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Lung alert

Effect of mild emphysema on left heart function

Severe chronic obstructive pulmonary disease is sometimes associated with cor pulmonale, impaired left ventricular filling and reduced left ventricular stroke volume and cardiac output with preserved left ventricular ejection fraction. However, whether similar changes occur in less severe cases of emphysema and airflow obstruction is unknown.

In this study the authors hypothesised that mild emphysema and airflow obstruction were associated with a decrease in left ventricular end-diastolic volume, left ventricular stroke volume and cardiac output. A total of 2816 individuals (13% current smokers, 38% former smokers and 49% never smokers) with normal lung function as well as airflow obstruction and CT evidence of emphysema were included. Patients with restrictive spirometry and clinical cardiovascular disease were excluded. Emphysema was measured quantitatively on cardiac CT scans, airflow obstruction according to ATS and ERS guidelines and left ventricular volume was determined by cardiac MRI.

After multivariate adjustments, significant associations were noted between left ventricular measurements and both percentage emphysema and the ratio of forced expiratory volume in 1 s to forced vital capacity (FEV_1/FVC). An increase in 10 percentage points in percentage emphysema was associated with a 4.1 ml decrease in left ventricular end-diastolic volume, a 2.7 ml decrease in stroke volume and a 0.19 l/min decrease in cardiac output. A decrease of 10 percentage points in FEV_1/FVC ratio was associated with decreases of 1.7 ml in left ventricular end-diastolic volume, 1.5 ml in stroke volume and 0.10 l/min in cardiac output. These associations were even stronger for current smokers. There were no significant associations between left ventricular ejection fraction and percentage emphysema and FEV_1/FVC ratio.

This study suggests that mild emphysema may be an independent and additional risk factor for cardiac disease. This may have implications for the way we screen and manage patients with mild emphysema.

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