Preoperative PFTs: The answer is blowing in the wind

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As a member of the Quality Management Task Force of the Society of Thoracic Surgeons (STS), I studied with interest the work of Ivanov and colleagues in this issue of the *Journal*,¹ which asks the important question of whether pulmonary function tests (PFTs) (Figure 1) improve risk stratification before cardiothoracic surgery. This question has both practical and theoretical implications. Although not apparent in all published studies,^{2,3} preexisting pulmonary disease is generally associated with both increased operative risk^{4,5} and diminished long-term survival in patients who undergo cardiac surgery.⁶⁻⁸ In fact, there is a strong correlation between reduced lung function and cardiovascular disease, independent of age, smoking, and other obvious confounders, that awaits mechanistic explanation.^{9,10} Therefore, accurate preoperative evaluation of pulmonary function takes on both clinical and physiological significance.

It is this context that the question of how to best evaluate preoperative pulmonary function becomes compelling. Unfortunately, the study by Ivanov and colleagues appears to fall quite short of this challenge. Compared with the hundreds of cardiac surgical centers and hundreds of thousands of patients used to derive the 2008 Society of Thoracic Surgeons (STS) risk models, this study was derived from a single institution over 10 years with only 1618 patients available, and correspondingly very few endpoints on which to base the analysis, which almost certainly was underpowered. The data appear to have been collected initially to satisfy New York State cardiac surgery reporting requirements, then modified to satisfy STS definitions. The endpoint definition for prolonged ventilation in the current study is quite different than that for which the STS risk model was developed (72 hours vs 24 hours), as is the mortality endpoint (30 days or in-hospital for STS vs apparently only 30 days for the current study). These factors likely account for the relatively poor discrimination of the STS risk models in the current study population compared with that in the considerably broader STS population. The specific definition of chronic lung disease applied to the patients in the study is not clear, and that attributed to the STS in Table 1 is incomplete,

PFTs.

Central Message

The incremental value of pulmonary function tests in assessing cardiac surgical risk remains to be determined.

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lacking PFTs, which are integral to that definition. PFTs were available for only approximately one-half of the patients, and in the vast majority of these patients were limited to bedside spirometry, which is not accepted in the STS criteria. Finally, improvements in area under the curve values are generally considered an inadequate major criterion for determining the value of added components to a risk model.¹¹

The shortcomings of this study provide no assurance that the question raised in the opening sentence has been adequately addressed. Indeed, neither the EuroSCORE I or II¹²⁻¹⁴ nor the New York State risk calculators for coronary or valvular surgery^{15,16}—all of which address operative mortality only—include PFTs in their risk models. Nonetheless, the ability of PFTs to reclassify chronic obstructive pulmonary disease (COPD) status in a substantial number of patients before cardiac surgery, through both identification of unrecognized disease and demonstration of the absence of airway obstruction in patients previously labeled as having COPD, is of concern, especially when one considers that it was this degree of PFT-defined airway obstruction that correlated with mortality.¹⁷ Is it possible that clearer, more universally accepted and carefully considered criteria for the diagnosis would eliminate the need for PFT testing in the evaluation of operative risk? Is spirometry sufficient, or should the evidence that diffusing capacity has an independent and incremental impact on postoperative mortality compel us to

FIGURE 1. Pulmonary function tests.

measure that as well?¹⁷ Are there mechanisms involved that transcend the intuitive association with pulmonary complications? Ivanov and colleagues are to be thanked for raising an important question; however, the answer awaits a more definitive and convincing evaluation.

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