

PH and COPD

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John-David Aubert
CHUV Lausanne

CHEST[®]

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Predictors of Rehospitalization and Death After a Severe Exacerbation of COPD

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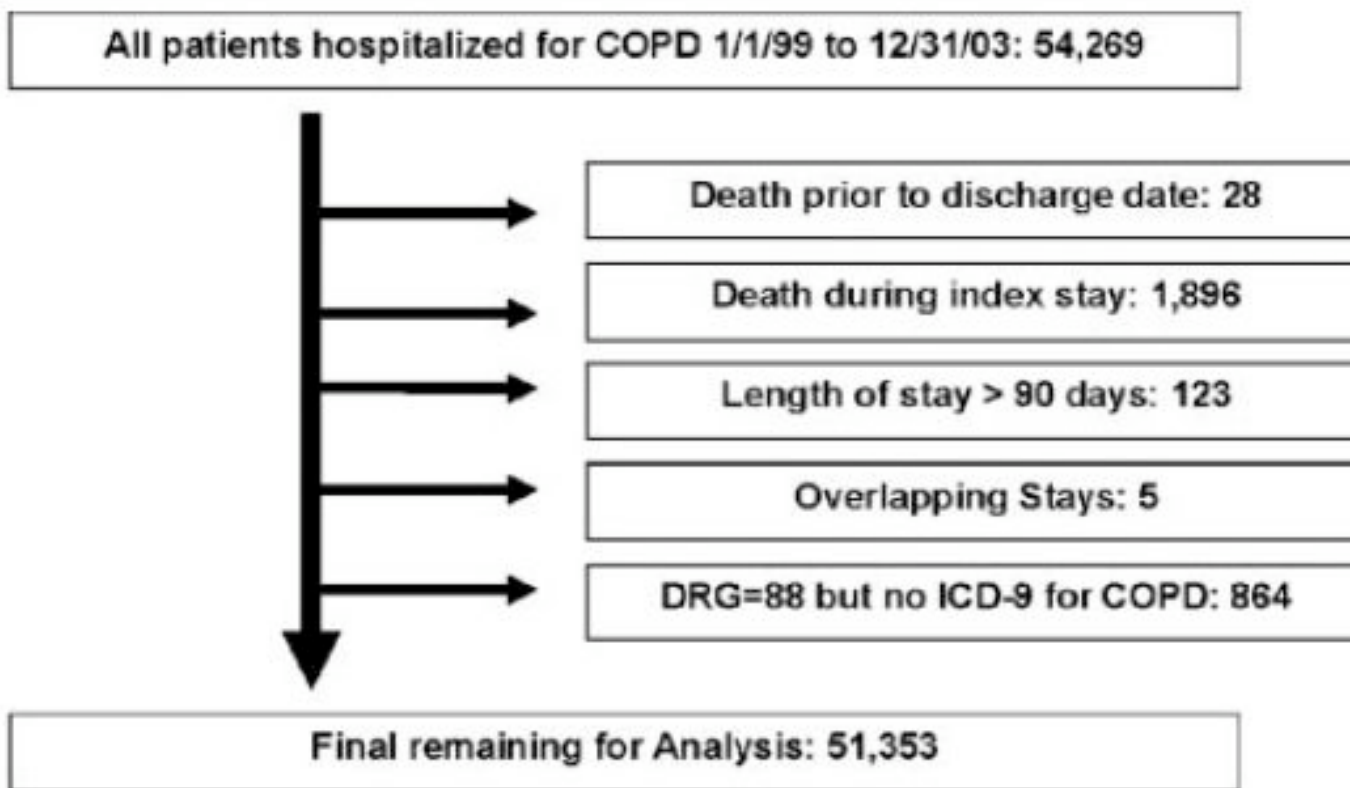


FIGURE 1. Cohort selection.

Table 2—Prevalence of Selected Comorbid Conditions

| Comorbidities | Prevalence, % |
|---------------------------------|---------------|
| Hypertension, uncomplicated | 42.8 |
| Heart failure | 20.2 |
| Diabetes, uncomplicated | 17.8 |
| Cardiac arrhythmia | 14.2 |
| Fluid and electrolyte disorders | 11.2 |
| Asthma | 9.2 |
| Depression | 8.5 |
| Alcohol abuse | 6.7 |
| Peripheral vascular disease | 5.3 |
| Solid tumor without metastasis | 5.1 |
| Obesity | 4.5 |
| <u>Pulmonary hypertension</u> | <u>4.4</u> |
| Weight loss | 3.1 |
| Hypertension, complicated | 2.3 |
| Diabetes, complicated | 1.6 |
| Metastatic cancer | 1.1 |

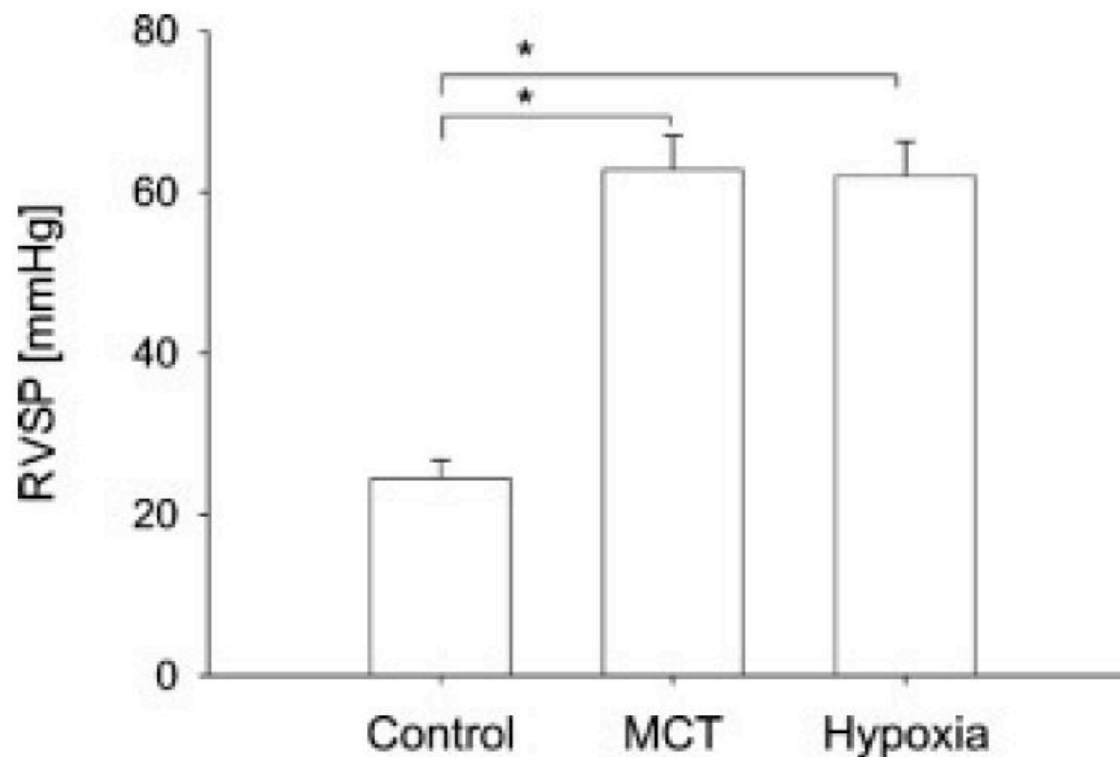
Table 3—Risk Factors for Death, Cox Proportional Hazards Model

| Risk Factors | HR (95% CI) |
|---------------------------------|------------------|
| Metastatic cancer | 2.57 (2.32–2.85) |
| Solid tumor without metastasis | 1.68 (1.60–1.78) |
| Weight loss | 1.49 (1.40–1.59) |
| <u>Pulmonary hypertension</u> | 1.36 (1.26–1.44) |
| Heart failure | 1.36 (1.32–1.40) |
| Male gender | 1.29 (1.17–1.42) |
| Prior COPD stays (per stay) | 1.14 (1.13–1.15) |
| Prior non-COPD stays (per stay) | 1.04 (1.04–1.05) |
| Age (per year) | 1.04 (1.04–1.04) |
| Asthma | 0.70 (0.66–0.74) |
| Obesity | 0.76 (0.70–0.82) |
| Other race/ethnicity | 0.80 (0.66–0.97) |
| Hispanic ethnicity | 0.80 (0.73–0.88) |
| Hypertension, uncomplicated | 0.88 (0.86–0.91) |
| Black race | 0.93 (0.89–0.96) |

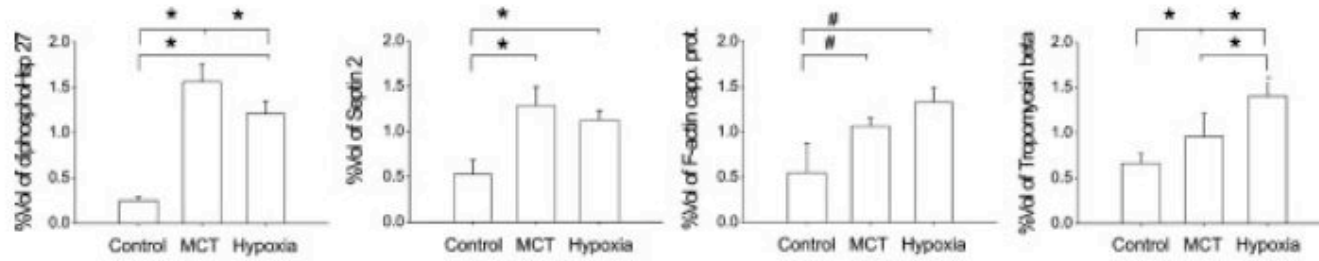
RESEARCH ARTICLE

Comparison of lung proteome profiles in two rodent models of pulmonary arterial hypertension

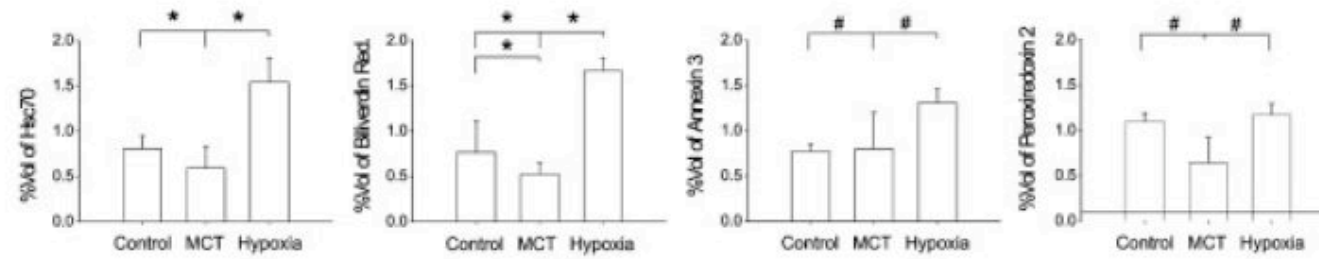
Sven Laudi^{1,2}, Wolfgang Steudel^{2,3}, Karen Jonscher², Wenzel Schöning², Björn Schniedewind², Udo Kaisers¹, Uwe Christians² and Saskia Trump²



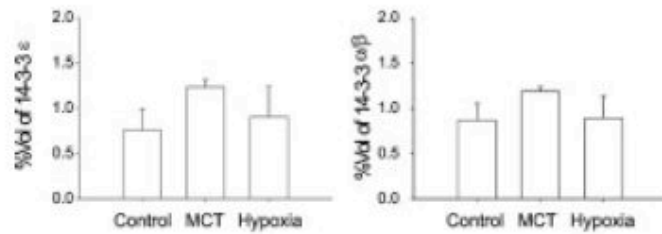
Contractile Apparatus



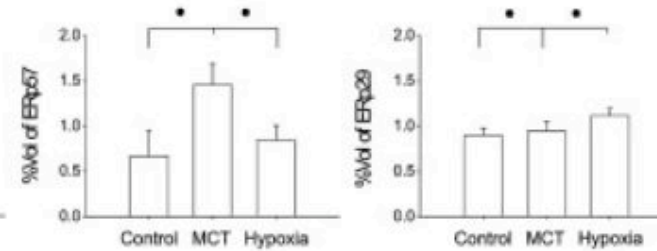
Hypoxia Affected Proteins



Serotonin-/Catecholamine Synthesis



Unfolded Protein Response



Serotonin-/Catecholamine synthesis

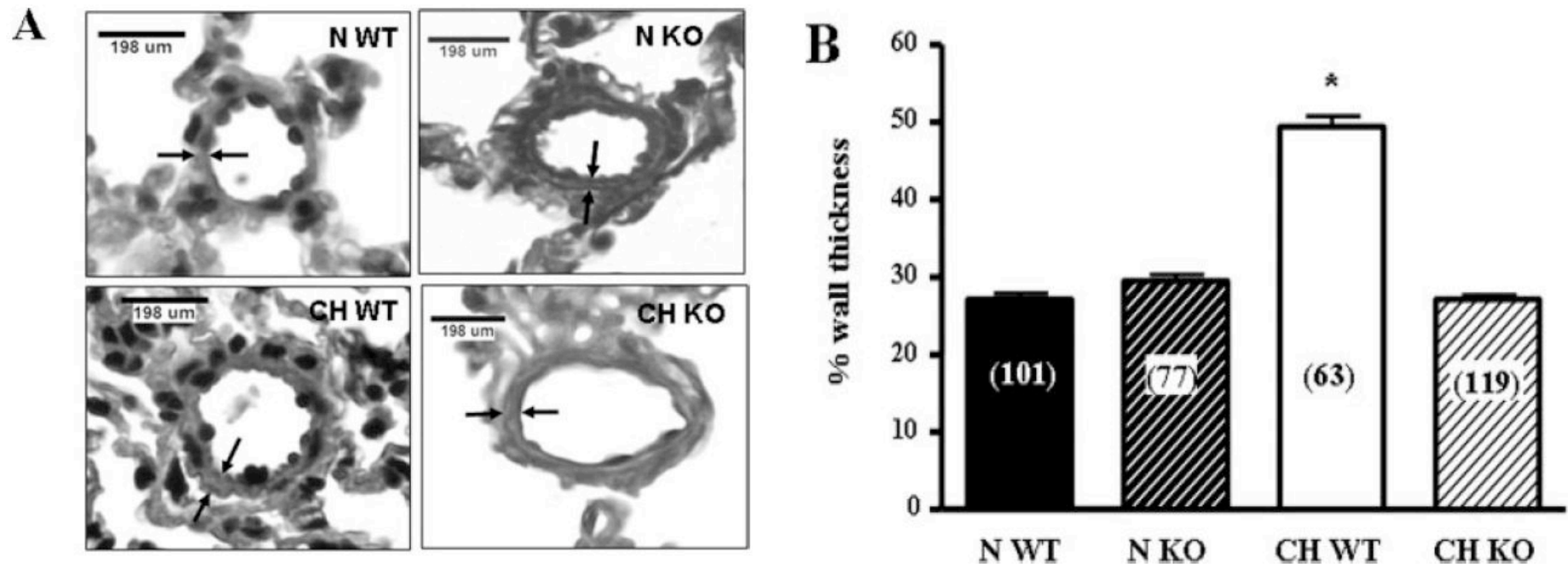


NFATc3 Mediates Chronic Hypoxia-induced Pulmonary Arterial Remodeling with α -Actin Up-regulation*

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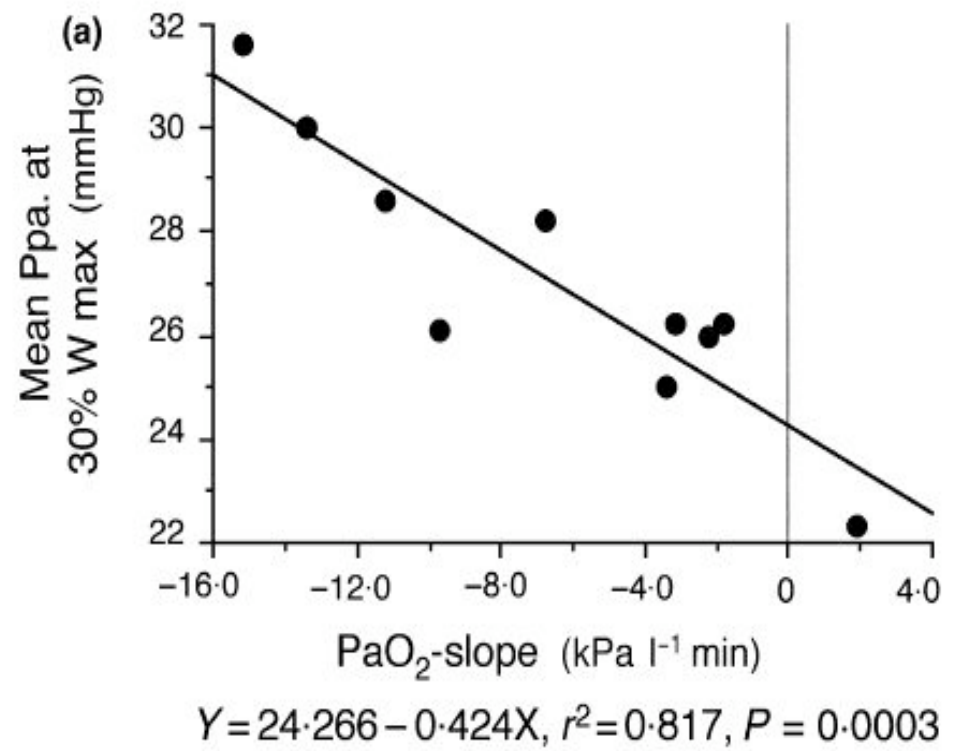
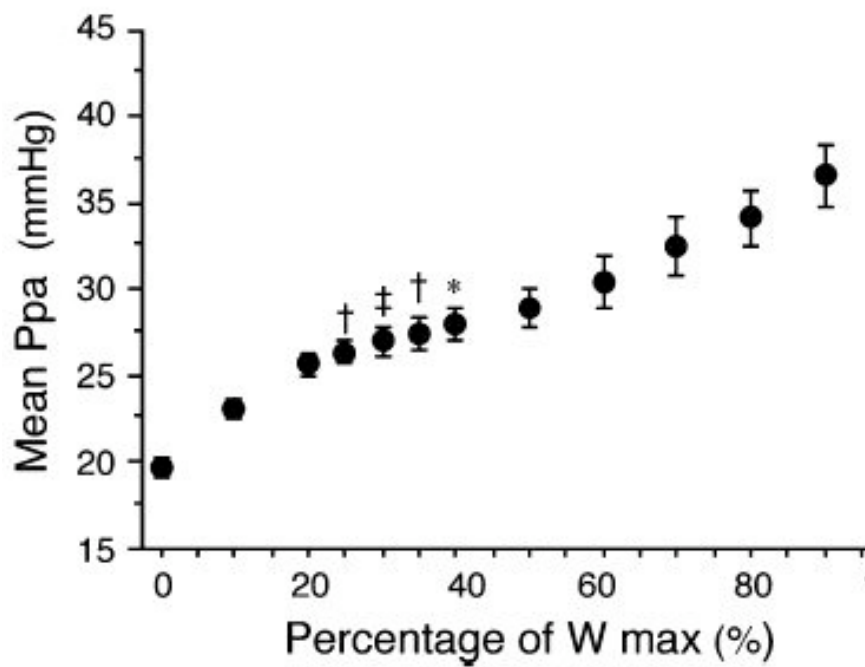
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The degree of exercise hypoxemia reflects pulmonary artery pressure during early exercise in chronic obstructive pulmonary disease patients

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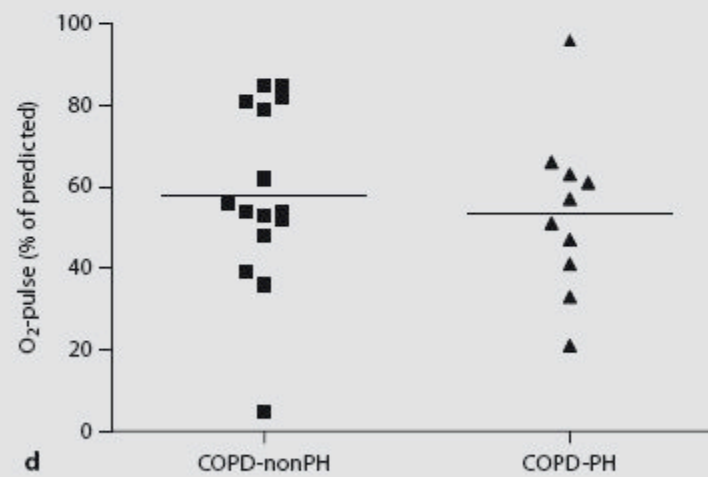
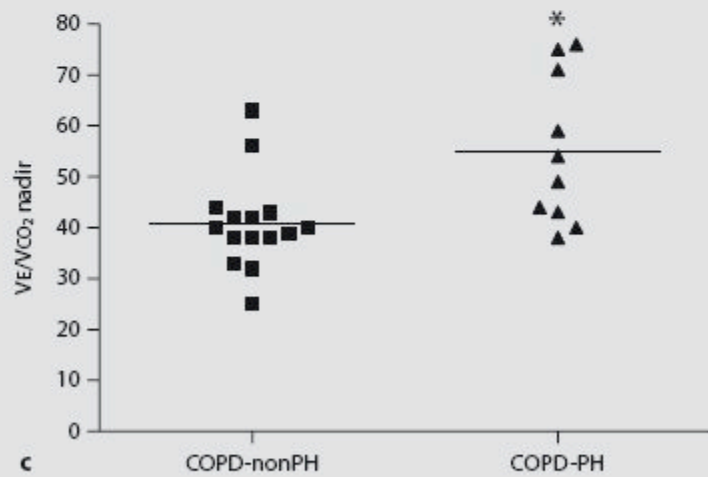
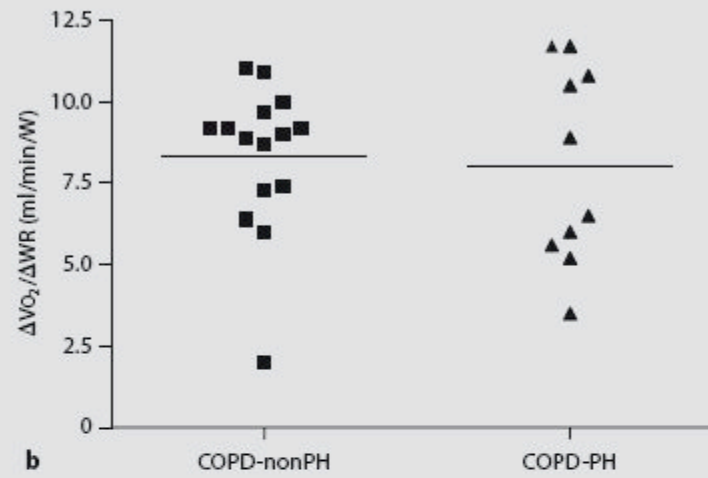
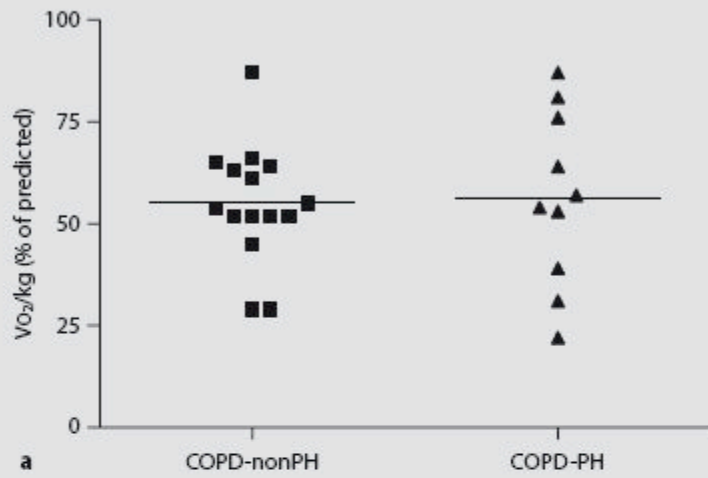
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Cardiopulmonary Exercise Test Characteristics in Patients with Chronic Obstructive Pulmonary Disease and Associated Pulmonary Hypertension

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Sildenafil treatment in COPD does not effect stroke volume or exercise capacity.

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Table 3 Stroke volume at rest and during exercise measured with MRI before and after treatment with sildenafil

| | Healthy controls n=8 | | COPD patients n=15 Pre-sildenafil | | After 3 months treatment with sildenafil | |
|-------------------|-----------------------------|-----------------|--|-----------------|---|-----------------|
| | Rest | Exercise | Rest | Exercise | Rest | Exercise |
| HR (beats/min) | 71 ± 8 | 96 ± 12 ‡ | 78 ± 13 * | 94 ± 15 ‡ | 79 ± 10 | 99 ± 8 ‡ |
| SV (ml/beat) | 81 ± 22 | 101 ± 28 ‡ | 62 ± 12 * | 70 ± 15 ‡ * | 64 ± 12 | 73 ± 21 ‡ |
| CO (L/min) | 5.7 ± 1.5 | 9.6 ± 2.6 ‡ | 5.1 ± 1.4 | 6.7 ± 2.0 ‡ * | 5.3 ± 1.4 | 7.3 ± 2.2 ‡ |

Values are means ± SD (n=15) HR = heart rate ; SV = stroke volume ;CO = cardiac output; ‡ P< 0.05 comparison of rest vs. exercise * P< 0.05 comparison of healthy versus controls.

| | Baseline | After 3 months treatment with sildenafil |
|--|----------------------|--|
| Workload max, W (% pred.) | 56 ± 28 (37 ± 17) | 56 ± 22 (39 ± 27) |
| Peak VO ₂ , ml/kg/min (% pred.) | 12.1 ± 3.6 (44 ± 11) | 12.4 ± 3.8 (46 ± 13) |
| HR max, beats/min (% pred.) | 122 ± 19 (79 ± 11) | 124 ± 14 (81 ± 7) |
| Peak O ₂ - pulse, ml/beat (% pred.) | 7.1 ± 2 (50 ± 18) | 7.4 ± 1.4 (53 ± 20) |
| Ve max, l/min (% pred.) | 38 ± 14 (67 ± 16) | 39 ± 15 (65 ± 15) |
| Ve/VCO ₂ slope | 46 ± 27 | 40 ± 17 |
| Ve/VCO ₂ at nadir | 51 ± 18 | 46 ± 15 |
| Δ VO ₂ /Δ workload | 8.4 ± 1.6 | 8.9 ± 1.9 |
| PaO ₂ mmHg- rest | 74 ± 13 | 72 ± 14 |
| PaCO ₂ mmHg- rest | 39 ± 6 | 36 ± 12 |
| SaO ₂ -% rest | 95 ± 2 | 94 ± 2 |
| PaO ₂ mmHg - exercise | 64 ± 17 | 64 ± 19 |
| PaCO ₂ mmHg - exercise | 42 ± 8 | 41 ± 6 |
| SaO ₂ -% - exercise | 89 ± 6 | 88 ± 6 |
| 6-MWD (m) | 385 ± 135 | 396 ± 116 |
| Borg-score | 6.4 ± 1.7 | 6.6 ± 2.2 |

Values are means ± SD (n=15) Pred, percentage of predicted value; Peak VO₂ = peak exercise O₂ uptake; HR = heart rate at peak exercise; Ve/VCO₂ = ratio of ventilation to CO₂; Δ VO₂/Δ workload = increase in VO₂ per increase in work rate; 6-MWD = six minutes walking distance.