

The value of slow vital capacity in diagnosing chronic obstructive pulmonary disease

Fortis *et al.* describe the utility of the slow vital capacity (SVC) in the diagnosis of spirometrically mild obstructive disease in patients who are current or former smokers compared with the traditional forced expiratory volume in one second/forced vital capacity (FEV_1/FVC) ratio. Current guidelines use FEV_1/FVC ratio and mild expiratory flow may not be recognised by using this criterion. Thus, individuals with features of chronic obstructive pulmonary disease (COPD) may not be diagnosed and treatment withheld. The FVC can underestimate the true vital capacity (VC) as airways collapse during the forced manoeuvre and SVC is probably a better reflection of the true VC in patients at risk for obstructive lung diseases.

The research question they sought to address was whether using the SVC rather than the FVC would increase the sensitivity of spirometry to detect mild obstructive air flow limitation. They included 854 current and former smokers from the Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS) cohort with normal spirometry (postbronchodilator $FEV_1/FVC > 0.7$ and predicted $FEV_1 > 80\%$) at enrolment. They compared baseline characteristics, chest computed tomography scan features, exacerbations and progression to COPD during the follow-up period. Most participants ($n=734$) had a post bronchodilator $FEV_1/SVC \geq 0.7$, and the remaining participants ($n=120$) had post bronchodilator $FEV_1/SVC < 0.7$ at enrolment. Participants with $FEV_1/SVC < 0.7$ were older, had a lower FEV_1 and more emphysema than those with $FEV_1/SVC \geq 0.7$. Participants with $FEV_1/SVC < 0.7$ had a greater percentage of emphysema (0.45%; 95% confidence interval (CI) 0.09 - 0.82), gas trapping (2.52%; 95% CI 0.59 - 4.44), and functional small airways disease based on parametric response mapping (2.78%; 95% CI 0.72 - 4.83) at baseline compared with those with a greater ratio. An

FEV_1/SVC ratio < 0.7 was not associated with total exacerbations (incident rate ratio (IRR) 1.61; 95% CI 0.97 - 2.64), but was associated with severe exacerbations (IRR 2.60; 95% CI 1.04 - 4.89) and with progression to COPD using the spirometry guide from the Global Initiative for Chronic Obstructive Lung Disease (GOLD).

In normal individuals with healthy lungs, FVC and SVC should be similar. In individuals with obstructive lung disease, FVC may be smaller than SVC. As a result, pseudo-normalisation of the FEV_1/FVC ratio may occur, which may lead to underdiagnosis of COPD in individuals who may benefit from treatment. Fortes *et al.*^[1] demonstrated that $FEV_1/SVC < 0.7$ increased the sensitivity of spirometry and they were able to identify those individuals with pathological features of COPD who were at risk of severe exacerbations and progression to COPD by the standard definition. Interestingly, many of these subjects were also receiving bronchodilator and inhaled corticosteroid therapy. The authors state that this category of individuals should be targeted for smoking cessation and that further research should determine if these criteria should be added to the GOLD parameters for COPD.

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1. Fortis S, Comellas AP, Bhatt SP, et al. Ratio of FEV_1 /slow vital capacity of < 0.7 is associated with clinical, functional, and radiologic features of obstructive lung disease in smokers with preserved lung function. *Chest* 2021;160(1):94-103. <https://doi.org/10.1016/j.chest.2021.01.067>