COPD 2016: Should we treat chronic obstructive pulmonary disease as a cardiovascular disease?_William MacNee_University of Edinburgh, UK

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Chronic obstructive pulmonary disease (COPD) is characterized by a persistent limitation of air flow which is usually progressive and is associated with an abnormal inflammatory response in the lungs to harmful particles or gases. The natural course of COPD is complicated by the development of systemic consequences and co-morbidities that have important prognostic implications that influence morbidity and mortality. Cardiovascular comorbidities are one of the most common comorbid conditions affecting patients with COPD, and COPD is considered a risk factor for the development of atherosclerosis and the cardiovascular complications it causes. The expiratory volume in the first second of a forced expiratory maneuver (FEV1) is also known to be an independent predictor of cardiovascular complications of COPD. Even a moderate reduction in FEV1 increases the risk of morbidity and death from cardiovascular events by two to three times. COPD shares common risk factors with several cardiovascular diseases (ie smoking), but several mechanisms have been implicated in increasing the prevalence of cardiovascular comorbidity in COPD, including systemic inflammation and aging mechanisms. Cardiovascular comorbidities in patients with COPD are under-recognized and under-treated and should be actively investigated and treated according to standard guidelines. This overview review will discuss the increased incidence of cardiovascular co-morbidities and prognostic implications in patients with COPD. The pathogenic mechanisms of cardiovascular comorbidities in patients with COPD will also be examined and the management of cardiovascular comorbidities in patients with COPD will be discussed.

COPD is the fourth leading cause of death worldwide. However, in the United Kingdom and the United States, more COPD patients die from cardiovascular causes and lung cancer than from respiratory failure. These mortality statistics are supported by evidence from large COPD studies in which the cause of death has been carefully established.

In the lung health study, 25% of deaths were due to cardiovascular disease (CVD) (average age 50 years, FEV1% average expected 79), and in the study Towards a revolution in COPD health (TORCH), the proportion was 27% (mean age 65, FEV1% mean expected 44). In mild to moderate COPD, three times more hospital admissions in this group of patients are for cardiovascular causes than pulmonary, therefore, CVD morbidity is also high in patients with COPD.

The most obvious explanation for the high cardiovascular morbidity and mortality seen in COPD patients is the high prevalence among this group of smokers and other known risk factors for coronary artery disease, such as poor diet, a sedentary lifestyle and a low socioeconomic class. However, several large population-based studies have shown that predicted FEV1% is associated with cardiovascular risk, even after adjusting for known cardiovascular risk factors, including age, gender, smoking, cholesterol and level of education / social class. Surprisingly, the FEV1 predicted at 1% is associated with cardiovascular risk even in non-smokers. Another proof that the association between COPD and CVD is real, and not due to coding errors, comes from the study of measures of central arterial stiffness, a new technique for assessing cardiovascular risk. The heart generates a pressure wave that travels through the arterial tree. Healthy arteries conform causing a slow transit time for the wave, and in more rigid arteries, the pressure wave travels faster. Using non-invasive measurement techniques, the speed of the wave between two points can be measured. This measure (called the pulse wave speed) can be a better measure of cardiovascular risk than the blood pressure measured at the periphery because it more closely reflects the pathological state of the central arteries and seems to be better associated with the atheroma load. coronary arteries and known risk factors such as smoking.

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