

High sensitivity cardiac troponin T levels are increased in stable COPD

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Materials and Methods

Study population. The index group consisted of 101 stable COPD patients selected from the hospital's outpatient clinic. Patients were classified as stable if they did not have worsening of their respiratory symptoms beyond normal day-to-day variation or change in medication at least three weeks prior to inclusion. The references consisted of 120 subjects, male or female, living in ten municipalities in the hospital's catchment area. They were invited after random selection from the National Population Registry. The age range of both cases and references was 40 to 79 years. The patients were considered stable if they had no exacerbations or change in their regular COPD medication at least 3 weeks prior to inclusion.

Measurements. The 99th percentile for hs-cTnT in a healthy reference population was 14ng/L, 95% confidence interval 12.7-24.9ng/L. The lowest concentration with a coefficient of variation (CV) less than or equal to 10% with the Elecsys Troponin T hs STAT assay was 13 ng/L. The Elecsys 2010 Troponin T hs STAT assay has a detection limit (LoD) of 5.0 ng/L and a limit of blank (LoB) of 3.0ng/L. NT-proBNP has a LoD of 0.6 pmol/L and IL6 has a LoD of 1.5 pg/ml. The analytical repeatability of the NT-proBNP method was 1,6% (level 14.6 pmol/L) and for the IL6 determinations the repeatability was 3.1% (level 12.1 pg/mL) (Roche Diagnostics, Mannheim, Germany). The limit of blank (LoB) for hs-cTnT is defined as the 95th percentile value from ≥ 60 measurements of analyte-free samples over several independent

series (Roche Diagnostics, Mannheim, Germany). Reversibility tests were performed among the cases (only) using 400 µg salbutamol. For comparison of data, we used pre-bronchodilator spirometry measures for the references and post-bronchodilator measures for the patients. Body mass index was defined as body weight (kg) divided with height-squared (m²). Smoking habits were expressed as current smoking (yes/no) and cumulative tobacco exposure expressed as packyears. Subjects who smoked or had stopped smoking less than one year prior to the study were classified as current smokers. One pack-year was defined as the time (years) elapsed between the investigation (current smokers) or the date of quitting and the date of commencement of daily smoking multiplied with the average daily consumption of cigarettes divided by 20 cigarettes.

Statistical analysis. The data for hs-cTnT, NT-proBNP and IL6 were highly skewed to the right. Measurements below the limit of blank (LoB) and the limit of detection (LoD) (21) were replaced with LoB/2 and LoD/2 (22). The following variables were included in the analysis: gender, age, body mass index, smoking habits (current smoking (yes/no) and pack-years), systolic blood pressure, heart rate, history of arterial hypertension, history of diabetes, use of statin, forced vital capacity (FVC), forced expiratory volume in one second (FEV₁), FEV₁/FVC-ratio, presence of pathological T- inversion and pathological Q-wave in the ECG, left ventricular hypertrophy (positive Sokolow-Lyon index), right ventricular hypertrophy (predominant R wave in V1, R/S amplitude ratio in V5 and V6 <1), neutrophils, IL6, NT-proBNP, creatinine and hs-cTnT. In addition we included COPD patient group A-D (including MMRC dyspnea scale, number of exacerbations within the last year and GOLD stage), arterial blood oxygen and carbon dioxide tension, diffusing capacity for carbonmonoxide (DLCO) and presence of p-pulmonale in the multivariate analysis among stable COPD patients. The final multivariate model included the following variables: gender,

age, IL6, presence of pathological Q-wave and presence of left ventricular hypertrophy and right ventricular hypertrophy.