54. COPD is not a pulmonary disease alone

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WITHDRAWN

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Endothelial dysfunction and systemic inflammation during acute exacerbations of COPD

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Background: Systemic inflammation is a potential determinant for the excess cardiovascular risk in COPD. Endothelial dysfunction, a marker of subclinical atherosclerosis correlates with circulating inflammatory markers in stable COPD. Acute exacerbations of COPD are characterized by a transient aggravation of systemic inflammation and might be accompanied by deteriorated endothelial function.
Aim: We aim to assess endothelial dysfunction and systemic inflammation during acute exacerbations of COPD and after clinical restitution.
Methods: We enrolled patients admitted to hospital due to an acute exacerbation of COPD. Study related procedures comprised spirometry, measurement of systemic inflammatory markers (i.e. C-reactive protein [CRP] and leukocyte count) and endothelial dysfunction by means of the flow-mediated dilation technique (FMD). The entire spectrum of measurements was scheduled within two days of hospital admission and thereafter when having confirmed clinical stability.
Results: We recruited 28 patients (female: n=20) during acute exacerbation. Baseline characteristics were as follows: age: 64±8 years, BMI: 24.6±5.9 FEV1: 36.5±12.1, %pred. During the acute exacerbations patients showed a median CRP of 7.0 (2.0-28), mg/l, leukocytes of 9.7±3.4 G/l and a FMD of 6.8±3.6% indicating severe endothelial dysfunction. After confirmed clinical stability we observed a decrease of systemic inflammation (CRP: 4.0 (2.0-7.0) mg/l; leukocytes: 8.2±2.9 G/l) and a simultaneous improvement in FMD (10.0±3.4%).
Conclusion: Our results indicate endothelial dysfunction in COPD patients. Furthermore, acute exacerbations deteriorate endothelial function in COPD, probably via aggravation of systemic inflammation.

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Low CT bone radio density is associated with adverse clinical features and increased coronary artery calcification in COPD

Elisabeth Romme[1], Lisa Edwards[2], MIchelle Williams[3], John Murchison[4], Martin Connell[5], Alvar Agusti[6], Stephen Rennard[7], Per Bakke[8], Frank Smeenk[1], Emiel Wouters[9], Erica Rutten[10], William MacNee[11]. *[1]Department of Respiratory Medicine, Catharina Hospital, Eindhoven, Netherlands; [2]Respiratory CEDD Discovery Medicine, GlaxoSmithKline, Philadelphia, United States; [3]Centre for Cardiovascular Science, University of Edinburgh, United Kingdom; [4]Department of Radiology, Royal Infirmary of Edinburgh, United Kingdom; [5]Clinical Research Imaging Centre, University of Edinburgh, United Kingdom; [6]Institut Clínic del Tòrax, Universitat de Barcelona, Spain; [7]Pulmonary and Critical Care Medicine, University of Nebraska Medical Cente, Omaha, United States; [8]Department of Thoracic Medicine, University of Bergen/Haukeland University Hospital, Bergen, Norway; [9]Department of Respiratory Medicine, University Hospital, Maastricht, Netherlands; [10]Program Development Centre, Centre of Expertise for Chronic Organ Failure, Eindhoven, Netherlands; [11]MRC Centre for Inflammation Research, University of Edinburgh, United Kingdom*

In addition to its pulmonary effects, COPD is characterised by extra pulmonary effects such as osteoporosis and cardiovascular disease. Accumulating evidence shows that osteoporosis and cardiovascular disease are related. However, data on this relationship in COPD are scarce. Therefore, we evaluated CT measured bone radio density and its relationship with coronary artery calcification score (CACS), as a marker for cardiovascular disease, in a well-characterised COPD cohort (ECLIPSE study).
Bone radio densities of T4, T7 and T10 and the CACS (measured as the Agatston and MESA scores) were assessed on chest CT scans in 1343 subjects (COPD n=998, 61% males, age 63.3±6.9yrs, FEV_1% pred 49.3±16.2; smoker controls n=228, 58% males, age 54.4±8.8yrs, FEV_1% pred 109.3±11.7; non-smoker controls n=117, age 53.3±9.0yrs, FEV_1% pred 114.7±13.6).

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Conclusion: Our results indicate endothelial dysfunction in COPD patients. Furthermore, acute exacerbations deteriorate endothelial function in COPD, probably via aggravation of systemic inflammation.

P209

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54. COPD is not a pulmonary disease alone

P207

WITHDRAWN

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P210

Coronary artery calcification in COPD is associated with adverse functional assessments and mortality

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COPD is associated with coronary artery disease (CAD). Coronary artery calcium score (CACS) can identify and stratify risk in CAD. We evaluated CACS and its relationship with clinical outcomes using non-gated chest CT in a well-characterised cohort of COPD patients (ECLIPSE study).

CACS (Agatston score) was assessed in 946 patients (COPD n=676, FEV1% predicted 48.7±16.1, age 63.2±7.0yrs; Smoker controls: n=199, FEV1% predicted 110.0±11.5, age 54.1±8.5yrs; Non-smoker controls: n=71, FEV1% predicted 114.4±13.8, age 54.7±9.2yrs). CACS was higher in COPD patients than smoker or non-smoker controls (415±689 vs 141.7±396.4 vs 66.6±228.5, p<0.001). When corrected for pack years, the calcium score percentile based on age, sex and ethnicity was greater in the COPD group (56.5±1.6 vs 40.5±2.8 vs 30.5±5.1, p<0.001). CACS in the COPD group correlated with age (r=0.40, p<0.001), pack years (r=0.20, p<0.001), function (6 minute walking distance (=-0.13, p<0.001) and mMRC dyspnoea score (r=0.11, p=0.006)) and some biomarkers (Interleukin 6 r=0.18, p<0.001; Clara Cell secretory protein16 R=0.18, p<0.001; Surfactant Protein-d r=0.11, p=0.006) but not with emphysema (% low attenuation areas), FEV1% predicted, exacerbation frequency or decline in FEV1. CACS and calcium percentile corrected for pack years were higher in those who died during 3 years follow up (65±(SD)23 vs 39±680, p=0.003 and 68±4.6 vs 57.2±1.5, p=0.027) and a significant association between high CACS and mortality was confirmed by a COX Proportional Hazards Model.

Thus in a cohort of COPD patients higher CACS was associated with poor function and increased mortality.

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Clinical impact of anaemia in patients with chronic obstructive pulmonary disease: Results from ECLIPSE study

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Anaemia is common in chronic diseases, associated with poor outcomes. In COPD, data on the effects of anaemia are scarce and inconclusive. We assessed the prevalence, incidence and clinical impact of anaemia in the ECLIPSE study,a large well characterised COPD cohort.

Methods: We included patients with haemoglobin (Hb) value at baseline and at least one measurement during 3-years follow-up. Anaemia was defined as Hb <13g/L in men and <12 g/L in women.

Results: In 2097 COPD patients (63±7 years, 65% men, postbronchodilator FEV1 48±16%) anaemia was recorded at baseline in 123 patients (6%, Hb 120.9±49.9 g/dl), who were older (67±7 vs 63±7 years, p<0.001), and had greater functional limitation as assessed by 6-minute walking distance, mMRC dyspnoea score, SGRQ and BODE index (p<0.05), than those without anaemia. They had greater cardiovascular, diabetes, peptic ulcer comorbidities (p<0.05) and had higher systemic levels of inflammatory markers (p<0.01). During follow-up, more patients with anaemia died (24% vs 9%, p<0.001),with no significant differences in FEV1 decline, exacerbation rates or hospitalizations compared to those without anaemia. New onset anaemia developed in 285/1974 (14%) of patients during follow up. These patients had a similar pattern of functional limitation, comorbidity and systemic inflammation as patients with anaemia at baseline, but had higher exacerbation rates and hospitalizations (p<0.05), but a similar proportion of deaths (9%).

Conclusions: In the ECLIPSE COPD cohort, anaemia was present or developed in 19% of patients and was associated with functional limitations and poor outcomes.

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Features of carbohydrate metabolism in patients with COPD

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Aim of the work: To evaluate carbohydrate metabolism in patients with COPD.

Materials and methods: In a randomized multicentral study cross evaluation of disease incidence in a group of patients with COPD (300 subjects) and diabetes mellitus 2 type (DM2) (400 patients) was performed. Sugar blood level was also analyzed by glucose tolerance test (GTT) in COPD patients in the age of up to 60 years with normal fasting sugar levels in a subgroup of nonobese patients (50 subjects) and in obese patients (17 persons). COPD patients did not receive steroid drugs or received them through inhalation in small doses, which were abolished 1-2 days before GTT. Population data served the control, and in GTT studies 45 patients within the age group up to 60 years with simple bronchitis and bronchial asthma were used as additional control, 30 of them were nonobese and 15 obese.

Results: In COPD patients DM2 incidence was 2.8 times above control data (p< 0.01), while COPD incidence in DM2 patients was similar to that in the control group (p>0.05). At the same time in both nonobese and obese COPD patients GTT figures exceeded control data by 1.5 times (p<0.001) and 2 times (p<0.005) respectively.

Conclusion: COPD is an important risk factor in developing glucose tolerance disorders and DM2 and requires their purposeful diagnostics and correction.

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Advanced glycation end products and its soluble receptor (sRAGE) are increased in chronic heart failure but not in chronic obstructive pulmonary disease

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The binding of the receptor for advanced glycation end products (RAGE) with its ligands begins a cellular activation and an inflammatory signal amplification in different diseases.

We determined the plasma levels of N(epsilon)-carboxymethyllysine (CML) and soluble RAGE (sRAGE) in chronic heart failure (CHF) patients, in cases with chronic obstructive pulmonary disease (COPD) and in healthy controls. We also investigated the associations between these biomarkers and the clinical and functional characteristics of the study populations.

The CML and sRAGE plasma levels were measured by using a sandwich enzyme-linked immunosorbent assay (ELISA) in 146 subjects, aged ≥ 65 years, divided into five groups: 58 with CHF, 23 with COPD, 29 with CHF and COPD and 36 controls (18 current or former smokers, and 18 never smokers). Individuals with diabetes were excluded from this study.

The CML and sRAGE levels were higher in CHF patients than in controls [CML: 1.9 (1.5-2.4) vs 1.6 (1.4-2.0) ng/mL; sRAGE: 0.51 (0.3-0.8) vs 0.41 (0.3-0.5) ng/mL; p=0.01]. By contrast, both CML and sRAGE were not different when the group with COPD and that with CHF/COPD were compared with controls (p>0.05). sRAGE positively correlated with N-terminal proBNP (Nt-Pro BNP) in the three patient groups: CHF (r=0.43, p<0.01), COPD (r=0.77, p<0.001) and in CHF/COPD (r=0.60, p<0.01).

In conclusion, subjects with CHF have high plasma levels of CML and sRAGE. The robust association between sRAGE and NT-proBNP concentrations might suggest a potential diagnostic and prognostic significance of this receptor in heart failure.

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Investigation of neuromuscular transmission in patients with chronic obstructive pulmonary disease: A preliminary report

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) is accepted as a systemic disease that affects all systems of the body. There is growing awareness about systemic inflammation and cardiovascular, neurologic, psychiatric, and endocrine comorbidities associated with COPD. Various studies of patients with CODP affecting both the central and and peripheral nervous system, either sequentially or simultaneously, have been reported by electrophysiological studies. Single-fiber electromyography (SFEMG) is an electrophysiological technique of great value in the assessment of neuromuscular disorders. The aim of study was to delineate any dysfunction of NMT by SFEMG in COPD patients.
Methods: Sixteen COPD patients without evident clinical signs of muscle involvement and 16 healthy controls underwent SFEMG. Ten to 20 different potential pairs were recorded and individual jitter values calculated. The results obtained from patients were compared with those from the controls.
Results: Of 201 individual jitter values of the patients, 15 (7.4%) were abnormally high, whereas only 1/165 (0.6%) jitter values from normal subjects were abnormal. Abnormal NMT was found in 6/16 (37.5%) patients, but in none of the control subjects.
Conclusion: Our study demonstrates that subclinical NMT abnormality is present in COPD patients. To our knowledge, this is the first study to explore NMT abnormality in patients with COPD, and we believe that further comprehensive studies are needed to clarify whether patients with NMT abnormality have different clinical/laboratory characteristics and prognosis than patients with normal NMT.

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The impact of bacterial colonisation on airway inflammation in stable COPD

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Culture-independent approaches are increasingly used for diagnostic microbiology. Quantitative PCR (qPCR) enables accurate assessment of bacterial load in sputum. We hypothesised that the degree of airway inflammation relates to bacterial load in colonised stable COPD patients and may increase over time.
Sputa prospectively collected from stable patients in the London COPD Cohort were analysed using qPCR, to detect *H. influenzae, M. catarrhalis* and *S. pneumoniae*, and ELISAs for sputum IL-1β and IL-8. 18 patients with bacterial colonisation (detection in two successive stable samples) were included.
Mean age was 71.1 years (SD 8.0), FEV_1 1.3L (0.5), FEV_1 predicted 51.0% (17.5). The mean interval between samples was 217 days (142).
Airway inflammation was higher with increasing sputum bacterial load (IL-1β: r=0.448, p=0.006; IL-8: r=0.513, p=0.001, figure 1).

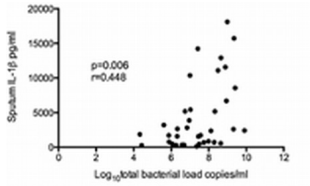

Figure 1a. Scatterplot of total bacterial load and sputum IL-1β

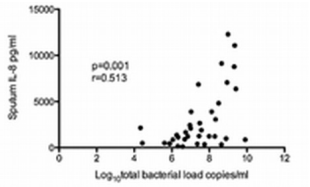

Figure 1b. Scatterplot of total bacterial load and sputum IL-8

There was no change in bacterial load or airway inflammation over time (table 1).

Table 1. Changes in bacterial load and airway inflammation over time

	Stable visit 1	Stable visit 2	p-value
Total bacterial load (Log_{10} copies/ml)	7.4 (1.5)	7.5 (1.3)	0.76
IL-1β (pg/ml)	4843 (5659)	3979 (4421)	0.26
IL-8 (pg/ml)	2876 (3461)	2919 (3166)	0.95

Bacterial load and airway inflammation are stable over time in successive samples. Increasing bacterial load, identified by qPCR, is associated with airway inflammation in stable COPD, suggesting the importance of airway infection in COPD pathogenesis.

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The evaluation of sensory gating with P50 paradigm in chronic obstructive pulmonary disease

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Objective: Chronic obstructive pulmonary disease (COPD) is a common preventable and treatable disease characterized by persistant airflow limitation in the airway. It is major cause of morbidity and mortality throughout the world. It is well known that COPD is associated with significant systemic abnormalities. Numerous neurological involvement like cerebrovascular diseases, motor neuron diseases and cognitive impairement has been reported in COPD. Cognitive dysfunction is usually associated with hypoxia or hypercarbia in these patients. We aimed to investigate the relationship between arterial blood gas analysis and pulmonary function test parameters with P50 sensory gating in COPD patients.
Methods: 25 male (mean age 65.16±9.95 years) patients with COPD and 17 healthy male controls (61.52±6.33 years) were included into the study. The diagnosis of COPD was defined according to GOLD guidelines. P50 and N100 measurements were taken, the suppression percentage of P50 and N100 was calculated.
Results: COPD patients showed significantly less P50 and N100 suppression when compared to healthy controls. P50 suppression percentage mean was 43.82±30.23 in COPD patients, and 65.21±15.77 in controls (p=0.012). N100 suppression percentage was 35.56±28.95 in COPD patients and 55.63±31.66 in controls (p=0.042).
Conclusion: We found reduced P50 and N100 suppression in COPD patients. This impairment is more clear in hypoxic COPD patients. Hypoxia leads to a decrease in cerebral perfusion and an impairment of some cognitive abilities. P50 sensory gating may be considered as a marker for cognitive decline in COPD patients. To our knowledge, this is the first P50 sensory gating study in COPD.

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WITHDRAWN

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FRAX program as a method of assessing the risk of osteoporotic fractures in patients with chronic obstructive pulmonary disease

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In patients with COPD have a high risk of osteoporosis.The most convenient tool to detect osteoporosis is a method of estimating the 10-year risk of osteoporotic fractures FRAX, proposed in 2008, JA Kanis.
Objective: To explore the practical application of FRAX method to assess the 10-year risk of osteoporotic fractures in patients with COPD.
Materials and methods: We examined 108 patients with COPD. The study group comprised men with long smoking history. Mean age 60,2±5,5 years. The study of respiratory function was performed on a multi-type installation "Master-Lab/Jaeger". The study of bone mineral density (BMD) of lumbar spine and proximal femur was performed by X-ray ab-sorbtsiometrii on densitometer "Lunar DPX-NT". Evaluation of ten major osteoporotic fracture risk and the risk of hip fracture was calculated using the computer program FRAX. To calculate the risk methodology used FRAX T-score femoral neck.
Results: In assessing the absolute risk of major common fractures associated with osteoporosis, using a computer program FRAX, revealed that the minimal risk of major fractures observed in patients with COPD 2 stage- 3,25, the maximum - in patients with COPD 4 stage -7,4. The maximum risk of hip fracture was observed in patients with COPD 4 stage- 4,5. Established reliable correlation values of ten osteoporotic fracture risk, estimated by the method of FRAX with BMI (r -0,62, p <0,01), with DLCO, (r -0,46, p <0,05), with BMD (r -0,86, p <0,05).
Conclusion: Patients with COPD stage 3 and 4 have a significantly higher risk of fractures compared with patients with COPD stage 2.

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The absolute risk of osteoporotic fractures according to the program of FRAX patients with chronic obstructive pulmonary disease

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Bone loss may be asymptomatic, and the first sign of osteoporosis are bone fractures. Assessment of absolute risk (AR) osteoporotichesih fractures in patients with COPD using the FRAX computer program is of great practical interest.
Objective: To examine the absolute risk of osteoporotic fractures by using FRAX method in patients with COPD.
Materials and methods: We examined 108 patients with COPD. The study group comprised men with long smoking history. Mean age 60,2±5,5 years. The study of bone mineral density (BMD) of lumbar spine and proximal femur was performed by X-ray absorptiometry at the densitometer "Lunar DPX-NT". Evaluation of ten osteoporotic fracture risk was calculated using the computer program FRAX. To calculate the risk methodology used FRAX T-score femoral neck.
Results: The assessment of absolute risk (AR) of all hip fracture patients were divided into 3 groups (AR <1, AR 1-3 and AR> 3). The maximum number of patients at high risk of hip fracture observed among patients with COPD stage 4 - 84,6% (p <0,05). In evaluating the 10-year probability of any major osteoporotic fracture patients were divided into 3 groups (AR <10, AR 10-20 and AR> 20). AR 10-20 major fractures in the stages 3 of COPD was observed in 15,68%, of patients with stage 4 COPD in 30,8%. These figures are significantly higher than the corresponding figures in patients with COPD stage 2 (p <0,05).
Conclusion: Assessment of absolute risk of fractures provides useful information to forecast the fracture in patients with COPD.

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Arterial stiffness and endothelial dysfunction in stable COPD patients

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Cardiovascular disease is common in COPD patients and is associated with poorer prognosis. Arterial stiffness (AS) is a validated measure of cardiovascular risk.
Aim: To assess AS and endothelial dysfunction (ED) in COPD patients, to determine thier association with other clinical and cardiopulmonary functional parameters.
Methods: We enrolled 41 COPD patients (64.5±7.6 yrs, FEV1 37.7±14.1%) and 34 normal control subjects (CS). Lung function, blood gases, six-minute walking distance (6MWD), nocturnal pulseoximetry, serum C-reactive protein (CRP) were measured. Assessment of AS was performed by use of digital photoplethysmography (Pulse Trace PCA 2 Micro Medical). Change in reflection index (RI) of the digital volume pulse in response to salbutamol (RISALB) and serum endotelin-1 (ET-1) were used to assess ED.
Results: In COPD patients stiffness index (SI) was higher than in CS: 11.3±3.3 vs 6.9±0.9 m/s, p<0.05. There were significant correlations of SI with FEV1 (r= 0.40), respiratory rate (r=0.44), BMI (r=-0.53), 6MWD (r=-0.53), pulse during sleep (r=0.50), CRP (r=0.47). RISALB was lower in COPD patients than in CS (1,15[0-10]% vs 11,50[6-19]%, p<0,05) and decreased according to COPD stages: GOLD II 5,85[2,15-13]%; GOLD III 1,65[-1,7-10,35]%; GOLD IV 0[0-2]%; p>0,05. The ET-1 levels were elevated in COPD patients and correlated with RISALB (r=-0.46, p=0.03). RISALB was significantly associated with mean nocturnal SpO2 (r=0.38), DLCO (r=0.45).
Conclusion: AS and ED are significantly impaired in COPD patients. Decreased FEV1, 6MWD and systemic inflammation were associated with ED. Hypoxemia, elevated ET-1 level and decreased DLCO have an association with both AS and ED.

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Evaluation of carotis intima media thickness in COPD patients

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Background: Chronic obstructive pulmonary disease (COPD) and atherosclerosis may occur due to similar risk factors and have a significant cause of morbidity and mortality. In this study to assess the relationship between COPD and atherosclerosis; carotis intima media thickness (CIMT) of COPD patients and adult healthy individuals with normal BMI and metabolic parameters compared.
Method: 2230 participants aged between 18 -92; 46 patients diagnosed with COPD according to clinical features and pulmonary function tests the study, 47 healthy controls who do not have exclusion criteria were evaluated. Doppler ultrasound was performed for the assessment of CIMT to all participants.
Results: Mean CIMT in COPD group and control group were 0.79±0.16 mm and 0.616±0.1 mm, respectively (p <0.001). In logistic regression analysis that made to determine the parameters affecting atherosclerotic; it was found that CIMT was related to age with direct proportion (p = 0.004) and to FEV1% with inversely proportion (p = 0.029).
Conclusion: Persistent low-grade systemic inflammation in COPD and atherosclerotic disease may possibly have been reported a factor in both pathologies. Early atherosclerosis and cardiovascular risks in adults with COPD increases independent of other risk factors. CIMT which shows direct proportion with age and inverse proportion with FEV1% is a non-invasive, easily applicable and cheap method that can be used in determining the risk of atherosclerosis.

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Myocardial injuries in patients with chronic obstructive pulmonary disease

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The purpose of this study is to determine a value of computer electrocardiotopography (CECTG) in myocardial injuries revealing in patients with obstructive pulmonary disease (COPD) and to determine hypoxemia role in its developing.
Materials and methods: We examined 62 male patients with COPD (15 – moderate, 28 – severe, 19 – very severe stages). CECTG method has been used in addition to common physical examination. This technique allows to evaluate condition of all heart's portions using multielectrode belt consisted of 65 unipolar leads, which should be consecutively applied to the frontal and right side of the chest, abdomen and the backside of the chest. Therefore, amount of monopolar leads increases to 260 electrocardiosignals. That allows estimating panoramic view of electrical field of the heart. 10 myocardial regions were detected with estimating terminal part of QRS complex. Patients have been devided into 2 groups by PaO2 level: first group (n=29) with PaO2>80 mmHg, second group (n=33) had PaO2<79 mmHg.
Results: CECTG method revealed significant generalization of the myocardial injuries in right ventricle as well as in the left one in patients with COPD (79.8%). Myocardial injuries were detected mostly in rite ventricle area and posterodiafragmatic area of left ventricle. In compare with standard ECG CECTG revealed myocardial injuries in 1,6 times often. Myocardial injuries in patients with hypoxemia has been detected significant more often (p<0,01) than in patient without hypoxemia.
Conclusion: CECTG method revealed myocardial injuries in right and left ventricle in 79.8% patients with COPD. Hypoxemia takes a definite role in injuries forming.

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The metabolic syndrome (MetS) in patients with chronic obstructive pulmonary disease (COPD) and its association with airway obstruction

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Background: The metabolic syndrome (MetS) is common in patients with COPD and is part of the so called chronic systemic inflammatory syndrome.
Aim: To investigate the presence of MetS in patients with COPD and healthy subjects and to assess the association of its components with airway obstruction.
Methods: We performed a cross-sectional study with 244 participants (mean age 60.5±9.5 years) divided into 2 groups: 141 subjects with COPD and 103 healthy matched controls. We measured the characteristics of the syndrome as stated by the IDF definition. Anthropometry and biochemical tests were performed, as well as spirometry to define the stage and severity of the disease.
Results: 41.8% of the COPD patients presented 3 or more features of the MetS versus 39% in the control group. Using multiple linear regression analysis we defined that the main predictor of MetS was the increased waist circumference (WC) (β=0.263, p=0.022). Among the MetS subjects, COPD patients had significantly higher WC compared to the controls (111.0±17.8 vs 104.0±12.4 cm, p=0.032). In COPD subjects with the syndrome BMI, WC, SBP, DBP, fasting blood glucose and triglycerides were significantly higher compared to those without MetS (p<0.01 for all), while HDL-cholesterol was significantly lower (p=0.017). In patients presenting MetS we also found a significant negative correlation between WC and FVC and FEV1% predicted (r= -0.291, p=0.011 for FVC and r= -0.327, p=0.004 for FEV1, respectively).
Conclusion: The present study suggests that the MetS is frequent among patients with COPD. The abdominal obesity measured as an increased WC is associated with the airway obstruction.

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Increased sympathetic nerve activity in COPD is associated with elevated morbidity and mortality

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Chronic obstructive lung disease (COPD) is characterized by systemic effects. Studies using microneurographic recordings and heart rate variability proved an increase in sympathetic nerve activity in COPD, which possibly contributes to progression and severity of the disease. Aim of this study was to investigate in a follow-up survey if increased sympathetic nerve activity is associated with elevated morbidity and mortality in patients with COPD.
Methods: Evaluations of the sympathetic nerve activity via microneurographic recordings were performed in two studies* in 1998/99 and 2005/06 at the Univer-

sity Medical Center Göttingen, including an overall of 20 patients with COPD (as published in AJRCCM 2001;164:597 and ERJ 2008;32:387). The study participants or their relatives were contacted via a telephone survey in the year 2010/11 and asked for the number of hospitalizations or date of decease of the participant. The results of the survey were correlated with the collected data of the past two studies.

Results: COPD patients who were hospitalized or deceased (n=12) compared to live patients without hospitalizations (n=8) show a significant increase in muscular sympathetic nerve activity (MSNA) in bursts/min (60,3 to 40,5; p=0,022), furthermore lower values in FEV1 (% pred) (39 to 54; p=0,035) and lower pO2 (69,12 to 78,04;p=0,025).

Conclusion: As well as other characteristics of COPD (decrease in FEV1, pO2) the increase in sympathetic nerve activity is likely to be associated with elevated morbidity and mortality in patients with COPD.

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