PostScript

LETTERS

GOLD stage I is not a COPD risk factor

A retrospective analysis of data from the Cardiovascular Health Study (CHS) performed by Mannino *et al*[1] concludes that older adults with borderline abnormal spirometry results have an increased risk of death and hospitalisations related to chronic obstructive pulmonary disease (COPD). The all-cause mortality result from the analysis by Mannino *et al* merely confirms many previous reports.[2] However, the mechanism is not obstructive lung disease since the *vital capacity* (FVC), aptly named by British surgeon John Hutchinson more than 150 years ago, is a stronger predictor than forced expiratory volume in 1 s (FEV_1),[3] and respiratory muscle weakness accounts for much of the relationship.[4]

It is intuitive that patients with COPD must make a transition from normal spirometry to clinically relevant airway obstruction. However, only a small minority of adults with borderline abnormal spirometric results will ever develop COPD, regardless of their smoking status. For example, in the Lung Health Study, only 10% of the variability in the subsequent decline in lung function in continuing smokers was predicted by baseline spirometric results, even when bronchodilator responsiveness and airway reactivity were included in the predictive model.[5] Therefore, very few participants in the CHS whose FEV_1/FVC was *below* the middle quintile (falling into the arbitrary GOLD stage I) have ever developed COPD. In fact, chronic bronchitis, emphysema, asthma and dyspnoea (as reported at study entry) were not independent predictors of a subsequently more rapid decline in lung function in the CHS cohort.[6]

The paper by Mannino *et al* suggests that GOLD stage I predicted ''COPD-related'' hospitalisations. However, the medical records were not examined for spirometric test results. I believe that the vast majority of these hospitalisations were not due to an exacerbation of COPD. In one recent study only one-third of 800 consecutive patients with a discharge diagnosis of COPD had a spirometric test.[7] A history of chronic cough, dyspnoea on exertion and cigarette smoking in hospitalised patients is more likely to be associated with heart failure or pneumonia than COPD.

In CHS participants with a normal baseline FEV_1 (GOLD stage I), 11 years of follow-up was not sufficiently long for even the continuing smokers to have lost enough lung function to have developed a COPD exacerbation. Current smokers in the CHS lost an average of only 48 ml/year during the first 7 years of follow-up,[6] which extrapolates to a loss of only 0.5 litres after 11 years. The average baseline FEV_1 was 2.4 litres in men and 1.8 litres in women.

In summary, as the CHS investigator responsible for spirometric testing in this study, I am not convinced by the analyses of Mannino and colleagues that GOLD stage I spirometry was a risk factor for COPD morbidity or mortality.

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What defines abnormal lung function?

A major concern with the GOLD criteria for defining chronic obstructive pulmonary disease (COPD) is that the use of 70% as a fixed cut-off for forced expiratory volume in 1 s (FEV_1) will add a significant number of false positives compared with the use of a true lower limit of normal.[1 2] The recent paper in *Thorax* by Mannino *et al*[3] argues that this false positive rate is acceptable because they found that these false positive subjects had an increased hazard of death when compared with those with FEV_1 >70%. This finding is to be expected because a group with a less good level of lung function is being compared with a group with better lung function, even though both groups are within the normal range. For example, in the Copenhagen City Heart Study data, if the 8101 subjects whose FEV_1% in standardised residuals (SR) was >0 (ie, above predicted) are compared with the 1876 subjects whose FEV_1%SR was between 0 and −0.5, the latter have a hazard ratio (HR) for death of 1.09 (95% CI 1.02 to 1.17) (Dr Peter Lange, personal communication). If, instead, those above predicted are compared with the 1292 subjects with FEV_1%SR between −0.5 and −1.0, then the latter have a HR of 1.24 (95% CI 1.14 to 1.34). So these 3168 normal subjects have results for FEV_1% well within the normal range but have an increased HR for death when compared with that part of the population with the best lung function. This effect is even more true for FEV_1 itself.

Is it then justifiable to label an asymptomatic individual with a disease on the basis of spirometric parameters that are within the accepted normal range just because they have an increased risk of death? If this argument is further developed, then male sex is also a disease since life expectancy in men is lower than in women.

Labelling an individual as having a disease can have a bad psychological effect and, if there is as yet no proven treatment for the presumed condition, this is an even more unacceptable state of affairs. Disease has been defined as ''an impairment of health or a condition of abnormal functioning'' (www.hyperdictionary.com) and as ''a disorder of structure or function in a human, especially one that produces specific symptoms or that affects a specific part'' (Oxford English Dictionary). The current GOLD definition of COPD does not meet these requirements for defining this disease and must be changed. Researchers may need to find another term to describe their point of interest rather than labelling normal individuals incorrectly as having the disease COPD.

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Definition of COPD GOLD stage I

Chronic obstructive pulmonary disease (COPD) is an important disease from a public health perspective, with a number of preventable occupational, environmental and personal risk factors. The Global Initiative for Obstructive Lung Disease (GOLD) was implemented to raise awareness of COPD and to improve the prevention and treatment of this lung disease.[1] A concern has been raised regarding use of the criterion ''forced expiratory volume in 1 s/forced vital capacity (FEV_1/FVC) <0.70'' in the definition of GOLD stage I which may lead to overdiagnosis of COPD, particularly in older individuals.[2–5]

To address this controversy, Mannino and colleagues assessed COPD-related hospitalisations and mortality among 5201 individuals aged 65 years and older who had participated in the Cardiovascular Health Study.[6] The authors concluded that study participants they termed ''potentially overdiagnosed'' (those with FEV_1/FVC <0.70 who also had an FEV_1/FVC ratio above or equal to the lower limit of normal (LLN)) were more likely to die and to have COPD-related hospitalisations during the 11 year follow-up period than ''normals'' (those with FEV_1/FVC ⩾0.70 and FVC >80% predicted who were asymptomatic). Based on