nocturnal SpO_2, per 1% decrease	1.24	1.15–1.32	<0.001
T90, per 1 % increase	1.02	1.01–1.03	<0.001
T90 ≥ 10 %, yes vs. no	2.62	1.53–4.51	<0.001
T90 ≥ 30 %, yes vs. no	3.98	2.23–7.11	<0.001
Lung volume with emphysema, per 1% increase	1.01	0.97–1.04	0.959

Definition of abbreviations: OR = odds ratio; CI = confidence interval; FEV_1 = post-bronchodilator forced expiratory volume in the first second; COPD = chronic obstructive pulmonary disease; OSA = obstructive sleep apnoea as defined by an apnoea–hypopnoea index ≥ 15 events·h $^{-1}$ (events/hour); DLco = diffusing capacity of the lung for carbon monoxide; T90 = percentage of sleep recording time with oxygen saturation <90%.